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Informal Recreation in Upland Britain: A Comparative Study of Two Sites in Lancashire

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Preface

INFORMAL RECREATION IN UPLAND BRITAIN

The use of an area for informal recreation will have long-term environmental effects, particularly on the vegetation. Changes associated with large numbers of visitors may be plain to see, but less noticeable changes induced in areas of lower use may be just as important to the preservation of the natural habitat; such changes may be difficult to detect without expensive and time-consuming research.

The degree of change permissible will vary according to the type of site, the value of the habitat, and the insistence of the demand for access. Control of vegetation change requires an understanding of the background environment and the ecology of the site, as well as an anticipation of the probable effects of recreation use and some means of influencing visitor activity and distribution.

Identification of indicator species for general application has so far proved inconclusive. The uncertainties surrounding the changes induced by recreation use are further complicated by the fact that many of our informal sites occupy areas of semi-natural sub-climax vegetation. Such vegetation may be worthy of preservation in its own right, but management of seral communities requires careful monitoring and control, and may not lend itself to a recreation programme.

The desire to protect certain habitats from destruction and extinction has led to the development of a system of protective designations, such as Nature Reserves and Sites of Special Scientific Interest. Vegetation not so designated may still be valuable wildlife refuges, as well as providing attractive settings for informal recreation. The problem is to control the distribution of visitors so that their very numbers do not destroy the countryside they come to see. The contemporary solution lies in various schemes for zoning; the basic idea being an hierarchy of sites, divided according to attractiveness, vulnerability and capacity. Such a scheme will only be successful if the sites can consistently attract visitors within the prescribed numbers and uses.

This study will concentrate on two sites within such a scheme in Lancashire. The major landscape attraction of the areas is the Forest of Bowland Area of Outstanding Natural Beauty. The sites investigated represent the two extremes of management: an informal, uncontrolled site within the designated area of AONB (the Trough of Bowland), and a formally planned site managed for countryside recreation, located on the fringe of the designated area (Beacon Fell Country Park).

The importance of preserving certain habitats and the relevance of theoretical studies of vegetation change is considered. An attempt is made to devise a means of objectively relating vegetation disturbance and trampling pressure, with a view to predicting likely changes in areas of new use. An assessment of contemporary changes on the heavily used recreation site led to a consideration of the importance of the vegetation community in the perception of landscape, and of the importance of landscape in the recreation experience. It became clear that the reaction of visitors to the site was related to the general form of the vegetation, but apparently not to the specific detail of species or structure. A comparative study involving the two contrasting sites is made in an attempt to elucidate this point.

The function and use of the two sites is examined by a detailed visitor survey, involving observation of distribution and activity, and an investigation of opinions and attitudes by questionnaire. The pattern of use of two picnic sites is analysed in an attempt to evaluate the landscape features influencing site choice, and specific location in relation to fixed features and other groups already present. The sites chosen demonstrate how such features may be used to modify the perceptual capacity of a site, thus allowing an increase in density where necessary, without loss of visitor satisfaction.

An analysis of the characteristics of the visitors and their activities is linked to an interpretation of site perception and use. It would seem that Beacon Fell Country Park is a very successful site. In spite of being partly landscaped plantation, it is fulfilling the desire of many visitors for a natural countryside setting. However, evidence suggests that it is not fulfilling its official planning aim; that is, to act as a filter for Bowland AONB. The implications of this finding are discussed.

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Sources: All data from original survey work unless otherwise stated.

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ABBREVIATIONS USED IN THE TEXT

AA	Automobile Association
AONB	Area of Outstanding Natural Beauty
CC	Countryside Commission
CP	Country Park
CRRAG	Countryside Recreation Research Advisory Group
CRC	Countryside Review Committee
LCC	Lancashire County Council
NCC	Nature Conservancy Council
NP	National Park
NOP	National Opinion Polls

Chapter One

INTRODUCTION: Informal Recreation in the Lancashire Countryside

In the course of the last fifty years there have been many social and economic changes causing, and caused by, a transformation of the geography of the United Kingdom. The vast majority of the population is now urban based, with over 40% living in the seven major conurbations (HMSO 1980). Only 3% of the workforce is directly engaged in the primary sector; for the rest, the countryside is a place of holidays and retirement, the background of recreation rather than a workplace in its own right. The processes of urbanization and industrialization have made successive demands on our land resources, with a conversion of approximately 16,000 hectares per year in the 1960s (House 1977). The remaining rural areas are under increasing pressure from agricultural intensification, forestry and water resource development. The conflicts mount by the year, reflected in the proliferation of lengthy planning enquiries; with massive projects, such as the development of a third London Airport, or the mining of the Vale of Belvoir, concern for protecting the beauty of the countryside is only one of many issues. However, the importance of conserving the natural countryside, for its amenity value, as a wildlife refuge, and for recreation, has been recognised in various government moves, the most significant for the last being the National Parks and Access to the Countryside Act (1949) and the Countryside Act (1968).

Recreation is only one of many countryside activities; its demand on land resources is relatively limited, although the need for a suitable setting may extend influence far beyond the area actually used. A distinctive feature of this activity is the involvement of large numbers of people, most living some distance away from the focus of activity - indeed, the journey itself may be an important part of the experience. Specific activities may involve lengthy walks across open moorlands, or sporting activities at lake or river banks, but by far the most significant in terms of numbers are the "passive" recreationists, who may seek only a pleasant view and a quiet place to picnic. In a recent home based survey*, only 9% of respondents reported taking part in organised outdoor sports in the previous month, whereas 54% had been on at least one countryside trip. Of those visiting the countryside, the most popular "activities" were the passive ones: drives, outings and picnics (Stoakes 1979).

The concern of geographers in the study of recreation patterns was prompted by the realisation of the growing importance of such activities in terms of the demand for access to land and the use of resources. The recreation geography of Britain has undergone fundamental changes; the widespread use of the motor-car has transformed the map of recreation supply and demand, releasing the spatial confines of public transport to selected resort towns (Patmore 1970). The impact may be seen in the profusion of recreation facilities, from permanent amusement parks along the seashore to the ice-cream vans on mountain roadsides, from carefully designed toilet blocks to "rustic" picnic tables. It may now be the case that these features are so much taken for granted that it is their absence, rather than presence, that is noted by the casual visitor; it is left to the long-time resident to lament the changes and remember the prospects uncluttered by the paraphernalia of a mobile public.

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* National survey carried out by NOP for the Countryside Commission

Perhaps more significant are the changes that are taking place literally underfoot, the insidious wearing away of the land surface. Physical erosion may be caused by many factors, some specific to a locality (as in trampling pressure on the Pennine Way), others more general (as in the nineteenth century air pollution affecting the growth of Sphagnum on the Pennine bogs) (Phillips et al. 1981). It may be very difficult, and is perhaps unnecessary, to attribute blame accurately, but the spatial concentration of recreation activities can leave little doubt as to the impact of people en masse, whether the pressure is exerted on Blackpool Beach or Snowdon Summit.

The concern of recreation geographers has followed the focus of activity. In terms of visitor numbers, the coastal resorts and urban parks demanded early attention (e.g. Wall 1972; Burton, T.L. 1967), but the wash of Dower's fourth wave quickly reached the research rooms, resulting in a flood of reports on the impact of motorists in more inaccessible places (e.g. Burton, R. 1974; White and Dunn 1974). The introduction of specially designed sites for countryside recreation after the 1968 Countryside Act inevitably singled out the new Country Parks and Picnic Sites, even as the earlier legislation had drawn attention to the larger area of the National Parks. However, the new sites of the 1968 Act were not to be an end in themselves, but part of a growing recreation strategy; research shifted from the description of individual sites to an assessment of regional demand (e.g. Settle 1977).

This study is concerned with the development of a recreation strategy in Lancashire, with particular reference to the recreation use of the Forest of Bowland Area of Outstanding Natural Beauty. The current financial constraints and lowered demand expectations have caused modification of original plans. The report traces the development of the strategy, concentrating on the operation of two sites in the middle years of the 1970s. A plan for recreation activity in Bowland is being prepared by the Local Authority, thus although their action to date may be interpreted as building a recreation strategy, it owes much to intuitive decisions over supply and estimations of demand.

The North West Region provides a suitable base from which to study recreation supply and demand, and the activity of the Sports Council has provided valuable initial information (Patmore and Rodgers 1972; Settle 1977). The North West is a comparatively large region, with great internal contrasts; the large population (6.5 million in 1974) is concentrated in the south, between the Ribble and the Mersey (5.9 million) (House 1977), leaving the northern area relatively unpopulated. It is a region of slow economic growth, many problems being associated with the rundown of the traditional industries of the Pennine towns. Efforts by the councils to improve the environment have involved projects of urban renewal and redevelopment of derelict land. The 1970s saw a growing awareness of the need for recreation space and the improvement in the environment such provision could represent. The efforts of the transport planners, although designed to promote industrial development and ease the journey to work, had brought the more remote areas of North Lancashire within reach of an easy day trip for the massed urban population of the south (Figure 1.1).

Figure 1.1 The NW Economic Planning Region: major built-up areas and communications

The demands of these people, both real and potential, led to ambitious ideas for recreation provision. Lancashire County Council was one of the first to take advantage of the 1968 Countryside Act, setting up Country Parks, Picnic Sites and new footpaths. A recreation officer was appointed to the planning office, and the estates office co-ordinated management of the new recreation sites.

The most recent structural planning document to be published is concerned with the central and northern part of the area (Lancashire CC 1981). The plans designed to take the region into the 1990s build on the strategies of the 1970s, but with significant changes reflecting the economic problems of the recession. The expected growth rates have been reduced, and ambitious new development schemes replaced by a more conservative emphasis on consolidation. The overall objectives remain, being 'the improvement of the physical and economic environment of the older industrial towns and cities and the creation of a wider and better range of employment opportunities' (ibid., 4). A significant point is the avoidance of greenfield sites, with reliance on fringe, infill and redevelopment possibilities.

In spite of the difficulties of planning at a time of recession, a particular case is made for the needs of conserving and enhancing the natural landscape, with explicit reference in twelve of the seventy-one policy statements. The need to expand recreation facilities is given similar importance, and the advantages of co-ordinating policies with the adjoining regions stressed. The potential revenue from tourism leads to a greater emphasis on this sector, with particular reference to the resorts on the Fylde coast, but the possibilities of inland areas and the needs of the local residents are not overlooked.

'The attraction of tourists to the rural areas is seen as a valuable bolster to the rural economy by supplementing local incomes and helping to retain facilities such as shops and filling stations which might otherwise be incapable of support solely by the indigenous population' (ibid., 118).

With the loss of the Southern Lake District to the North Region and the North West Peak District to the East Midlands in 1974, the Forest of Bowland is the only extensive area of protected landscape in the region; it is identified as one of the 'more environmentally sensitive areas' (ibid., 5) in need of special attention. The importance of protecting the fringe areas is also stressed, although considered to be 'generally well managed', their vulnerability is evident.

The report recognises the difficulty of forecasting countryside recreation demand, but anticipates a rise in the real cost of travel that may lead to increased pressure on regional resources.* The uplands of Lancashire may well be substituted for a more expensive journey to the Lake District, the Yorkshire Dales, or North Wales. Thus more facilities are proposed to 'accommodate and contain this increased demand', resulting in the 'concentration and management of a large proportion of countryside recreational activity in areas where it already occurs, thereby allowing existing land uses elsewhere to remain relatively undisturbed' (ibid., 125).

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* The validity of this expectation is investigated in Chapter Four

This policy statement embodies the emphasis of the strategy for recreation provision. The Council makes no undertaking to encourage greater use of the countryside; new facilities will be provided only where existing facilities are inadequate to meet the demand. The provision for new Country Parks and Picnic Sites is made, but it is stressed that 'new countryside facilities will be provided in areas that can absorb a greater number of visitors by means of suitable management measures and in areas where potential conflicts are minimised through close co-operation with appropriate bodies and land-users.' The strategy of filtering is maintained so that 'recreational pressures are diverted away from the more vulnerable areas of high scenic, ecological or agricultural quality' (ibid., 125). With regard to the overall Urban Concentration Strategy, and the expectation of increased travelling costs, the favoured areas for development are to be the urban fringes.

Thus the strategy for countryside recreation in Lancashire is built on local needs and national capabilities. The complicated zoning schemes, with traffic management and so on that feature in some heavily used areas were never established here (e.g. Morris 1977). The implicit desire to keep the more remote areas of Bowland for quiet enjoyment prompted the development of a Country Park in a prime filtering location. The future plans envisage development of additional facilities at the other end of the journey, in the urban fringe. The successful operation of such a system requires that the new sites can consistently attract the casual visitor; they must be located at the significant break-points and continue to be attractive in spite of coping with large numbers of visitors.

The Country Parks may have been designed to take the casual visitors off the roads and out of the farm gates, but a substantial number of visitors will still seek out the unplanned, and frequently unmanaged, sites, or no site at all, preferring a gentle amble round the lanes with no extended stop. A complete recreation strategy should be concerned not only with the designed sites, but should also have an eye to the damage inflicted elsewhere. Concern for the natural landscape is an appropriate accompaniment to a recreation programme; although most countryside recreation does not demand a natural setting, much benefits by one. It also provides a suitable dual objective where it may be hard to justify expense on amenity grounds alone. However, it should be recognised that although countryside recreation may be compatible with landscape conservation, the stricter requirements of wildlife conservation may not allow multiple use.

The execution of the recreation strategy requires information concerning real and potential demand, the activities of visitors, and their interpretation of the sites available. It is also necessary to be able to identify vulnerable areas, with consideration of their ecological and perceptual capacity as well as the danger of physical erosion. If the filtering strategy is to work, the new sites must fulfil the need; if not as scenically attractive as the beauty spots they are designed to relieve, then they must offer other advantages. No strategy for leisure activities can be based on compulsion; although it may sometimes be necessary to prohibit entry, for casual activities it will always be better to encourage people to go elsewhere of their own volition. Thus, it is necessary to understand what makes people go to one place rather than another, when the decision is made, and how best to influence them to work within the recreation strategy of their own free will. With the ever-increasing evidence of damage in heavily used places, there is little time to waste in taking action; with the greater pressure of recession, there is little money to waste on experiments. Thus, future planning should be based on evidence, rather than informed guesses.

Chapter Two

RESEARCH PROGRAMME

I The Information Base for a Recreation Strategy

In Chapter One the need for a recreation strategy was expressed - a course of action that would cater for the army of visitors, co-ordinating resources with demand, relieving congestion and reducing damage to the countryside. It is suggested that a system of site hierarchy and filtering may provide the required range of opportunities while sheltering the most vulnerable places. Such a system necessitates the identification of vulnerable places, an assessment of damage with reference to future trends, and the provision of new sites sufficiently attractive, by facilities or location, to draw off undesirable pressure. These new sites may have to withstand the levels of use that created damage elsewhere, thus their design demands manipulation of the natural environment to produce high density, hard wearing sites that still fulfil the conditions for quiet countryside settings.

The strategy should also be concerned with the potential users, identifying their needs and likely activities. Examination of visitor characteristics in relation to those of the background population may help to anticipate future demands for recreation space. It is also necessary to review existing and potential resources with a view to co-ordinating a management plan. Because the users are mobile, no regional scheme can work in isolation; the plans will inevitably build on existing patterns of use, which may include interregional movements.

Some of the required information may be available in previous reports, some may be collected by direct observation; consideration of experience in other areas and pointers from theoretical studies may prove valuable. Experimental studies are extremely interesting, but there is not always sufficient time, money or staff to exploit this technique.

In this study it is intended to test out some of the theoretical ideas concerned in recreation planning, particularly the problems of site design for high density use and filtering techniques. In this chapter the theoretical approach will be identified and main aims stated; the methods used will be outlined in Chapter Three, with a discussion of problems in survey design and implementation.

II Theoretical Considerations

The 1968 Countryside Act initiated a new age in recreation planning by promoting recreation as a specific land use publicly financed; the new Country Parks and Picnic Sites were to be purpose built (or at least located) to meet real and potential demand, while the major land-owning authorities were to be encouraged to open their forests, moorlands, lakes and reservoirs to multiple use. The original description of the need identifies the target locations and populations. The new sites were

> 'to make it easier for town-dwellers to enjoy their leisure in the open, without travelling too far and adding to congestion on roads; they would ease the pressure on the more remote and solitary places; and they would reduce the risk of damage to the countryside - aesthetic as well as physical - which often comes about when people simply settle down for an hour or a day where it suits them, somewhere "in the country" - to the inconvenience and indeed expense of the countryman who lives and works there' (Min. of Land and Nature Resources 1966, 6)

Thus the filtering function is identified as being aimed at intercepting the "site-free" visitors, ie those with no particular destination in mind. Prime locations would be at either end of the potential journey, on the fringe of the urban area or approaching a valued landscape.

In spite of the impressive record of provision, with 125 Country Parks and 155 Picnic Sites designated by 1975, a cursory examination of the map showing their distirbution leads to the suspicion that expediency rather than strategy has dictated their location. Although there is some association with the edges of the centres of population, clusters suggest particularly enthusiastic authorities rather than exceptional need, and there are some curious gaps. There are many Parks that do not seem to fit the intended function either by location, being neither close to urban areas nor protected landscape, or characteristics, many being more "urban" than "country" with formal gardens and fixed amusements.

The introduction to a text on environmental planning makes a point that is particularly relevant in the context of recreation planning: 'any change of land use is a potential source of disruption and the task of every planner is to supervise these rearrangements so that the disharmony they cause is reduced to a minimum' (Edington 1977, 1). The importance of two basic concepts is stressed, the _site requirements_ of the new enterprise, and _compatibility_ with existing land uses. In terms of recreation planning, the further consideration of _location_ must be held firmly in mind; if a strategy is to work then the right site, offering the right facilities, must be in the right place. The strategy will also be concerned with the appearance and ecological well-being of the sites, whether planned or not. Although linked to the question of compatibility, the physical and ecological _capacity_ of the sites must also be examined.

(a) Site Requirements

Some confusion existed in the earlier literature of countryside recreation as certain studies included all out-of-doors activities in country settings, whereas others restricted the term to the passive pursuits of gentle walks, picnicking and driving for pleasure. It is now generally agreed that "informal countryside recreation" should encompass the passive pursuits, leaving the organised sector to "sport". CRRAG define informal countryside recreation as 'recreation, the main aim of which is relaxation, which requires little in the way of special skill or organisation, which lacks any competitive element and which requires a countryside location for its full enjoyment' (CRRAG 1970, 7). However, to say that an informal recreation site should provide for walking and picnicking is not very helpful, and by definition, much of this sector requires no "site" at all, with the view being more important than the stopping place.

There are two ways of approaching the problem of site requirements, one is to consider the general attributes favourable to informal countryside recreation (particularly important for the mobile activities), and the other is to examine the specific facilities required at the stopping place. In the first case, the assessment of the resources of a region as a whole may be accomplished, with reference to some evaluation of what contributes to "good" conditions for recreation. In the latter case the easiest approach is to investigate sites that are already used, and interview the visitors; if a sufficient range of sites is included, it should be possible to identify the attractive features.

Coppock and Duffield (1975) suggest the distinction of "user-orientated" and "resource-based" recreation may assist the assessment of land requirements. User-orientated facilities need to be located close to the people, as the distance people are prepared to travel for playing fields, formal parks or golf courses may be quite short. This is not necessarily a problem as such facilities are not very demanding in land resources and, barring extreme physical limitations or problems of access, most urban fringe sites would be possible of development. Resource-based recreation is more demanding, being dependent on the availibility of specific natural resources such as lakes, mountains or particularly beautiful scenery. This may well be the case for the more active pursuits, and the more demanding visitors, but although certain natural attributes favour informal activities, these are not necessarily dependent on the resource. Relative availibility may be important; the success of the Country Park scheme rests partly on the knowledge that "somewhere in the country" will do for most people. Thus, although the natural resources may lure people towards the beauty spots, some may be relatively undemanding of the specific stopping place. In effect, the philosophy behind the Country Park scheme seems to suggest that much informal activity is user-orientated rather than strictly resource-based, hence the emphasis on urban fringe sites.

In terms of informal countryside recreation a further division may be suggested, that of "site-specific" and "site-free" visitors. Site-specific visitors would be in the truly resource-based category; they have one destination in mind and nowhere else will really do. A site-free group may be somewhat less demanding; having reached their target area (e.g. an AONB) they will look for somewhere to stop that meets basic requirements. A site-specific group could not easily be deflected from their objective without reducing their enjoyment; a site-free group is available for "filtering".

Coppock and Duffield describe a number of studies assessing recreation resources on a regional scale, including the researches of the Edinburgh team in Central Scotland. Their assessment of "recreational environments" involved identification of recreation potential in four independent categories: suitability for land-based recreation, suitability for water-based recreation, scenic quality and ecological significance (Coppock and Duffield 1975). The survey area was covered by a two kilometre grid, each square assessed on a combined score, producing a map of recreational potential. It was hoped that this would 'assist the choice of suitable areas for Country Parks' (ibid., 106) and aid landscape conservation by identifying valuable areas.

The criteria selected were necessarily subjective, but an attempt was made to assess each area by the presence or absence of facilities particularly needed (e.g. water for water recreation), areas providing resources for several activities scoring highest. The bias towards the active pursuits was in some ways redressed by the inclusion of the scenic quality measure, deemed to be of greatest importance for the passive pursuits. The survey used a modification of Linton's technique based on the combined score as a "landform landscape" (relative and absolute relief) and a "land-use landscape" (urban to "natural"). In the latter scale moorland was ranked higher than woodland, diversified use higher still, and the maximum score given to landscapes where water 'makes a significant contribution' (ibid., 115).

Ecological significance was included on the assumption that 'areas of high ecological significance represent part of the attraction to the countryside' (ibid., 115). Although this is undoubtedly true, the inclusion of this factor with equal weight in an assessment of recreation potential is courting trouble, as it would tend to promote recreation development in the very areas the ecologists may wish to protect.

In terms of informal recreation, the scheme is fairly undemanding; any country within a quarter of a mile of a road or with access to a beach was considered suitable, although land with varied relief, mixed habitats and water was considered to be better than less varied lowlands. The technique is certainly useful in identifying areas of great potential in terms of their suitability for many forms of recreation, a point likely to be of interest to those contemplating large-scale developments. However, it may undervalue perfectly reasonable sites for informal activities on the grounds of their unsuitability for other forms of recreation. Equally, there is the danger of concentrating all attention in the areas of greatest value, and hence possibly most at risk. The broad-brush approach may be more useful in assessing potential danger areas, than suggesting sites for development. Thus, a more detailed consideration of specific site requirements may be more appropriate; planning tends to be influenced by practical considerations, such as right of access and land availibility, and at least for informal recreation, there may be a case for avoiding the areas of "greatest potential".

A review of the site surveys may help to show the range of resources which attract people to particular locations. Activities may be recorded (by observation or enquiry) and questions may probe the desire for more facilities. In Table 2.1 the activity charts of three surveys of informal countryside recreation sites are shown. Other reports show similar results, showing that the majority of people spend their time taking short walks, sitting (often in the car) and picnicking, hence the popularity of sites offering interesting views and variety for short walks. Few other activities are sufficiently common to attract consistent mention, with the possible exception of exercising dogs (frequently included in "walks") and playing games with children. This suggests that areas where dogs may run free will be favoured, as will sites with flat, safe playing areas.

Many studies show the tendency of visitors to stay very close to their cars (e.g. Burton, R. 1974), but there is the suggestion that familiarity with the site loosens the bonds a little. There is some disagreement over the reason for this phenomenon: need to supervise children, danger of getting lost, problem of carrying picnic equipment and fear of damage to car are all suggested. It is most likely that a combination of factors is responsible, together with the fact that most visitors to informal sites have no wish to walk far, and staying near the road or car park will also keep them close to whatever facilities may be available. A similar tendency to cluster near the point of access has been observed on beaches, where many visitors do not have a car to tie them down. The facilities that gain most frequent mention in the list of requirements are toilets, a café and information, but the last comes a poor third.

Table 2.1 Activities on Informal Recreation Sites

(a) Cannock Chase (Quota sample in 11 zones across area)
Burton, R. 1974 % activities n = 499

Social class	Walking 15 mins	Sitting in/by car	Listening to radio	Other
Prof./Intermed.	66	59	9	15
Skilled and semi-skilled non-manual	65	68	14	4
Skilled and semi-skilled manual	56	74	29	4
Unskilled	63	81	45	0

(b) West Midlands (6 sites) White and Dunn 1974 n = 797

Social Class	Walk	Picnic	Ex.dog	Games	Fish.	Sit	Other
1	75.9	36.1	11.1	25.9	3.7	25.9	16.7
2	78.8	37.9	12.1	21.2	4.5	12.1	18.2
3	74.9	34.6	12.5	15.8	11.4	24.6	17.5
4	70.2	23.9	11.7	21.6	7.4	43.2	14.4
5	59.4	22.6	14.2	24.5	6.6	35.8	20.8
6	58.3	30.0	11.4	17.9	3.6	35.7	15.8

(c) Clwyd (13 sites) Brown 1976 % activities by hourly observation

	Picnic	Walk	Sit (out)	Sit (in)	Games	Other
Major sites (8 including one beach where sun-bathing was important) n = 52,360	11.4	23.5	29.0	18.9	12.6	4.6
Minor sites (5 including one reservoir where fishing was important) n = 8,161	10.1	24.7	31.0	10.7	13.5	10.0

(NB: reported activities included all for the trip,
observed activities records one at time of survey)

An assessment of site surveys is useful in showing the general range of requirements, but there are two problems. First, a site survey will only encounter those who have decided to spend time on the site, therefore they must be reasonably happy with the conditions they find. Second, site surveys are specific to the setting, and hence not necessarily comparable. However, a base level of requirements is indicated, that may be filled in with detail of local conditions.

In this study, a survey of two sites is used to investigate the questions of resource use and site interpretation. One of the sites has been designed for recreation use, with a deliberate plan to improve the walking and picnicking opportunities. The second site is a roadside in a very attractive part of Bowland; there are no formal facilities for parking, no arrangements for picnicking, and few walking opportunities. The comparison of activities at the two sites should provide an interesting comment on the value of planning. Specific site requirements were further investigated by the questionnaire, asking about particular likes and dislikes, and about additional facilities thought to be an asset.

(b) Compatibility

Many of the new County Structure Plans, prepared after the reorganisation of Local Government in 1974, have attempted to assess compatibility of different land-uses. One forerunner was the Sherwood Forest Study (Sherwood Forest Study Group 1974), which produced a subjective assessment of incompatibility. Uses assessed as having "insuperable conflict" were landscape with coalmining/industry, recreation with agriculture or military training, and agriculture with military training. Uses with no apparent conflict were roads with water supply, landscape with nature conservation, military training or water supply, and towns with military training (the last presumably because the training areas are located well away from the towns). It was suggested that other existing and potential conflicts could be substantially overcome by management and co-operation between users.

The conclusions underlined the incompatibility of economic activities such as agriculture with anything else, leaving the possibilities for multiple-use largely in the non-profit-making categories such as landscape and nature conservation. Apart from a possible reduction in the military training area, the main possibilities for increasing provision for countryside recreation were seen to be in developing a number of new picnic sites, dispersed to avoid congestion, and in negotiating multiple-use agreements with forest holders. However, the Study Group were reduced to recommending that more sites be developed outside the study area to relieve pressure. Although this study is very specific to its regional context, it does suggest some areas of possible multiple use that warrant closer examination, particularly the connection of recreation with nature and landscape conservation.

(i) Management for Nature Conservation

The Nature Conservancy Council has listed all known sites of biological importance identified in four categories which may be summarised as follows: Grade 1, international importance; Grade 2, national importance; Grade 3, regional importance; Grade 4, local importance (Nature Conservancy Council 1977). Listed areas cover approximately 5% of the land area of England and Wales. This system draws attention to specific locations; most of them are relatively small and many do not have protection by statutory designation. Grade 1 status is regarded as a minimum to qualify for designation as a National Nature Reserve, thus many important sites are excluded. Remaining Grade 1 and 2 sites are covered as either local Nature Reserves or Sites of Special Scientific Interest. Some 500 sites in these categories have been identified, but only about fifty are managed as Nature Reserves (NCC, local authority or voluntary bodies by agreement). Thus, the vast majority of even these key sites are managed for some other use. Although these uses may not be incompatible with conservation, the dangers of trampling and disturbance, pollution, drainage or total destruction with agricultural "improvement" are obviously very real.

There is also concern for the other listed sites, those in categories 3 and 4. It is argued that such sites 'assume national importance in providing enough semi-natural habitat throughout the country to maintain richness and diversity of species and communities generally (Countryside Review Committee 1974, T.P.4 par. 25). However they may be totally unprotected, preservation depending on the interest and awareness of the landowner. In the case of the sites identified by the NCC, there is at least an awareness of the need to consider conservation. However, even taken together, these sites only cover a small proportion of the countryside, indeed their significance is supported by the high standards applied. Many other areas of landscape interest are excluded, considered either to be of less value ecologically, or not rare enough to warrant classification.

The Countryside Review Committee defines the 'conservation ethic' as 'a dynamic concept which seeks to secure the willing co-operation of many in identifying where protection, active or passive, is needed and in maintaining necessary change in such a way as to secure that protection' (ibid., par. 6). Throughout the report they emphasise the need for co-operation and positive planning, but also underline the basic assumption that some change is inevitable and necessary, and should be accepted as such with 'direction to minimise adverse effects and preserve vital areas, elements and features' (ibid., par. 6).

The feeling of this report is carried through to the Wildlife and Countryside Bill (1980) recently put before Parliament. This seeks co-operation in management by providing means of negotiating agreements and compensating landowners forgoing development on conservation grounds (HMSO 1980, par. 17 and 21). However, the Bill stops short of the compulsory powers suggested in an earlier Countryside Bill (HMSO 1978) and limits compensation to the predevelopment value of the land. The success of such schemes would obviously depend on a high degree of commitment by the landowners, and it is questionable whether it is reasonable to rely on co-operation to protect valued areas where individuals may have to bear the brunt of the cost.

Two broad objectives of nature conservation have been suggested

'(a) maintaining the richness and diversity of plant and animal species and communities in the countryside generally, and of geological and physiographic features; and

(b) ensuring that particular sites, which are of special importance for nature conservation, are safe-guarded from damaging developments or harmful forms of land use or management practices' (CRC op. cit., par. 18).

The emphasis on richness and diversity is significant, as is the recognition of the need for attention to the countryside as a whole, to support specific protection for particularly valued sites. In the context of countryside recreation, it is the former point that is of greatest relevance.

The impact of recreation use, in terms of disturbance and trampling, is incompatible with the strict habitat and species preservation necessary on Nature Reserves. Thus there can be little question of combining high intensity recreation use with conservation in the Grade 1 sites. However, it has also been shown that many areas deemed to be of biological interest are not so protected. Equally, it is a premise of the report that the adequate maintenance of the top level sites requires some concern for their context, i.e. attention to general points of conservation in the background areas. Argument continues as to whether single large reserves or several smaller sites are preferable, but whichever route is taken, the reserves cannot operate as closed systems, they will inevitably be influenced by the surrounding areas (Higgs 1981).

(ii) Management for Landscape Conservation

The CRC report points out the specific problems of "island" Nature Reserves where the protection of a species is at issue, but it states that 'an area of valuable landscape can be successfully protected without the need to protect other areas' (CRC op. cit. par. 70). This assumes that landscape can be appreciated in small scale detail, as can perhaps the scientific merit of a pond. This is arguably not the case; surrounding landscape changes can detract from the experience of a small protected area by intrusive noise and "backdrop" changes just as much as agricultural drainage or run-off can destroy the water regime of a wetland reserve. The need for ensuring that 'the countryside at large is itself in a good state of "ecological health"' (ibid. par. 70) may be just as important in landscape terms as it is in ecological terms. The approach, view from, smell, sound and total atmosphere of a site will all contribute to the experience of the environment.

Thus, it is necessary to adopt a "whole environment" approach for both landscape and nature conservation; encouraging an awareness of conservation needs to influence the management of the whole countryside, not just sites designated as being of specific value. This will help preserve the valued sites by maintaining their context, and may also help reduce pressure on the reserves by providing alternative sites of almost equal attraction, if not equal scientific interest, for more general "consumption". It would be sad indeed if designation of favoured areas only resulted in comments such as David Lowenthal's on the American experience: 'the features most admired are set apart and deluged with attention; the rest of the country is consigned to the rubbish heap' (Lowenthal 1968, 84).

Multiple-use is often regarded as a compromise solution where the activities involved cannot command economic viability in their own right. This is an unfortunate fact of life when land resources are under such pressure, and so many valued habitats or landscapes have no official protection. Nature conservation of particularly valued habitats is virtually incompatible with all other uses, with the possible exception of certain delicately balanced habitats where necessary management may involve some "use", e.g. grazing of water meadows or chalk downland.

The main area of promise is in the development of compatibility between the lower grade conservation sites and recreation use. To this end, the survey attempted to discover the degree of change brought about by visitor pressure over a wide area, not just along a footpath. If access for recreation is to be allowed in conservation sites, then some objective means of assessing and predicting damage is necessary. Observation of the use of a recreation site is very important; it may be possible to combine recreation and habitat conservation by skillful manipulation of the land resources, discouraging visitors from penetrating the more valuable areas.

The question of the compatibility of recreation and landscape conservation should be more easily dealt with. The landscape architects have long counselled the need for good design in the countryside, and care over location of facilities, screening and so on should prevent intrusive and damaging developments (e.g. Beazley 1969, Fairbrother 1970). In areas of particular value some filtering may be appropriate, e.g. at Wycoller Country Park, Lancashire the car park is about half a mile short of the village. All visitors (except the disabled) must approach on foot and an unattractive confusion of cars in the village is avoided. Similar exercises with countryside attractions are well documented, as at Tarn Hows in the Lake District (Brotherton 1977). However, the presence of any facilities and screening may involve the use of materials alien to the natural environment. An attempt was made to assess people's awareness of these changes by their interpretation of the "naturalness" of the sites.

(c) Location

In terms of recreation strategy, there is more to site location than simply meeting an existing demand. Many plans of varying scale and complexity have already been devised (Gilg 1978), but there is a great gulf between drawing up the plan and successfully putting it into operation (Miles and Seabrooke (1977) discuss management strategies and techniques). The intended design may be fairly simple in theory with a nested hierarchy of countryside, AONB or NP, Country Parks, honey pots of high activity and protected areas of low activity. The implementation of such a scheme may be quite difficult, with inevitable modifications to take account of existing resources and land uses. Access may be difficult to negotiate, disrupting plans, or it may be too easy in places needing protection. The Countryside Act makes provision for Access Orders to be put on moorland areas, and these have been adopted where necessary to unite the open moorlands in Bowland, But it is not an ideal solution.

Theoretical considerations may be adopted to modify behaviour where there is a need to change the existing recreation pattern. The two concepts most frequently applied are filtering and substitution.

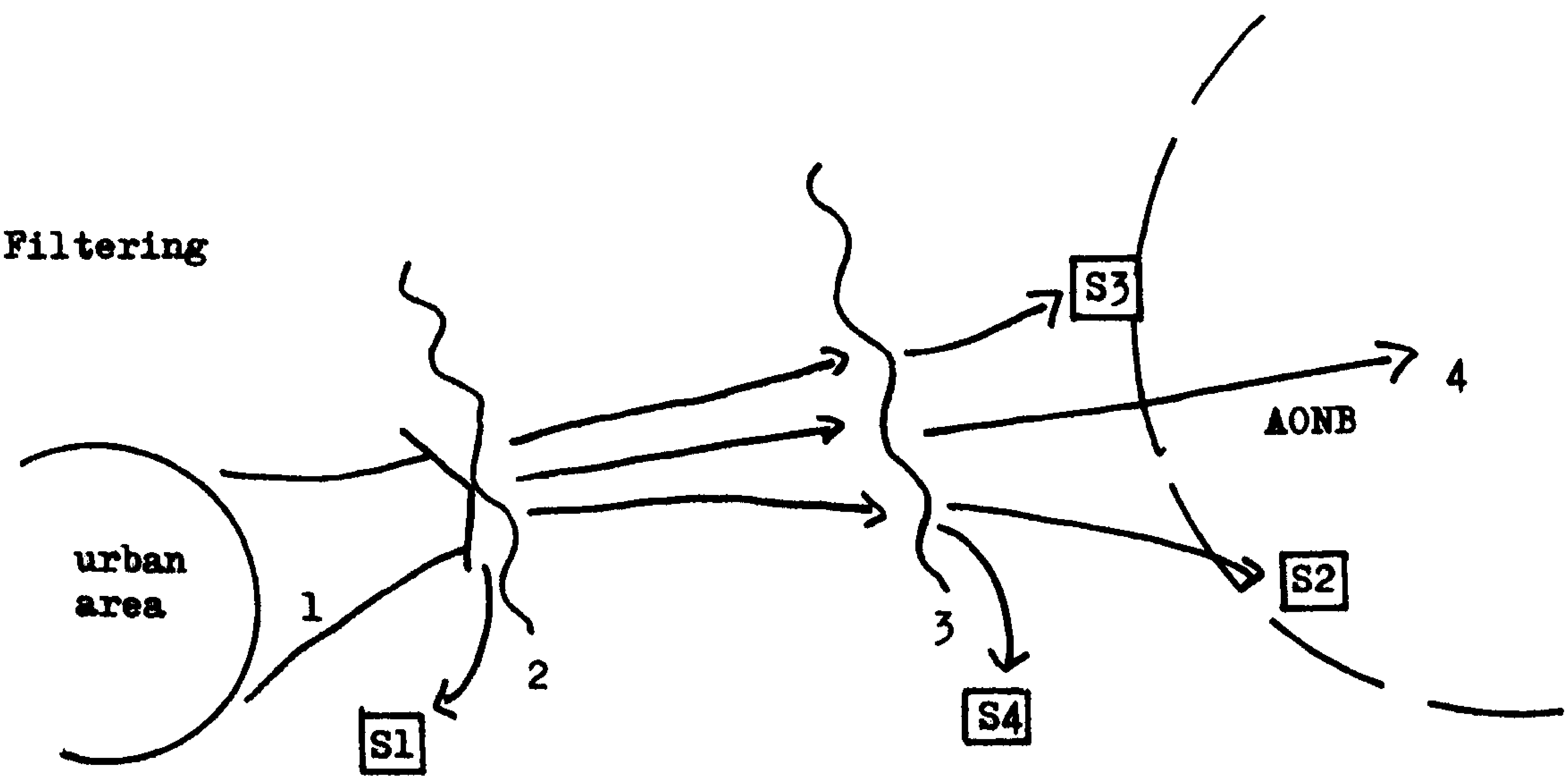
(i) Filtering

As suggested, most visitors could be categorised as either "site-specific" (with a particular objective in mind) or "site-free". The essence of filtering is to provide sites in the course of the journey, suitably advertised and located to attract the site-free visitors, thus avoiding aimless driving about and reducing the number of visitors penetrating the protected area. This should make the journey easier and the trip more enjoyable for the "filtered" visitors, by providing the resources they want where they can find them, and improve the experience of the site-specific by reducing congestion on the roads and crowding at the site. Two key break-points are suggested, the urban fringe for those who simply want a country site for walking/picnicking and do not want to drive far, and the fringe AONB/NP site for those who enjoy the drive out or want more spectacular scenery (see Figure 2.1). In both cases, the site would be made "attractive" by providing the basic facilities so many urban visitors look for, i.e. the typical Country Park.

The filtering effect would be achieved by the information services: publicity, advance warning by roadsigns or information centres. In this case the key factor would be the roadside notices, informing the first-time visitor where facilities may be found. Where problems are severe, there may be a case for removing all reference to the original sites and simply posting the filter sites.

Figure 2.1 Modifying Site Selection

Filtering



1) Potential visitors leave in direction of AONB

2) Decision break-point (I): those not interested in pleasure driving or not attracted to AONB will look for somewhere to stop

3) Decision break-point (II): "site-free" visitors will begin to look for somewhere to stop

4) "Site- specific" visitors achieve their objective

S potential "filter" sites

(ii) Substitution

If a specific site is subject to particularly heavy pressure it may be possible to reduce this by substituting another equally attractive though not necessarily identical site. 'The ability to "substitute" the development of one activity for that of another, where a particular resource is scarce, can be of great help to those responsible for the planning of recreational facilities' (Coppock and Duffield 1975, 67). Although similar in nature to filtering, substitution operates closer to the target site and is usually aimed at relieving one specific destination. Some visitors may be prepared to trade a particularly famous view for a quieter site or the advantages of basic facilities. Again, substitution may be achieved by informing the potential visitors of alternatives before they leave home (publicity to the home or information on a previous visit), or it may occur through filtering in the approaches to the site. Advance warning of the alternative site may draw off some visitors early in their journey; others may approach the site, only to be enticed past by the promise of better facilities elsewhere. Thus the diplomatic planner does not say "Keep Out" but "Picnic Site ½ Mile → ".

The Forest of Bowland AONB is the only extensive area of protected land in Lancashire, and includes some of the most remote areas of the northern Fells. The Trough of Bowland forms the only route across the central area, following the headwaters of the Wyre and the Hodder. This is a favourite recreation area, giving a drive through spectacular scenery and also several attractive picnic places (see Plate 1). However, the number of cars leads to congestion on what is an important local route way, and the presence of a large number of people here is

Plate 1 The Trough of Bowland: Approaching from Clitheroe

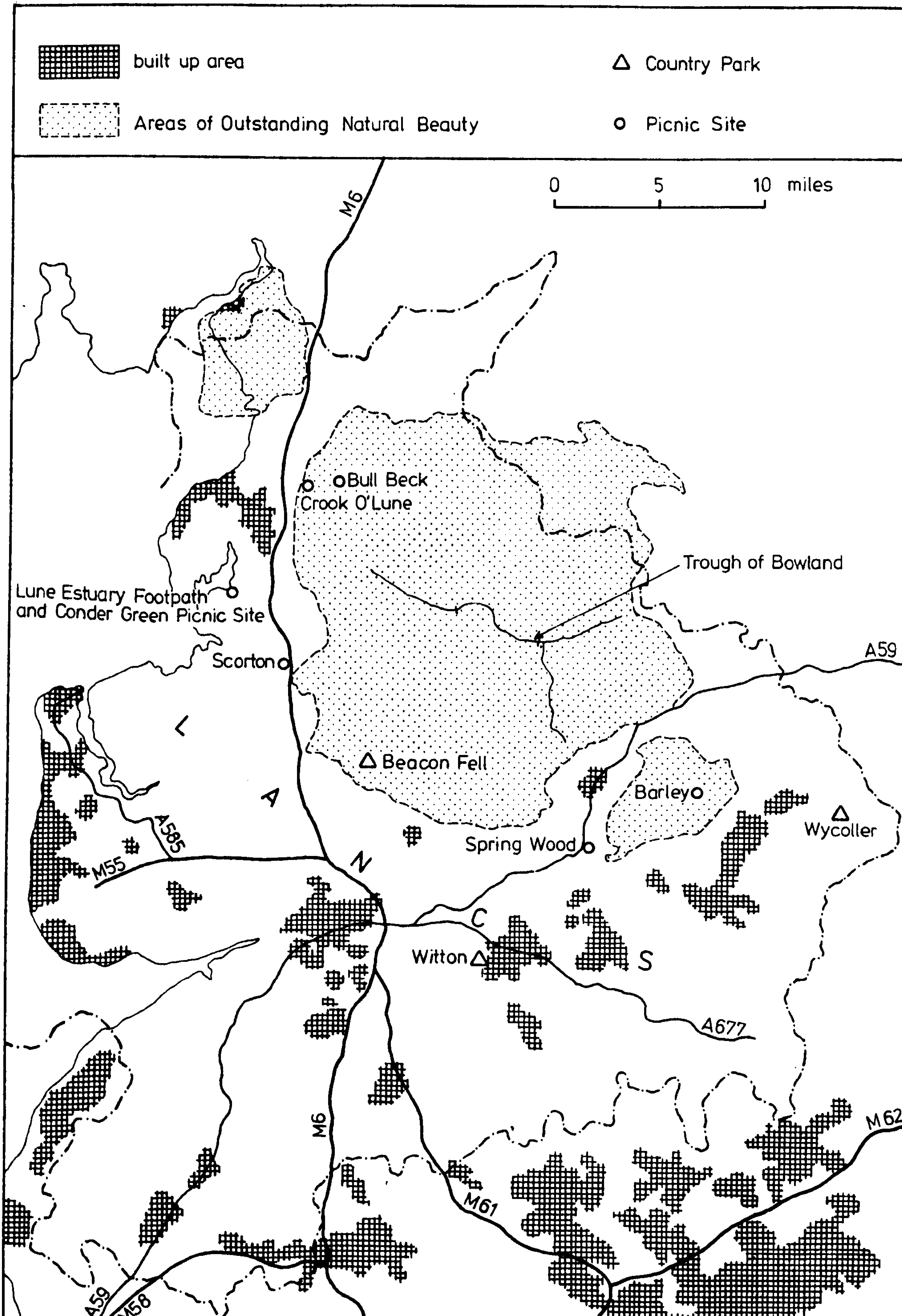
Plate 2 Beacon Fell Country Park: Viewed from the North West

out of character with the peaceful moorland setting. Other countryside lanes in the area are also used for recreation driving, some with popular stopping places - e.g. on the moors near Abbeystead, and on the moorland edge route near Quernmore. A number of more extensive areas have been used unofficially for informal recreation for many years, as at ParlickFell, and the outlier of Beacon Fell. Beacon Fell was one of the earliest Country Parks to be designated, and it stands in a classic filtering position, eight miles north east of Preston on the edge of the AONB (see Plate 2). In surveying both Beacon Fell and the Trough of Bowland it was intended to investigate the question of filtering by a comparative study of site use and interpretation, trip type, visitor characteristics and intentions.

The Local Authority is gradually adding to its collection of recreation sites (Figure 2.2), and some consideration of the ideas of filtering and substitution is evident. The early accent on the AONB (as at Beacon Fell Country Park, Crook O'Lune and Scorton Picnic Site) has been replaced by a more deliberate emphasis on the urban fringe sites (as at Witton and Wycoller Country Parks). The main effort of the Authority has latterly been directed towards the Anglezarke Area; it was felt that the extreme pressure of the mid-1970s was not likely to be repeated in the near future, and that the present reaction to travel costs was to stay closer to home. The concentration on urban fringe sites also ties in with the overall consolidation strategy and a desire to provide for less advantaged groups by putting recreation sites within reach of public transport. In this study, the function of two recreation sites will be assessed, with particular reference to the potential filtering role of Beacon Fell Country Park.

Figure 2.2

LANCASHIRE COUNTY: RECREATION SITES



(d) Ecological Capacity

The potential capacity of a recreation site may be assessed from several points of view. If there is to be any attempt to encourage recreation in areas of scenic or habitat interest, then the resilience of the natural environment may be the most important factor. Ecological capacity has been defined as the 'maximum level of recreation use, in terms of number of activities, that can be accommodated before a decline in the ecological value, assessed from the ecological point of view' (CRRAG 1970, 2). In spite of many possible ways of measuring ecological change, the assessment is bound to be subjective due to the problem of establishing what constitutes an unacceptable decline. There is no clear boundary: 'it follows that the amount of use an area can receive without deterioration of the vegetation occurring is dependent upon the declared management objectives for that site, and the degree of "naturalness" it is felt necessary to preserve' (Burden and Randerson 1972, 440). Thus it is possible to set several different carrying capacities for the same site, according to the management objectives.

The first step in setting a carrying capacity must be the identification of changes caused by recreation use. Much initial research work is in the form of theses and site surveys of limited circulation, so reviews such as those of Speight (1973) and Lloyd (1970) are particularly useful. Speight lists a number of activities responsible for ecological change in areas used for recreation: trampling, passage of vehicles (land and water), on-site structures (covering vegetation and causing localised trampling), disturbance to animals, specimen collection, pollution (land, water and noise), fire (accidental and intentional). These activities may be summed up in terms of the problem of human access. As soon as people collect in any number wildlife is disturbed and the natural ecosystem threatened. Lloyd distinguishes between inevitable effects of pressure such as soil erosion and disturbance to wildlife, and unnecessary threats such as vandalism and litter accumulation. He suggests that education should be encouraged to limit the latter, and that positive planning should be involved to minimise the former. Identification of the processes at work will help to formulate effective management plans.

The most obvious "inevitable effect of pressure" is seen in the operation of trampling. This is rarely directly responsible for erosion, but by weakening the vegetation cover creates conditions in which the normal erosive agents are more effective, thus trampling may be considered a catalyst or accelerating agent. Speight notes the problems of trying to abstract evidence of general application from the disparate studies on recreation effects, a theme taken up by Simmons, who also laments the absence of a general framework, remarking that 'impact studies have ... tended to be ad hoc evaluations of particular processes as they arise, with no common methodology ...' (Simmons 1980, 153). Before considering theories that may provide such a framework, it would be valuable to assess some of the observations that have been made of the effects of trampling on soil and vegetation.

(i) Edaphic Changes Due to Trampling

The sequence of changes usually starts with damage to individual plants, loss of vigour of the community as a whole and soil compaction. Total pore space is reduced and the proportion of pores filled with water may increase, hence reducing air space in the soil. This may take place quite rapidly after the onset of the heavy trampling pressures. On a study of a nature trail on Ranmore Common, Burden found that 50% of the compaction took place within the first two days of use (Burden and Randerson 1972). The size of the pores may also be reduced, adversely affecting drainage, with consequent reduced infiltration capacity and increased surface run-off. Where water is freely available the reduction in air spaces in the soils may lead to gleying, although in previously dry, freely drained soils, some compaction may assist water retention and benefit plants.

In an experimental study in the seasonally dry Missouri Ozarks it was found that 'both the field capacity and the permanent wilting percentage were significantly lower for the surface three inches (eight centimetres) in the used areas' (Settergén and Cole 1970, 230). With the difficult soil conditions of the area this resulted in crown wilting and "stag-heading" in the trees and the permanent loss of the shallow rooted ground flora. The consequent reduction in organic matter further reduced infiltration rates and the moisture-holding capacities of the soil, and a vicious circle of cause and effect was established. Running water is one of the most effective agents of erosion; where run-off is increased, rills may develop rapidly, especially on steep slopes. If the ground cover is lost, sheet or wind erosion may become important, while the increased temperature range of the newly bared surfaces may accelerate physical and chemical weathering.

Although less frequently studied, evidence is available to suggest accompanying changes in soil fauna, notably the reduction in total numbers and a shift in favour of species found in the warmer and drier habitats of the grasslands. Chappell recorded fewer but larger earthworms under paths than under the nearby untrampled vegetation (Chappell et al. 1971). Actual physical erosion where feet push soil away and break up the surface may become a problem, especially on steep slopes or where the subsurface is poorly consolidated (see Plates 3 and 4). Sand-dunes are a prime example of compounded problems, their extreme vulnerability being due to the combination of potential problem characteristics: poorly consolidated material, very thin soils, steep slopes, unstable vegetation, demanding physical environment. The possibility of gully erosion is exacerbated by the tendency of people to walk straight up hills. This distinctly human characteristic is one of the biggest problems in designing paths on recreation sites, and may lead to the need to insert hard core or steps on the steeper sections.

Severe soil erosion will inevitably lead to long-lasting ecological changes, but other changes may be caused by additions to the soil. Organic matter introduced into recreation areas may cause soil enrichment, particularly from food remains and excreta. Even on short-stop sites and footpaths, the number of dogs can alter the natural nutrient balance, a factor compounded by their attraction to particular locations. The distinctive "gateway" flora may be attributable in part to such interference, and is characterised by particularly rank growth of plants favoured by eutrophic conditions, such as <u>Urtica dioica</u>*. Transfer of nutrients may also take place if

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* Common names of plants are given in Appendix I

Plate 3 Beacon Fell: Erosion at the Summit in 1974; plinth was set level with surface in 1970

Plate 4 Beacon Fell: The Summit 1981; note paving to protect plinth surround, and new erosion at its edge

visitors take dead wood from one area to burn it in a campfire elsewhere. Such scavenging may be very damaging, causing trampling and ripping up of ground flora in areas which may otherwise have escaped.

Liddle (1975) points out that soil compaction is fairly localised and generally only affects the upper layers, with the maximum depth of impact at about forty centimetres and a peak at eighteen centimetres. Established plants may benefit from slight soil compaction in dry weather, a fact employed by many groundsmen. Severe compaction is almost always detrimental, although the exact effect will depend on the season, life cycle and life-form of the plants, and the previous soil conditions.

(ii) Vegetational Changes Due to Trampling

One of the earliest reports on the effects of trampling on vegetation still provides a standard descriptive account. Bates (1935) stressed the importance of life form and soil compaction in determining the type of plants found in pathways. He observed that effects were worse when the ground was wet, a point subsequently taken up by other workers. The intensity of use is also very important, but varies with different vegetation types. Burden showed that 7729 passages in one week caused species loss in chalk grassland, and 'a reduction in the standing crop of <u>Hedera Helix</u> by a factor of more than four on the path in the beech wood' (Burden and Randerson 1972, 444). A similar number of passages spread over a whole season was sufficient to cause complete loss of vegetation on a mature salt-marsh, and to initiate erosion on a sand-dune

(Schofield 1967). On the slow-growing montane and moss heaths of the Cairngorms, 240 passages brought about a 19% increase in recorded bare ground (Bayfield 1971). However, in a subsequent report on the seeding trials, Bayfield noted that 'the overall plant cover was slightly higher on trampled than on untrampled ground, but there was substantially less cover where there was use by cars' (Bayfield 1980, 256). The increase in cover was due to infiltration of the heath flora by such species as Trifolium repens, Cynosurus cristatus, and Lolium perenne.

Capacity to recover will depend on degree of structural damage to plant, amount of soil damage and period of "rest". On Cairngorm the slow-growing plants had little chance of recovery in the period of little trampling, whereas at Ranmore Common even the more vulnerable plants were showing some signs of recovery three weeks after the trampling. In this case a brief period of intensive use was followed by little or no use; underground, vegetative parts of the plant survived to aid rapid recovery. La Page (1967) showed that although there was considerable loss of ground cover in the first season of use of a new camping ground, subsequent seasons involved less damage as more tolerant species became established. Bayfield (1980) noted the persistence of ruderals on disturbed ground in the Cairngorms experimental area; however there was a rapid decline in the number of ruderals recorded on the reseeded plots as species of the original flora became re-established.

The effect on vegetation is still difficult to predict, despite numerous studies. Effects fall into two main groups: (i) damage to individual plants, (ii) changes in community composition. Various studies of trampled areas and experiments with individual plants have produced a list of commonly "resistant" species, i.e. species that seem to withstand trampling pressures. However, Speight can only list twenty-two species that are quoted by more than one worker, a fact that suggests that resistance has as much to do with habitat and the environmental conditions as with the inherent characteristics of the plant. It is known that watering and fertilizing helps to increase resistance to trampling in some species (Burden and Randerson 1972), so variations in natural soil conditions must also influence resistance. This makes isolation of "indicator" species very difficult. A further problem is that a combination of species is generally lost together; the elimination of species in series is apparently rare, and usually due to selective removal, e.g. in grazing or picking. Casual flower picking can lead to a serious reduction in numbers of more favoured species, although in perennial species this may take some time to have a noticeable effect, e.g. Primula vulgaris. Loss of rare species is more likely to be the result of specimen collecting, and may constitute an acute problem in Nature Reserves. Comparison of studies in similar habitats may be used to produce lists of plants showing the best survival rates.

Study of the so-called resistant species may help to identify common features aiding resistance. Favourable vegetative features include procumbent or trailing form, flexible stems or leaves, basal rosette, cryptophytic perennating buds and vegetative reproduction by suckers or stolons. Other factors that may discourage trampling or aid rapid recovery are protective thorns or prickles, intercalary as well as apical meristems and rapid growth rates. The tussock grasses have particular advantages: the tillers and shoots leave the ground at an angle and therefore are less likely to be damaged, loosely bunched tillers cushion each other and the root mass allows compression. The large seed producing capacities (and efficient dispersal) of the typical opportunist or "weed" species is also an advantage.

The Countryside Commission has produced a booklet (No.13 1980) of advisory notes detailing plants suited to growth on recreation grounds, and suggests sowing mixtures for a variety of situations. The plants include some native species, but many of the cultivars suggested would not necessarily be suitable in country situations where the introduction of species alien to the natural community may be undesirable. However, throughout the notes other aspects of management are stressed, particularly the need for good drainage and attention to the nutrient balance.

The absence of the features favouring resistance are an indication of vulnerability. In the case of the moorland community an example may be found in Calluna vulgaris. The erect form and woody stem make it vulnerable to physical damage; the flowers encourage picking and trampling. The damage most frequently observed in the smaller plants is shoot damage - mechanical breaking, bruising and reduction in numbers. However, root damage may also be a problem. This may be less apparent in the smaller plants as soil compaction sufficient to damage roots is also likely to cause critical shoot damage. Thus, root damage is more often quoted in connection with trees, where shoots are usually beyond the reach of physical damage (excluding the more athletic vandals).

Mechanical damage to individual plants is only half the story. As Liddle states 'trampling alters the dynamic balance between the species in a natural community' (Liddle 1975, 19). However, there is some disagreement as to the effects of this alteration. Edmonds (1962) states that light trampling favours dicotyledonous plants, later eliminated and replaced by monocotyledonous plants if trampling is continued. Westhoff (1967) states that trampling increases diversity, but van der Maarel (1971) limits this effect to species-rich areas, claiming that species-poor areas are likely to suffer a decline in diversity. This disagreement probably arises from the different conditions studied; it is now recognised that the composition of the original vegetation is important as well as the level of trampling. Liddle suggests that such information could be used to regulate the vegetation of recreation areas. However, this assumes that where it is desirable to have a cover of dicotyledonous plants, then fairly low levels of trampling can be maintained. This type of information may be very useful in Nature Reserves or other areas where recreation use is not the main objective, but is less helpful where the aim is to create conditions for heavy use.

Studies in meadows have shown that heavy grazing may lead to the loss of favoured species, the vacant ecological niches being occupied by less palatable species, either from within or outside the community (Wells 1971). If the colonising species are from within the community, then the vegetation will move towards uniformity; if they are from outside, an increase in diversity may be recorded. Liddle noted that trampling appears to have a similar effect, vulnerable species being gradually replaced by more resistant ones. The timing of a study is obviously important as there may be a confusing change-over period, during which a loss of species and increase in bare ground may be recorded. Subsequent increases in cover may be due to spread of existing species or colonisation by new species.

The source of the spreading species will be determined by the initial community and the surrounding habitat. If suitable resistant species occur within the initial community, then these will probably become more important. If not, then a nearby habitat may supply resistant species. As noted, apparent resistance may be due to growth form or the ability rapidly to colonise an area. In the latter case a major characteristic is the ease of dispersal, often by wind. It is reasonable to assume that species already established in a community will have an advantage in the speed with which they could move into the trampled areas. The extent of the trampled community may also be important. An extensive community may suffer loss of diversity as vulnerable species cannot easily be replaced from outside. In the moorland community the Juncus association of the wetter areas is most likely to provide resistant species as these are more tolerant of the gleyed conditions often brought about by trampling.

The size of the gaps created may be very important. Miles (1979) shows that smaller gaps tend to have a more equable microclimate and provide more favourable conditions for germination of the crucial early stages of seedling growth. However, small gaps are more quickly closed by the growth or vegetative spreading of surrounding plants, so longer term survival trends may be reversed. After three years of a natural recolonization trial the largest experimental patches had almost twice the cover from seed than from vegetative regeneration, despite the earlier good growth of seedlings on the smaller plots. However, the proportion of bare ground remaining was much higher, reflecting the more difficult growing conditions. The size of gap necessary for natural seeding to be successful varies with different species. Where the clearance is not complete, seeds of the shade tolerant species of the woodland ground layer will stand a better chance of becoming established than light-loving species of the open communities.

Westhoff (1967) describes paths as a special type of ecotone with a vegetation gradient from the edge to the centre. This is difficult to test as many paths follow or may help to form ecological boundaries. Where they do not, the nature of the transition depends on the community, the level of use, and its concentration. A path through Pteridium may show an abrupt boundary from 100% high cover to bare ground. Paths on grassland usually show a more gradual change, whereas a path through a Callunetum may offer a habitat to plants not normally an important part of the community, producing a distinctive "edge flora".

While the collated observations of many workers are valuable in providing background expectations, the great range in changes recorded indicates the importance of attention to the specific conditions of site and use. Variations of soil, nutrient balance and microclimate are obviously very important, but the pattern of use may be equally significant.

(iii) Theories Concerning Vegetation Development

In the preceding section, a range of studies have been brought together to demonstrate the variety of effects of trampling that have been observed. The studies are spread over a number of years and represent many different habitat conditions. In some cases evidence appears to conflict, in other cases supporting evidence may have to be discounted due to differences in the background environment. Prediction based on disparate observations is inevitably unreliable; if the observations could be fitted into a theoretical framework, it may be possible to make substantive predictions. Several approaches seem promising; the concepts of succession, ecosystem stability and vegetation strategies will be examined in turn, with reference to the evidence already presented.

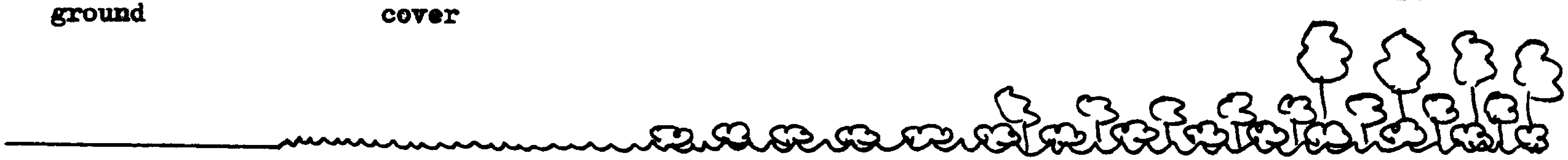
1) Succession

The succession model of vegetation development is attractive because it suggests easily identifiable stages and a sequence that could be related to management practices. After more than fifty years of study and modification, the basic idea of progressive change remains, but the detail has been difficult to substantiate. Odum presents succession as akin to an organism developing through several immature stages to the adult (Odum 1971). He defines succession as the orderly and directional process of community change resulting from the modifications of the physical environment by the community. The accumulation of organic matter promotes soil development and may affect moisture availibility; shading and sheltering will influence the microclimate. The end product of the succession would be 'as stable an ecosystem as is biologically possible on the site in question' (ibid., 78). The model may be summarised to show the predicted development of a prisere, from bare ground to climax vegetation (Figure 2.3).

Initial colonisation will be by plants able to cope with the exacting conditions of extreme microclimate, drought and nutrient deficiency likely to be experienced on bare ground. Once some plants are established, their presence will modify the microclimate and contribute organic material that will be crucial in the early stages of soil development. As conditions ameliorate, the range of plants able to survive will increase and the vegetation will become more complex in terms of both structure and species density. The species composition at any stage will depend partly on the habitat conditions and partly on the plant-stock available, thus various types of seral development may be recognised (e.g. the wetland hydrosere). The climax phase is assumed to have long-term stability; thus although there may be slight modifications in space and time as the plants go through their life cycle, the community will inevitably return to a form of the climax association.

This concept of the succession is autogenic, or dependent on internal influences. A more appropriate model for systems in areas of human activity may be that of allogenic succession, or one subject to external influences. The importance of fire was recognised quite early (the pyroclimax), but many other forms of more overt human activity may also be important. A familiar plagioclimax is the temporary grassland maintained by grazing pressure. According to succession theory, if the arresting factor is removed then a secondary succession would establish development towards the expected climax.

Figure 2.3 Generalised Prisere (developed from an original diagram by Odum (1971))



Bare ground	Ground cover	Low bush	Shrub	Forest	
	"Pioneer"	Second stage: Herbaceous plants	Third stage: Shrubs invade	"Climax" Large trees dominate; well-defined layers	Vegetation
Bare rock	Regolith with some organic matter	Developing soil-forming processes incorporate organic matter improving texture, nutrient and water balance		zonal soils developed	Soil
Drought	Little moisture briefly held	Increasing organic content improves moisture-holding capacities			Moisture
	Poor - mineral nutrients only	Improving - enriched by organic nutrients		open cycles gradually replaced by closed cycles conserving nutrients	Nutrients
Severe - subject to exposure and extremes				modified by sheltering	Microclimate

In Tansley's classic description of the vegetation of the British Isles six major systems are discussed (woodlands, grasslands, hydroseres, heath and moorlands, montane and arctic/alpine and maritime); many of the subdivisions owe their existence, more or less, to human interference (e.g. scrub, heather moorlands) (Tansley 1939). Continued wide-ranging interference means that little, if any, of the existing vegetation can be considered to be "natural climax". The landscape, of which the vegetation is a major component, is the result of centuries of deliberate management and accidental changes. Developments in agricultural techniques continue to have lasting implications for the fauna and flora as a whole, as demonstrated by such writers as Goudie (1981).

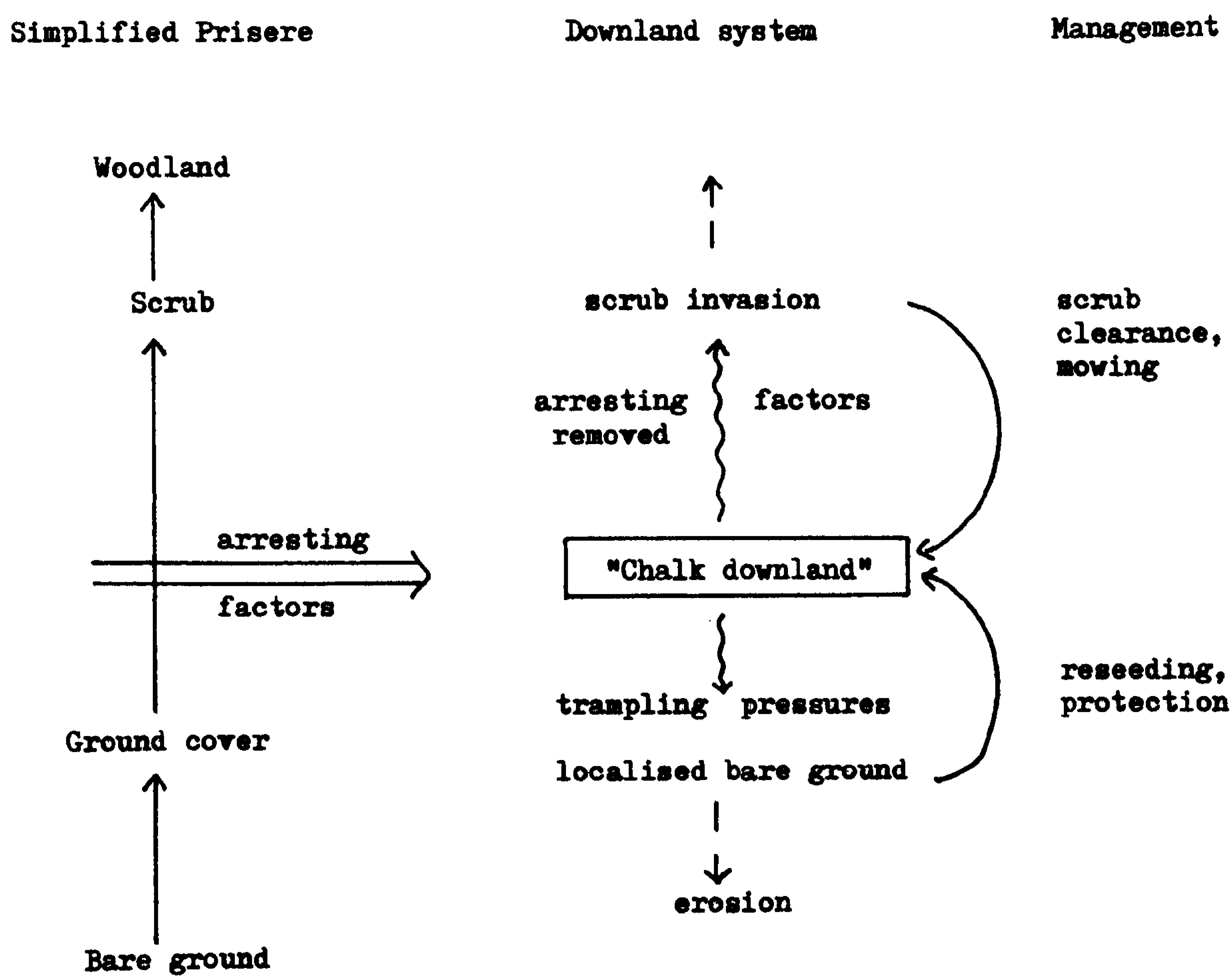
Many of our beauty spots and areas favoured for outdoor recreation are "man-made" in that the vegetation has been created, or at least held in check, by man's activities. Such areas will not hold their character without continued intervention. 'The significance of successional theory to ecosystem management lies in the fact that many areas which are intensively used for recreation are sub-climax seral stages (e.g. sand-dunes, chalk grassland) and that larger management inputs are required to maintain a particular area at an early successional stage than at a later one' (Goldsmith 1974, 220). Thus it is now recognised that conservation of a natural system involves much more than preventing its destruction by human interference. A fence and "keep out" notices may be just as destructive as a bulldozer to certain delicately-balanced systems.

A simple example can be used to demonstrate the forces at work. The traditional successional approach to the vegetation of the South of England predicted a development through grassland and scrub to deciduous woodland. Without worrying unduly about the actual species composition, diversity or complexity of the systems, this model can be used to represent the course of development for the chalk downlands. Over many centuries of human activity a grazing regime became established that prevented the regeneration of woody plants and favoured the turf-forming grasses. Years of familiarity have caused this attractive park-like scene of short grass with isolated clumps of trees to be taken as the "natural" vegetation of the Downs (Figure 2.4). Beauty spots such as Box Hill have a renown of many generations, based on attractive scenery, varied views, and fortuitous location.

Two changes have taken place recently that have upset this system and caused management problems. First, the extensive grazing of the North Downs has given way to more intensive forms of agriculture, releasing marginal lands for other uses. The loss of grazing pressure was exacerbated by the myxomatosis outbreak of 1954 which devastated the rabbit population (Wells 1971). Box Hill has been preserved as open ground, but without the control exerted by grazing, woody plants are invading the valued turf. The build-up of scrub may be welcomed by some bird lovers (Duffey 1974), but it is undoubtedly changing the scenery.

The second recent change is the vast increase in the number of visitors which has led to severe trampling problems. The most favoured route up the steep slope above the car park has become a white

Figure 2.4 The Vegetation System of Chalk Downland



gash of eroding chalk, plainly visible from miles away. The substitution of people for sheep has resulted in too little widespread pressure and too much concentrated pressure.

In one of the earlier detailed examinations of the biotic effects of recreation use, Streeter (1971) showed that some species characteristic of the chalk downland proved sensitive to trampling and were quickly lost (Thymus drucei and Asperula cynanchica). He also noticed the appearance of characteristic "weed" or opportunist species, such as Plantago major and Taraxacum officinale, in the more heavily trampled areas. The change in the composition of the grassland produced new dominants in trampled areas, such as Lolium perenne and Cynosurus cristatus, probably due to improved competitive position caused by either nutrient enrichment or soil compaction (Liddle 1975).

Many characteristic species of nutrient-deficient limestone soils show a slow growth rate (Liddle 1975, Grime 1979). This is a great disadvantage if the area is subjected to trampling. Species colonising the trampled areas are usually characterised by higher productivity. 'On chalk downland, the interesting paradox arises that although visitor pressure reduces the botanical richness of the sward, and hence its scientific value, a degree of use actually produces a sward that is better adapted to withstand the visitor pressure to which it is subjected' (Streeter 1971).

Thus Box Hill showed two problems of trampling pressure, the loss of some characteristic species, detracting from the botanical interest of the downland, and the introduction of uncharacteristic species frequently leading to scrub development. Extreme pressure resulted in total loss of cover, as around the Salomon memorial. A cutting and slashing regime has now been introduced at some cost to try to keep down the scrub, but little can be done to re-establish vegetation on the heavily-used paths where bedrock is exposed.

This example illustrates the basic dilemma. The succession system was controlled by a particular regime of interference. The cessation of one type of activity led to readjustment within the system, here allowing for progressive colonisation and further development of vegetation. The introduction of a different pressure brought other areas of the system under strain, in this case too great for the internal balances to cope with, resulting in vegetation destruction, soil loss and erosion of the bedrock. Similar problems have been observed elsewhere; with reference to hay meadows, Lloyd (1970) states that 'scientific interest is often dependent on the maintenance of traditional farming methods and such changes (e.g. leaving uncut because of trampling damage) may cause a degradation in interest as well as loss to agriculture'.

Thus, within recreation ecology the general concept of the succession has been applied quite successfully to the problem of vegetation change with interference (Goldsmith 1974; O'Connor 1974). However, in the effort to achieve precise measurement and prediction many problems have arisen principally concerning the characteristics of the succession and applying the concept to particular cases.

Two main areas of research have produced problems for succession theory, and both are relevant to the question of managing damaged systems. Succession theory predicts sequential colonisation of the area as conditions improve, with the later arrivals achieving dominance over and possibly eliminating the plants of the earlier stages. Recent research on vegetation development from the pioneer communities suggests the presence of much of the eventual range of species from an early stage (e.g. McIntosh 1980). If it is changes in proportional representation rather than absolute composition that suggests the different stages, then the succession must be due to some mechanism retarding the early development of the eventual dominants rather than differing colonisation rates. The concept that "stages" can be defined at all has been questioned, with workers now favouring the idea of a "mosaic" of associations showing continuous change in space and time (Harrison 1979). Although a closer approximation to reality, this concept loses one of the main attractions of the succession, the easily identifiable and predictable stages.

Some of the changes that have been observed cannot easily be absorbed into the succession model. For example, many of the works cited show that in some cases trampling promotes colonisation; thus after an initial set-back suggesting a reversal of the succession, atypical "resistant" species spread, actually increasing the cover (Streeter 1970; Liddle 1975; Bayfield 1980). This led to the realisation that in some cases the seral stage was more "resistant" than the climax community. Thus, although the general outline of succession theory may help to set an association in context, it can be of little value to managers unless the processes and thresholds can be more clearly defined. One obvious, and vital, area of confusion was the problem of stability and diversity, and this provides the second possible approach.

2) Stability

In the early sixties, many workers accepted the basic assumption that a complex system would be stable: the complex structure and great species diversity of the climax would provide many alternative linkages, cushioning the system against change. Increasing familiarity with actual systems showed many examples of supposedly stable mature forest that quickly deteriorated under pressure (e.g. Burden and Randerson 1972), and also systems of the early successional stages that were remarkably resistant to change (e.g. Perring 1967). Continued attempts to assess the stability of associations involved detailed study of the whole ecosystem. The important question in recreation ecology concerns the amount of interference a system can absorb before it reacts in such a way as to change its character (e.g. the loss of grass cover from a footpath). This raises the question of resilience, or the ability of a system to correct an imbalance.

Trudgill presents a general model of stability which he uses to investigate many theoretical variations of the problem. He relates the resilience of a system to the ratio between the amount of energy flowing through it and the degree of disturbance (Trudgill 1977). Thus, a high energy system (e.g. a large river) could absorb a relatively high level of disturbance (water abstraction or input) without destructive change. A low energy system (e.g. alpine vegetation) could be fundamentally changed by a small disturbance (passage of a few vehicles). If disturbance is continued, then recovery would depend on the rate of input (e.g. vegetation growth) being greater than the rate of loss (trampling damage). Thus, in the Ranmore Common example, plants growing quite rapidly in favourable conditions were able to recover quickly once disturbance ended; in the Cairngorms example the extreme conditions resulted in very slow growth, retarding recovery. A "balance-point" occurs where the degree of disturbance is roughly equal to the energy throughflow of the system, and this would indicate a threshold.

The interpretation of balances is complicated by the fact that most systems are not inert, but involve complex feedback loops that will react to disturbance. Trudgill identifies two types of threshold: "irreversible", where positive feedback operates to accelerate the change; and "reactive", where negative feedback dampens down the change reducing disturbance. Thus, the spread of resistant forms in the chalk grassland could be interpreted as an example of negative feedback, indicating that a reactive threshold had been passed. In the example of the Missouri Ozarks (page 36), disturbance had reached the point of the irreversible threshold, with positive feedback (the loss of organic matter) accelerating the destructive soil changes.

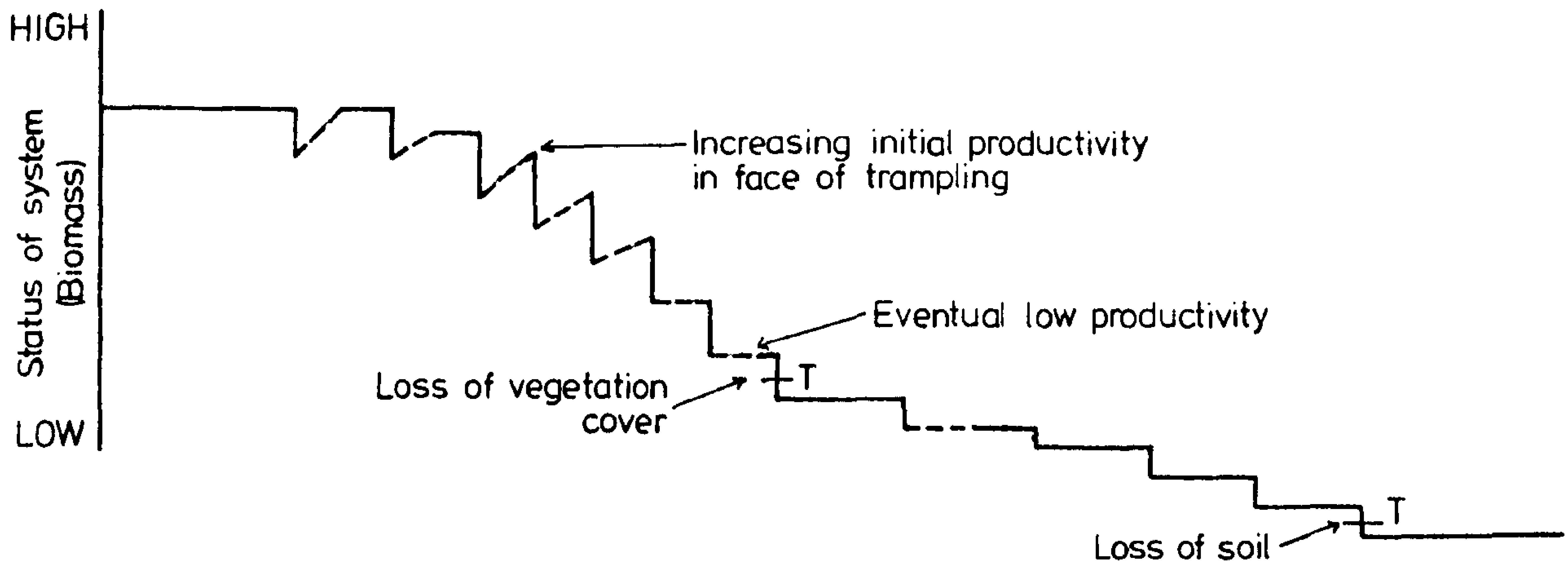
Reaction time will vary with the type of system and disturbance experienced. Trudgill contrasts the fairly rapid spread of "resistant" species into newly bared ground with the slow processes of soil formation necessary to restore severe erosion. Potential recovery will depend largely on the reserves, especially on the abiotic components as these take longer to accumulate.

In theory, the model is potentially very valuable, not least because it allows the prediction of the probable outcome of different management policies. Trudgill presents a series of applied models, one of which represents the relationship of biomass and trampling (Figure 2.5). Two thresholds are shown and 'final stability is defined when the system is exhausted and the soil has all gone' (ibid., 136). Until the first threshold is met with, recovery by natural processes is possible, although resilience and the recovery rates will vary with the type of vegetation. Thus, the management application of the model requires an understanding of the resilience of different associations (not species as Trudgill states, as specific resilience varies with habitat conditions) and the identification of thresholds.

It is easy enough to see when a threshold has been passed, but this is of little help in setting capacity levels that will prevent future damage. Much research has been directed towards the identification of indicator species, key plants whose presence or absence may indicate the approach of a threshold. Unfortunately, as has been shown, the reaction of plants depends very much on habitat conditions so "indicators" will not necessarily be transferable (Speight 1973; Liddle 1975). Reaction lag may occur masking changes, so that by the time a species is severely damaged or lost the trend may be irreversible.

Figure 2.5

GENERAL STABILITY MODEL: BIOMASS & TRAMPLING



Source: Soil and Vegetation Systems by Stephen Trudgill 1977

Problems also occur in the operation of a control; concentration of disturbance may be crucial, but the difference between reaction to sudden, intense pressure and more prolonged but lower pressure is hard to quantify (Burden and Randerson 1972). In most cases, the prediction of possible recovery by "natural processes" assumes no further disturbance; in practice this may involve the exclusion of people, thus defeating the intended aim. A system that is only stable in the absence of people is of no value to a recreation manager. Thus the model can be used to demonstrate changes, but to apply it in a predictive way, especially in the crucial area of identifying thresholds, involves a far more intimate knowledge of the particular system than is usually available.

3) Vegetation Strategies

In a series of articles in the early 1970s Grime investigated the relative importance of stress, disturbance and competition in determining the form and functioning of plant associations. He developed the hypothesis of recognisable plant strategies or 'groupings of similar or analogous genetic characteristics which recur widely among species or populations and cause them to exhibit similarities in ecology' (Grime 1979, 1). The approach is particularly interesting for recreation ecology because of the prominence given to disturbance. While rivalry between plants for the same material resources (light, nutrients, water) and space may be termed <u>competition</u>, <u>stress</u> may be imposed by shortages of materials or sub-optimal temperatures. Grime defines <u>disturbance</u> as the 'partial or total destruction of the plant biomass (which) arises from the activities of herbivores, pathogens, man (trampling, mowing and ploughing), and from phenomena such as wind-damage, frosting, droughting, soil-erosion and fire' (ibid., 7). Thus while stress reduces the rate of productivity, disturbance actually destroys plant material.

Grime proposes three major strategies of established associations with various combinations of the extreme of each factor (Table 2.2), and several minor strategies occupying intermediate positions. Competitors are characterised by the ability to grow rapidly when conditions are favourable and by the ability to make rapid morphogenetic changes (e.g. root-shoot ratio) to maximise resource use. There may be highly seasonal growth patterns, but constant readjustment by the plants will result in a crowded vegetation with a dense canopy.

Table 2.2 Suggested basis for the evolution of three strategies in plants (Grime 1979, 8)

Intensity of disturbance	Intensity of stress	
	Low	High
Low	Competitors	Stress-tolerators
High	Ruderals	No viable strategy

By contrast, stress toleratora are characterised by long life histories but slow growth. Many are evergreen and thus avoid wasting valuable resources in leaf-fall; individual organs are long-lived (e.g. leaves), nutrient turnover is slow, and flowering infrequent. However, mechanisms exist to provide for rapid uptake and storage of surplus resources when available. Highly acidic soils are typical stress-inducing environments, with nutrient deficiency and impaired biotic functions such as nitrogen cycling and mycorrhizal activity. The ruderals exist in areas of frequent disturbance; they are characterised by short life-cycles, high rates of dry matter production, early flowering and rapid seed production. These are the annuals and short-lived perennials of waste places, agricultural fields and footpaths; they are also, incidentally, plants able to cope with the taxing conditions of early succession. Each strategy may be distinguished by its reaction to stress: 'the stress-response of the ruderal ensures the production of seeds, those of the competitor maximise the capture of resources, whilst those of the stress-tolerator allow the conservation of captured resources' (ibid., 46).

Grime represents this classification in a model (Figure 2.6) supported by experimental data from different habitats. Some ambiguity in the expression of the variables makes comparison difficult; in the course of the research a measure of morphology is transformed into the competition index, the mean rate of dry matter production becomes a stress indicator, and a previously unmeasured disturbance factor appears. However, there is some evidence to suggest that stressed habitats (including acidic grasslands) approach the ruderal angle.

In applying the hypothesis of vegetation strategies to succession theory, Grime uses the model to trace the path of the dominant life forms which move from ruderal strategy (early colonisation) to stress-tolerators (climax). The relative importance of the competitor strategy would depend on the productivity of the habitat, with competitors dominating the seral stages in productive systems. The dominance of the stress-tolerating strategy in the climax phase is accounted for by the increasing problems of shading and nutrient exhaustion (i.e. self-induced). Grime makes the observation that moderate stress or disturbance would tend to increase species density by reducing the vigour of the potential dominants.

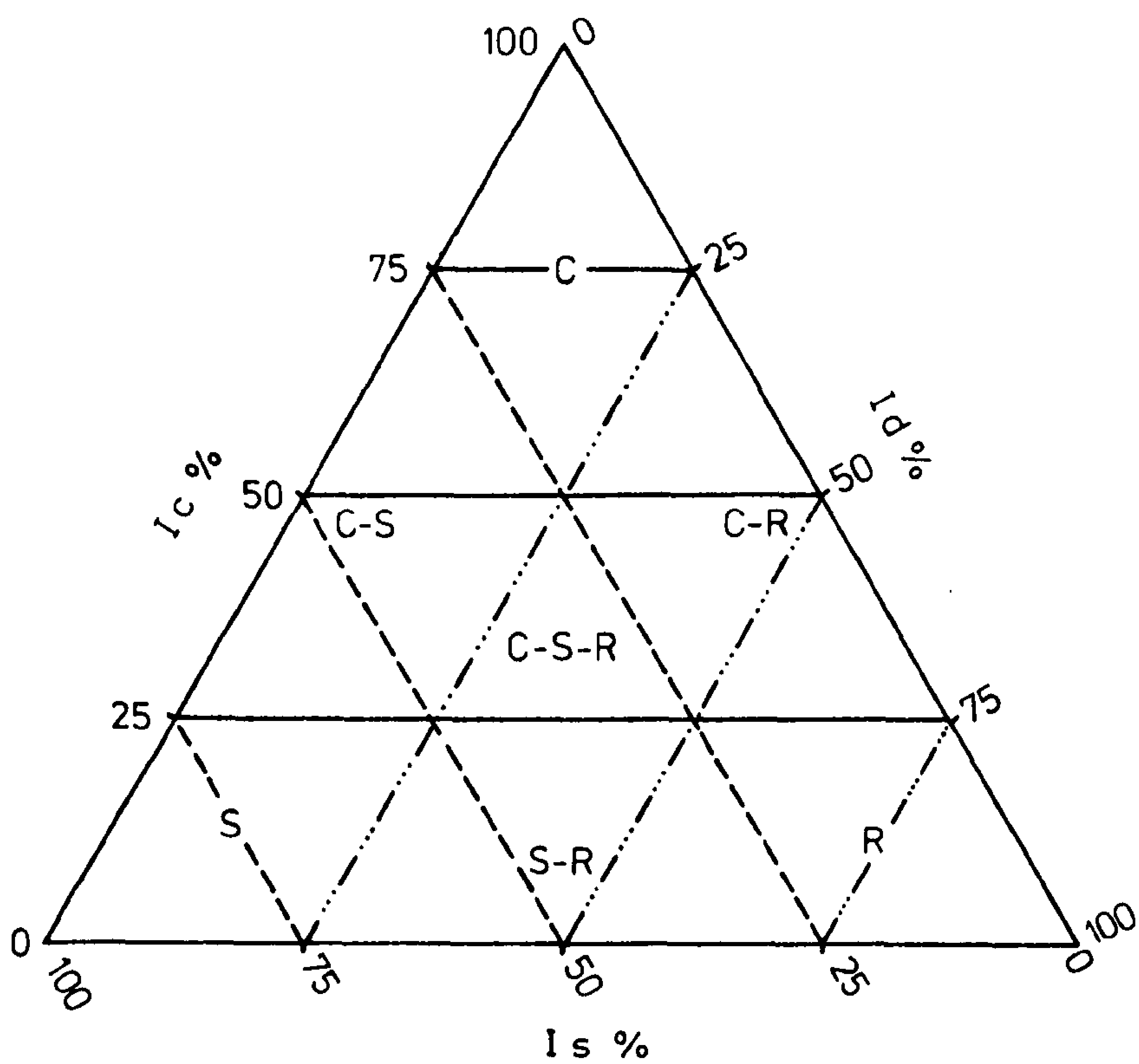
Applying this hypothesis to the problem of trampling disturbance, plants surviving in severely trampled areas would be expected to show a ruderal strategy (R on Figure 2.6 (a)). Where disturbance is reduced, there may be a move towards either the competitive-ruderal (CR) strategy in areas of low stress, or the stress-tolerant ruderal (SR) strategy where stress is important. The strategy for undisturbed areas such as the acidic grasslands and moors would be that of the stress-tolerant competitor (CS); with disturbance there would be a shift towards the stress-tolerant ruderal (CSR), and finally ruderal (R) strategy. Where stress and disturbance are both high, there is no viable strategy, as shown by the bare ground of heavily trampled paths.

Grime presents a further model to relate species density and maximum standing crop (Figure 2.6 (b)). With this model he is able to account for the apparently conflicting reports of both an

Figure 2.6 (a)

MODEL OF VEGETATION STRATEGIES

Redrawn from Plant Strategies and Vegetation Processes by Grime 1979



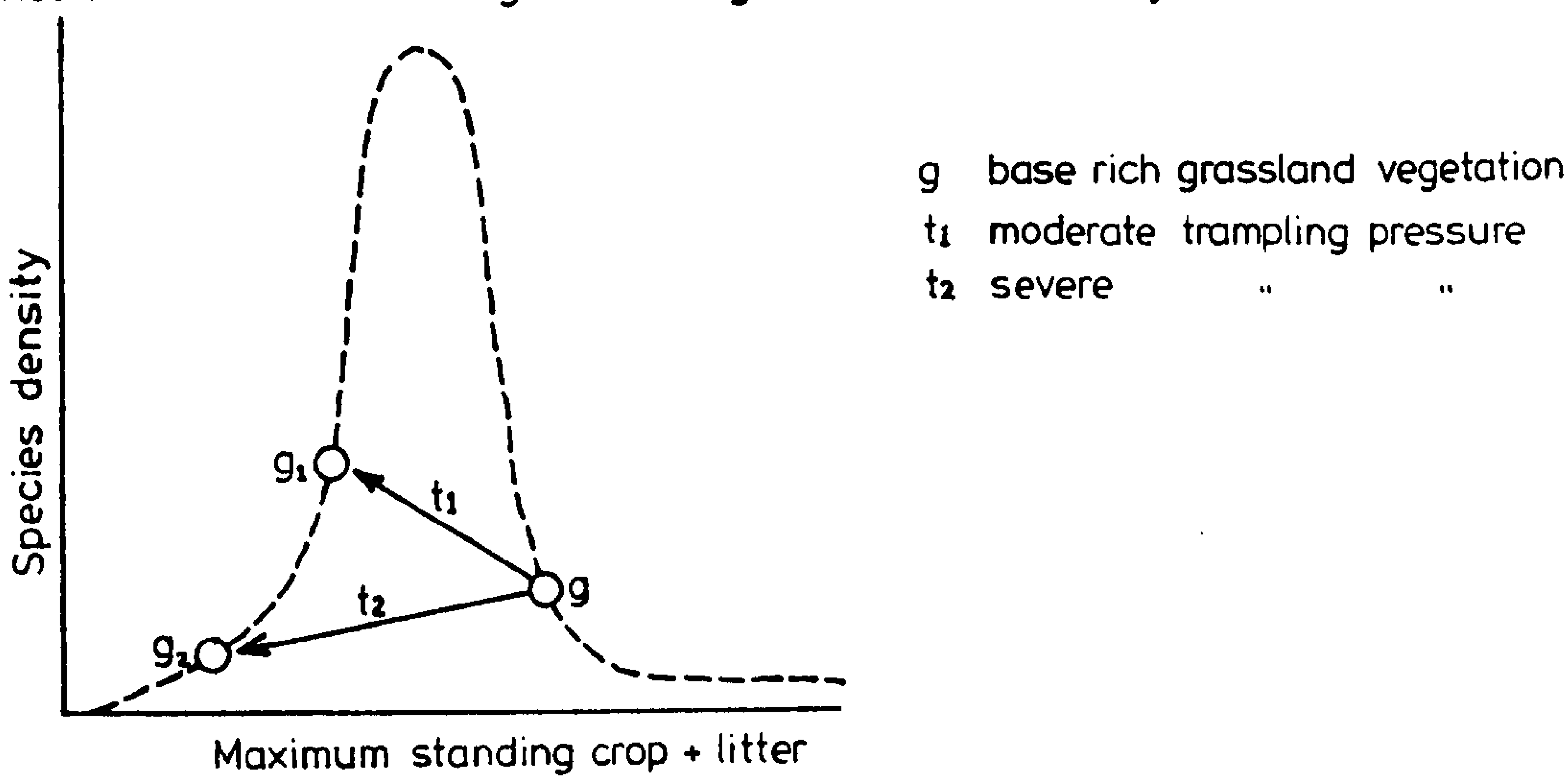
Ic relative importance of competition (———)
Is relative importance of stress (– – – –)
Id relative importance of disturbance (–···–)

For description of strategies see text

Figure 2.6 (b)

THE 'HUMP-BACKED' MODEL OF SPECIES DENSITY AND STANDING CROP

Redrawn from Plant Strategies and Vegetation Processes by Grime 1979



increase and a decrease in species density with trampling pressures. Referring to relatively undisturbed base-rich grassland, he predicts that 'at the lower intensity of trampling the result is a reduction in the vigour of the dominant components of the turf, allowing an ingress of species. The effect of more severe trampling, however, is to create an environment in which only a small number of specialised plants are able to survive' (ibid., 189). In the latter case, these plants may not be typical of the original vegetation; in both cases productivity declines.

The models presented are hypothetical, and although some experimental data is quoted, they remain largely unsubstantiated. However, the explanations do agree with some of the observations reported. For example, the soil and moisture conditions of the chalk grasslands produce a fairly typical stressful habitat for plants, resulting in slow growth. The dominant strategy would be that of the stress-tolerator. Streeter's "weeds" are obviously plants of a ruderal strategy taking advantage of the trampling disturbance; their more rapid growth helps to produce the improved cover and productivity often reported. It may be possible to limit invasion of ruderals by encouraging the growth of the original community, hence the emphasis on watering and fertilising, both forms of management aimed at reducing stress.

The study of vegetation strategies is aimed at identifying the dominant strategy in a community; it does not mean that all the plants of the community will follow the same strategy.

It may be possible to manipulate the composition of the vegetation to achieve the desired end product, but the management objectives must be reasonably close to the natural pattern. Thus it would be quite unrealistic to attempt to maintain a community with no ruderals in an area to be used for recreation. There is room for manoeuvre in the central area of the strategies diagram; with careful management it may be possible to relieve one factor (e.g. stress) sufficiently to encourage continued growth in plants that would otherwise be unable to cope with the disturbance.

Three approaches have been considered. The first, vegetation succession, has been largely superseded by research. Although it offers a useful general framework for long-term change, the detail of the predicted succession has not been substantiated experimentally. The second approach, the question of stability and resilience, has one great advantage: consideration of the whole system emphasises the importance of the inorganic as well as the organic factors, and allows for study of changes in the physical environment as well as the vegetation. However, it has proved very difficult to apply the theory in practice, because of the large amount of detailed information necessary. The large number of variables involved means that it is dangerous to translate predicted patterns from one habitat to another, as no two systems will be exactly the same. If the information were available in sufficient detail, this approach offers the possibility of quantified prediction and measurable thresholds, but it is unrealistic to expect this precision in many recreation sites.

The last approach, of vegetation strategies, seems promising in terms of accounting for observed variations in the vegetation of recreation areas. It is clear that the plants resistant to high levels of trampling would be predominantly ruderals, with recognisable characteristics assisting their survival. The make-up of the rest of the community would depend on the habitat conditions, but the majority of our recreations sites would occupy habitats requiring a stress-tolerating strategy. The recognition of the natural strategy and likely changes with trampling would allow the construction of appropriate management aims, possibly resulting in the abandonment of any idea of recreation use if there is a need to preserve a stress-tolerating or competitive strategy intact. The disadvantage of this approach is that it is aimed at understanding the functioning of the system, it can give no direct guidance to managers concerned about just how much disturbance the vegetation can tolerate.

In view of previous unsuccessful attempts to identify thresholds and indicators, it seems unlikely that hard and fast boundaries occur in reality. The sharp balance of the models must be replaced by a continuous change, perhaps with differing rates. Thus, in terms of vegetation strategies, the move from stress-tolerating strategy to ruderal to none may be a straightforward progress, but the time taken to achieve the transformation may not be uniform.

In this study it is intended to investigate the vegetation of several areas experiencing different levels of trampling disturbance. In the attempt to limit the variation to disturbance, sites showing similar habitat characteristics will be selected. The reaction of the different associations will be measured, in relation to the trampling pressure, and plants best able to cope with heavy trampling identified.

III Summary of Aims

In this chapter the need for information on which to base a recreation strategy has been expressed, with particular reference to the questions of site requirements, compatibility, location and ecological capacity. The overall aim of the study is to produce a body of information sufficiently detailed in specific studies to facilitate application to more general development plans. The study examines the background, justification, working and success of a strategy involving filtering through the observation of two sites, chosen to exemplify the opportunities available to both managers and visitors.

The study is developed through three approaches, dealing with the questions of participation, impact and site perception. Specific aims may be listed under these headings, although the information base is integrated.

(a) Participation

The aims of this part of the study relate to the specific operation of two sites, and from them the trends in recreation in the region.

(i) To establish the pattern of participation in informal recreation in the decade 1970-80, providing a context in which to study the operation of individual sites.

(ii) To investigate the spatial and temporal pattern of use of these sites, related to their location, landscape and function.

(b) Impact

The aims of this part of the study relate to establishing the cause of damage observed on one site, with a view to its control and restoration. In the latter case, the observation of distribution of activities on both sites provided insight into factors influencing site choice.

(i) To investigate the impact of visitor pressure on the vegetation of open areas, with the intention of establishing a quantitative relationship between trampling pressure and community disturbance.

(ii) To investigate the use of land resources by visitors with the attempt to identify factors influencing their distribution.

(c) Site Perception

The aims of this part of the study relate to the characteristics of the people found on each site, with an attempt to identify visiting patterns that may be related to a filtering strategy.

(i) To establish the range of resources required and used by the visitors to informal countryside recreation sites.

(ii) To investigate the relative importance of landscape and facilities in influencing site choice by different groups of visitors.

(iii) To investigate landscape interpretation by different groups of visitors and appraise the importance of landscape in the recreation experience.

Chapter Three

SURVEY DESIGN AND METHODS

The aims set out at the end of the last chapter indicate the range of the survey and the information required. This may be grouped into three interrelated studies concerning:

(i) participation - numbers of visitors, their activities and distribution;

(ii) impact - disturbance to vegetation caused by recreation;

and (iii) Perception - assessment and use of site resources, factors influencing site choice, interpretation of "natural" characteristics in the landscape and their importance in the recreation experience.

In this chapter the survey design will be described, with a discussion of the methods used to collect information. The results of the survey will be examined subsequently: Chapter Four, the pattern of participation; Chapter Five, the impact on the vegetation; Chapter Six, site perception and visitor type.

I Choice of Site

The Forest of Bowland AONB provides a wealth of recreation opportunities. The aims of this survey required assessment of two contrasting sites, one used informally, the other designed for recreation. With a view to examining the operation of a filtering system, it was desirable that the designed site should have a potential filtering function, with the alternative site representing the area to be protected. It was also necessary that one site should provide suitable conditions for an impact study, in this case a relatively large area of similar vegetation where access could be easily observed, if not controlled.

(a) Site I: The Trough of Bowland

The Trough road is the only route to traverse the central area of the Bowland Fells, crossing the watershed between Langden Brook (flowing south to the Hodder and Ribble), and the Wyre (flowing north and west to the sea at Fleetwood) (Figure 2.2). Although narrow and tortuous in places, it is a vital access route for those living and working in the area, and also forms a suitable "scenic" route to the coast for those travelling from the industrial towns of Lancashire. The road passes through bleak country between Winfold Fell and Blaze Moss, giving car-borne visitors their nearest impression of wilderness, the classic Bowland scenery which prompted the designation of the Fells as an Area of Outstanding Natural Beauty.

The Trough road is an interesting site because of the number of different users: local farmers and water authority workers, residents and local people needing access, pleasure drivers and picnickers. There is potential (and real) conflict between some of these users: parking is a problem on the narrow road, therefore there is a danger that picnickers will be tempted to use gateways; many urban motorists are unsure of the steep, narrow roads and "pleasure" drivers tend to drive slowly anyway, so congestion easily builds up, inconveniencing those who wish to make a more rapid transit. Some of these problems are resolved by the timing, as the greatest recreation traffic occurs on Sundays, but an investigation of visitor perception of the site may indicate their awareness of potential conflict.

The Trough of Bowland passes through country that is probably one of the closest approximations to wilderness found in England. If wilderness can be measured by the absence of people (Priddle 1978) or noticeable human activity, then the central area of the route would certainly qualify. Obviously the presence of the road will prevent any true feeling of wilderness and the occurrence of buildings and plantations lower its value in certain places, but the overall impression is of open, spectacular scenery. Two factors deserve study: the identification of features that contribute to the interpretation of an area as wilderness, and the importance of such features in the recreation experience. It seems likely that many of the visitors are not seeking a wilderness experience, and yet they will contribute to the steady stream of traffic passing along the road on a typical Sunday. The presence of so many cars would prevent any impression of wilderness, even for the most blinkered observer. If the preservation of an impression of wilderness is important for some visitors, then there is good reason to encourage less demanding visitors to go elsewhere.

Thus the Trough of Bowland typifies the problem of Bowland: the most characteristic scenery but under great pressure from the number of visitors. It is not a recreation "site" as such; it has no defined boundaries and many functions. Pleasure drivers contribute to road congestion, and when they stop their cars cause erosion to the verges. The land alongside much of the route is fenced, and there are few opportunities for walking far. It would appear that this is exactly the sort of area that would benefit from a filtering and substitution exercise - i.e. providing a suitable informal recreation area to draw off some of the "site-free" visitors and reduce the congestion that is destroying the wilderness feeling.

(b) Site II: Beacon Fell Country Park

Beacon Fell is an outlier of the Bowland Fells, detached from the main mass of hills by the valley of the River Brock. Situated in open country eight miles north east of Preston, it is just within the boundary of the AONB and in a prime filtering location, being available to visitors driving out from Preston and the Fylde. For many years a hill farm, the Fell was adopted as a water catchment in 1910 and the southern flanks planted to conifers. It subsequently became disused, and in 1969 was acquired by Lancashire County Council, becoming one of the earliest Country Parks.

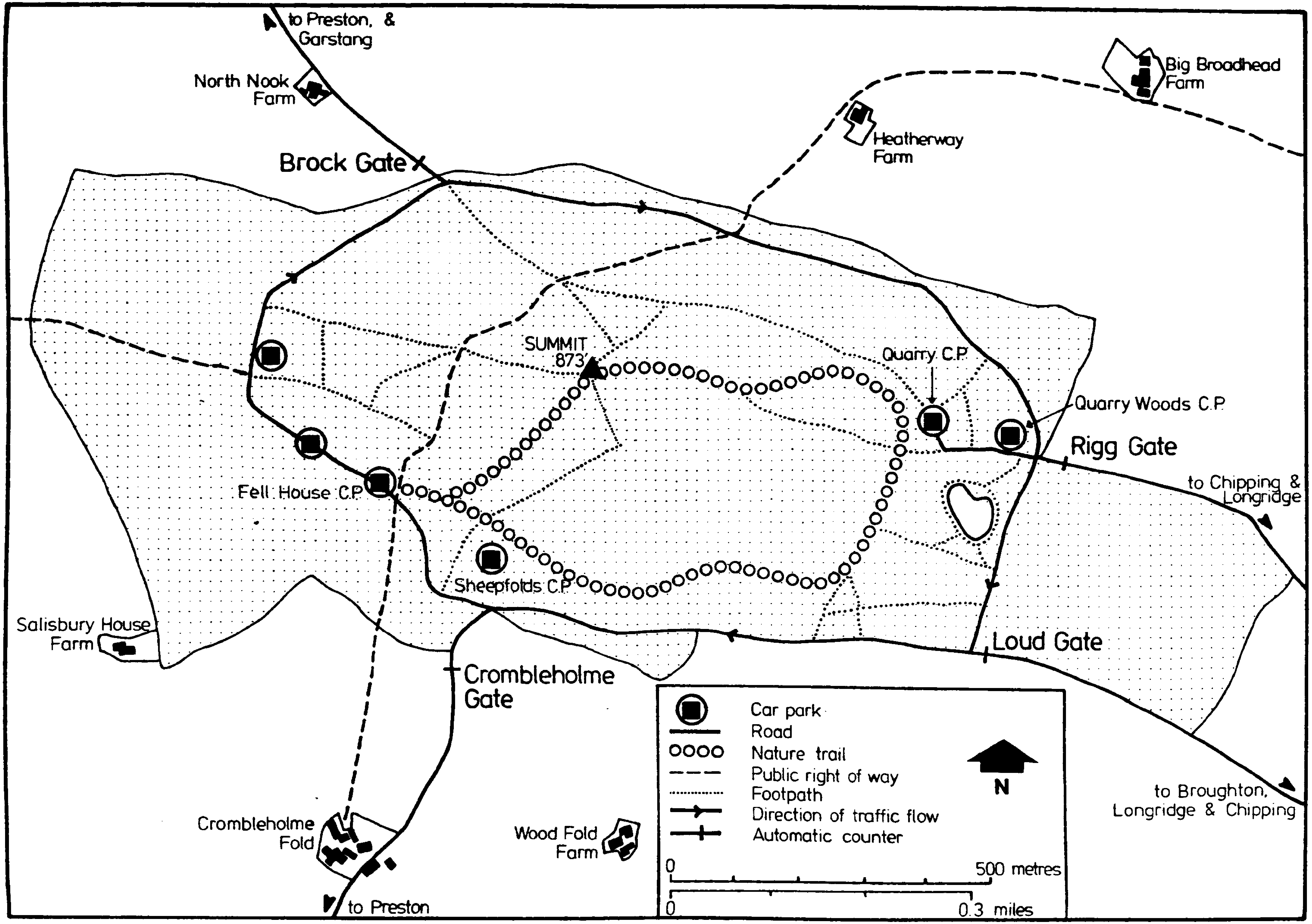
Although the open moorlands had been used previously for informal recreation, the publicity afforded by designation and the improved access due to the new road and car parks dramatically increased the number of visitors. The main recreation area is defined by the perimeter road, a feature that greatly facilitated field work. Automatic traffic counters were installed in 1970, and provided a valuable source of background information. Initial activity by the Council involved completing the circuit road, building car parks and a toilet block, laying out picnic places and footpaths. Subsequent activity has been confined to maintaining the existing facilities, repairing damage to footpaths and pursuing a landscape development plan aiming at the eventual conversion of the woods to deciduous trees (Coates 1970).

The location of the car parks tends to concentrate activity in the southern half of the Fell (Figure 3.1) with the Summit acting as a focus for the whole site. The open moorland of the northern part provided a suitable habitat in which to study trampling pressures. After a relatively short period of familiarization, it was possible to select sites of differing levels of use within this area.

The Access Areas of the Forest of Bowland provide space for those who want the freedom of long walks across open moorland, but these are inappropriate sites for those wanting to linger and picnic. Beacon Fell was developed to provide informal walking and picnicking opportunities within easy reach of the urban population to the south of the AONB. A comparison of the use of Beacon Fell and the Trough of Bowland should provide an interesting commentary on the operation of a filtering system. It was also intended to test the reaction of people to the appearance of the two sites, with particular reference to the modifications of the landscape at Beacon Fell.

Figure 3.1

BEACON FELL COUNTRY PARK



II Participation

The most appropriate method of counting depends on the site characteristics and the survey requirements. Where there is controlled entry, the total number of visitors may be counted by admission ticket, automatic counters, or observation. Where there is no charge, an automatic system is preferable as observation can only provide sample data. If there is free entry to the site, with several access points (as is the case on Beacon Fell) it may be very difficult to achieve accurate counts by these methods.

The relatively isolated location of Beacon Fell suggested that most people would reach the site by car, and four separate interview surveys in the early seventies all showed at least 98% of visitors travelling by private car (see Chapter Six). Thus, in this case a traffic census should provide an accurate measure of visitor numbers. The cordon method gives good results, especially where it can be combined with a questionnaire survey and count of car occupancy, but is time-consuming and very expensive. Long-period data may be collected by automatic counters, of which the pressure-sensitive cable is the most common.

While a traffic census is valuable in providing information about total numbers of visitors, seasonal patterns and annual trends, it cannot indicate how the visitors are distributed within the site. The impact survey required additional information on distribution that could be linked to a vegetation study.

(a) The Beacon Fell Traffic Census

Automatic traffic counters were installed at Beacon Fell when the site was first developed by Lancashire County Council in 1970. Records have been kept continuously since that time, with occasional lapses due to equipment failure or staffing problems. The raw counts were supplied by Lancashire County Council. The first year was largely experimental, but subsequently a consistent pattern was established with readings at 0900 Saturday, Sunday and Monday mornings. From these three readings, it is possible to give totals for Saturday, Sunday, the weekend, the weekdays, and the whole week. (See Appendix IV).

The counter cable is fixed right across the road at each gate, so the count is of vehicles entering and leaving the Fell. The total count of vehicles at each gate was halved to give an estimate of the number entering at that point. This may give some inaccuracy for direction at each gate, but the total entering the whole site will be reliable.

Missing values were estimated by a proportional method. A systematic sample of complete data sets produced the breakdown shown in Table 3.1.

Table 3.1 Traffic Census: Average Breakdown for Decade

Gate	Brock	Rigg	Loud	Crombleholme
% of total	44	14	31	11

Average weekday	9% of week	
Total weekdays	45% of week	
Saturday	16.5% of week	(30% of weekend)
Sunday	38.5% of week	(70% of weekend)
Total weekend	55% of week	

The weekly total for a set with a missing record was estimated from these proportions (using Brock Gate wherever possible) and the missing record was then estimated from this total.

There was very little variation in the weekend split throughout the year. Saturday tends to be a day for shopping and house chores whatever the season, so totals for Saturday were consistently much lower than those for Sunday. In the winter, with poor weather and short days, fewer people visit in the week and a larger proportion come at the weekend. In the summer, with better weather, longer hours of daylight and school holidays, more people visit on weekdays. The difference was not sufficiently large or consistent to adjust the estimate counts for season, but it may be an important consideration in management.

1979 presented a series of problems not encountered previously. In January the weather was so severe that the counters were frozen up for long periods. An estimation produced the low value of 2981 cars for the month, but even this may be a little high as the Fell roads were blocked by snow for some of the time.

No counts were made for the months of June to September inclusive. An attempt was made to estimate the total for the missing months by the use of the mean percentage contribution of each month to the total of a sample of known years. Each of the known months of 1979 was used to calculate an annual total based on these percentages; these estimated totals were then averaged to give a mean estimate annual total, from which totals for the missing months could be calculated. An improved estimate of the annual total was then arrived at by adding all the monthly totals, including the estimated months.

Table 3.2 Beacon Fell Traffic Census

Mean monthly contribution, based on 1972, 1974 and 1978

January	3.5%	July	13.0%
February	4.8%	August	14.3%
March	9.4%	September	9.5%
April	11.6%	October	6.1%
May	10.1%	November	4.2%
June	10.1%	December	3.7%

The method was tested by estimating annual totals from a sample of known years. The results showed a surprising degree of accuracy, the estimates being within ± 0.1% of the counted totals. The estimation of monthly totals was less reliable, giving an average error of $\pm$ 10%. This is to be expected, as monthly totals are more likely to be influenced by random fluctuations in the weather.

This technique was also employed in 1980. From 11th to 31st May inclusive the Fell roads were closed because of the fire risk. Although there were no visitors in this period, an "assumed" visiting estimate has been made, so that the trend of the demand is consistent. There were inadequate readings to calculate a total for November and December, so these months had to be estimated as well. The Rigg counter was vandalised in June and was not replaced, so over half the year is affected by estimated readings.

(b) Mapping Distribution of Visitors on Beacon Fell.

There are many ways of approaching the problem of mapping site use, but certain problems are common to all. The total number of visitors varies with the seasons, the day of the week, the time of day, and the weather. A great deal of time is needed to count visitors accurately, and plotting their distribution in detail would require many helpers as well. Some form of sampling is inevitable, either to monitor a selection of days, or a selection of places within sites, or both.

A traffic census could be employed to assess the flow throughout the day, but this would require frequent meter readings, and is not practical for more than a few sample days. There was insufficient help available to attempt daily counts, as it would be necessary to count each gate simultaneously to achieve a realistic assessment of flow. An elaborate survey involving traffic ounters and taking car registration numbers would enable the construction of detailed flow diagrams and an accurate measurement of length of stay, but it is doubtful if the use of such information would justify the enormous amount of time necessary to collect it.

One factor discouraging such attempts is the variable nature of the weather. The seasonal visitor pattern shows the importance of weather, especially early or late in the year when exceptionally good weather may lead to unexpectedly large numbers of visitors. Poor weather may result in low numbers even in the middle of summer. This problem was encountered early in the study. In the summer of 1974 a number of helpers were assembled one weekend to carry out an interview survey. It was felt necessary to collect a large sample at the same time, so that questions on crowding perception would have a common base. In the event the weather was remarkably cold and wet. The few visitors who made it to the site stayed shut up in their cars, and the potential interviewers were reduced to knocking on car windows in search of someone to talk to! The pattern of use was certainly distorted by the adverse conditions; visitors made short stops and few ventured far from the car parks. This experience prompted a change of technique for the questionnaire study, and resulted in the idea of a similar attempt to count length of stay being dropped.

The number of cars on the site is obviously a factor in site use, but the effective use of land will depend on how the people are distributed about the site. Various techniques have been employed to measure dispersed use, e.g. stile or kissing-gate counters to record footpath use, or time-lapse photography for the wider areas. In a series of articles in the Recreation News Supplement, Bayfield and others discuss the application of pressure-sensitive and photoflux counters (Bayfield et al. 1971, 1972; Coker 1972 a). The main problem in each case is the need for some constriction - a confined space that all visitors would have to pass through. A gate or stile is ideal, but a photoflux counter can be used on a path provided there is sufficient cover to hide the equipment, without too much shading for the light beam to operate effectively. This approach is useful if there is a need to know how many people pass a given point, and has one great advantage, if set against a paper chart it is possible to get a continuous read-out over time (e.g. in Pennine Way Survey, CC 1972).

Various other methods are available to assess areal spread. Metal pins have been used to measure spread across footpaths, but these can only be depressed once so give no count of the number passing. Photography has also been used effectively, with aerial photographs where large sites are to be surveyed quickly. In this case it is usual to count cars with a simultaneous ground exercise to assess party size (e.g. Burton, R. 1974). Time-lapse photography has been employed to measure distribution against time, and may be effective in suitable areas (Coker 1972 b). The vantage point is most important: it must be unobstructed, high enough to give a view over a reasonable area, but with a suitable hiding place for the camera. If the camera is visible, it may at least modify people's movement, and at worst get damaged or stolen. The equipment is quite bulky and expensive, and power may be necessary to work the timing mechanism. If the ground is uneven, or the view interrupted by bushes or trees, several camera sets may be necessary to cover one site. The information from the pictures can be transferred onto maps, but distortions may occur with distance.

There were two main objectives for the survey of the distribution of visitors to Beacon Fell. The attempt to relate intensity of use to vegetation damage required a measurement of use that could be tied to exact locations. It was also intended to collect information to assess daily fluctuations in use, and to investigate the use pattern of different parts of the Fell. If the popular walking and picnicking sites could be identified, and their use observed in some detail, the features that contributed to their popularity may be examined.

It was decided to monitor a number of sites of varying types and intensity of use. The need for a distribution count to relate to the vegetation study ruled out the use of footpath counters. The number of sites to be monitored, the uneven nature of the ground and the lack of cover over much of the Fell meant that photography would be unsuitable. Although it had the advantage of mechanical operation, it would have been too expensive to set up an adequate number of cameras, and the need for suitable vantage points would have unreasonably constrained the choice of site. A mapping technique was devised that would produce the required distribution counts at regular intervals throughout the day.

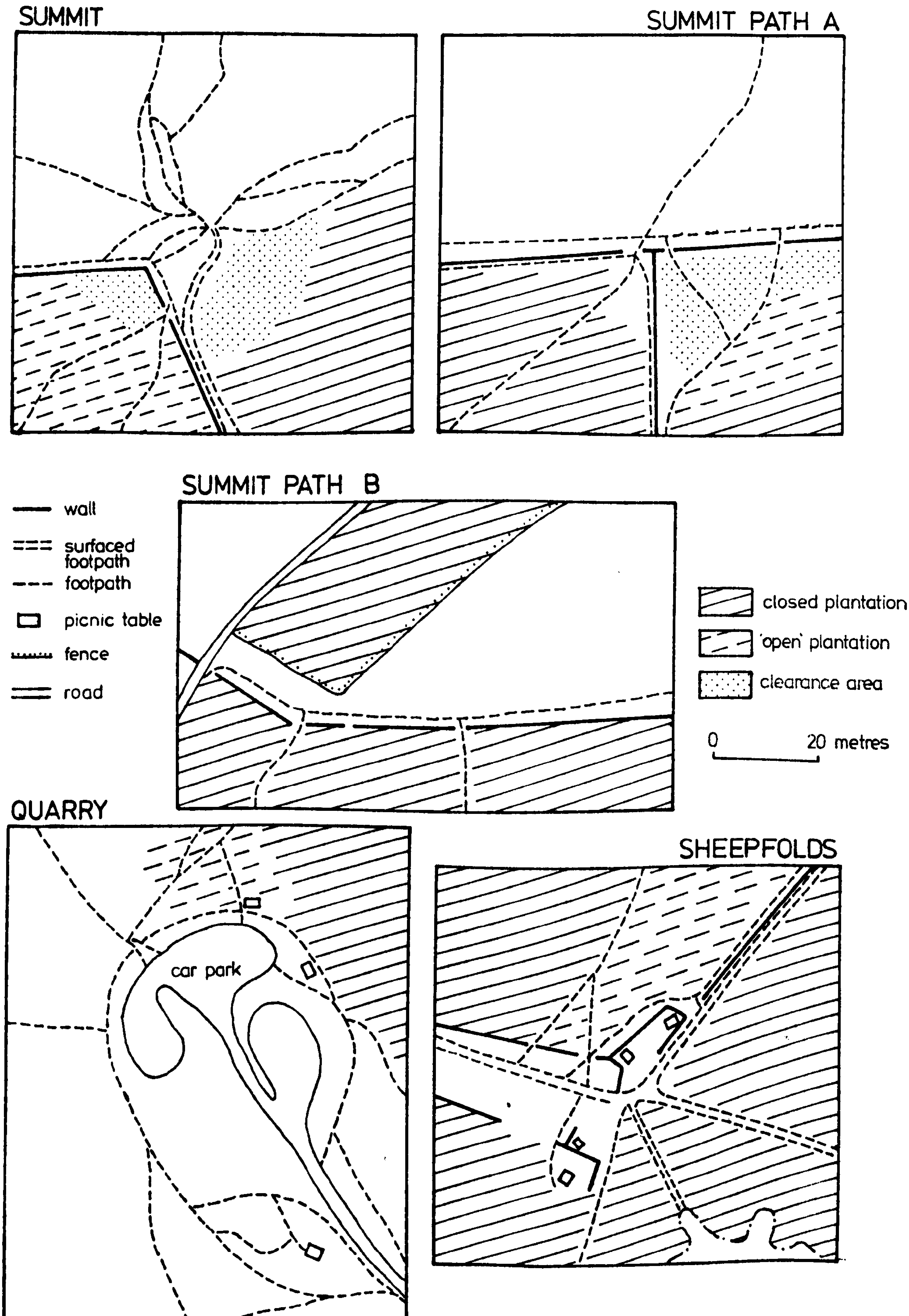
Before discussing the results of this survey, it is appropriate to indicate the problems encountered and possible sources of error. The need for sites of different types and levels of use meant that they had to be distributed about the Fell. It was found that the maximum number that could be reasonably monitored at the same time was five. Three of these sites were chosen to relate to the vegetation survey, and these comprise the "walking" sample. Two more sites were selected to represent "picnic" places (for locations see Figure 5.1).

Each site was an area of approximately 0.6 ha within a rectangular outline, but the dimensions were varied to suit specific requirements. They all include a portion of land that was not recorded - "closed" plantations, surfaced car parks, etc. - so the actual area recorded on each site is different.

The boundaries are quite arbitrary and sometimes proved difficult to locate on the ground; marker pegs seemed to deter adults from crossing the area and were quickly removed by children anyway. Wherever possible some "fixed" point - wall, tree or large bush - was used to mark the boundary, and other prominent features were marked on the maps (see Figure 3.2). However, the plotting of people had to be carried out very rapidly, especially if the site was crowded, and there would inevitably be some inaccuracy in detail. The boundary problem may have led to some inaccuracy along the edges of the maps, as there was a tendency to count borderline cases as being "in" rather than "out". This is not a serious problem as the biassing is not sufficiently large to have a noticeable affect on the totalled counts, and the "edge" quadrats were dropped from the vegetation analysis. This problem accounts for the rather unlikely clusters found as the main footpaths cross the boundaries, particularly evident on the Sheepfolds and Path A sites.

Counts were made on forty-four days of the spring and summer of 1974, including fourteen weekends and three Bank Holidays (for dates see Appendix II). The maps were plotted in series while walking round the Fell, starting at Fell House Car Park:

Figure 3.2 Beacon Fell Country Park: Survey Sites Base Maps



minutes past the hour:

10	Summit Path B
20	Summit Path A
30	Summit
40	Quarry
50	Sheepfolds

In addition, the number of cars in the upper level of the Fell House Car Park was counted on the hour, with the Quarry and Sheepfolds Car Parks being counted in association with the people counts. Starting and finishing times, lunch breaks and other interruptions were staggered so that the totalled counts cover the majority of the "visiting" day, the maximum range recorded being 0930 - 2000 hrs.

A complete set of records for each hour is made up of five unique maps. Each plot represents the number and position of all the people present at the time of the record. Symbols were used to distinguish people sitting down from those walking or standing, but it was not practical to isolate children or specific activities.

An overall site plot was made by combining the maps from each complete set of readings. These were produced to represent the two main survey periods, Easter (April and May) and Summer (July and August), and the total recorded (Easter and Summer together). Separate maps were drawn to distinguish walkers and picnickers. In the maps drawn for comparison with ground effects, people sitting at picnic tables were excluded.

The Easter sample comprises one hundred sets of recordings, made up from forty-eight weekend records, forty weekday records, and twelve Bank Holiday records. The Summer sample comprises eighty-five sets of recordings, made up from sixty-seven weekend records, seventeen weekday records, and one Bank Holiday record. The difference in the number of records in the two periods means that they cannot be directly compared for density, but the individual sites may be compared within the same period. However, the imbalance was partly due to the weather, the cool, wet summer resulting in whole days being lost. Thus the maps do represent a similar time period. Examination of the traffic census shows that there were, in fact, fewer visitors in the summer, especially in July:

1974 Traffic Census: number of cars

April	13273	July	9660
May	10586	August	13869
Total	23859		23529

The sampling method must be kept in mind when interpreting the results; "one-off" counts to represent an hour may be highly misleading. A map showing seven people does not mean seven people an hour, nor seven times sixty people. They could be the only people to cross the site in the hour, and recording five minutes later would miss them!

The sampling problem is most marked with the low numbers. One map of the Quarry on a quiet weekday morning has the unusual plot of fifteen dots in a carefully spaced row on one footpath - the Preston

North End football team out for a training jog; another catches a field study party on the Summit. Busy days are likely to record a fairly steady presence, but even on a Bank Holiday a brief lull may occur causing a single count to be unrepresentative. Because of this difficulty, it is not possible to calculate a meaningful density figure, and the count for an individual day must be treated with great caution. Unless otherwise stated, an "intensity" count is used, made up of the amalgamated results of all 185 sets of readings.

One further technical problem should be considered. The location of each person was plotted onto a base map drawn to a scale of two millimetres to one metre, using one map for each count. At this scale, the dot used could cover one metre on the ground. This inevitably led to some inaccuracy of exact positioning, especially when plotting groups walking or sitting close together. When the problem of compilation was considered, it was decided that there was insufficient data to warrant the use of an electronic digitiser, and all transfers were made by hand with a tracing paper overlay. In all there were 925 maps, but many recorded no-one present, and the majority show less than ten people. The digitiser would have to be precisely lined up for each map, whether there was one dot to record or several hundred. It was felt the improvement in accuracy would not justify the time necessary.

Obviously dot maps lose precision when the number of dots found in a small area is so great that they coalesce. In terms of visual impact the resulting black blur may be very impressive, but for quantified analysis an actual count was needed. This was achieved by laying a ten by ten metre grid over each site and recording the number of people in each cell. Thus a series of maps could be drawn: dot maps from the original overlay, choropleths from the grid count, and isopleths using the central point of each cell. The totals were also used to investigate distribution around the Fell as a whole.

III Recreation Impact on Vegetation

The model of vegetation strategies discussed in Chapter Two (page 58) suggests three influential variables: competition, stress and disturbance. In the study of the impact of recreation use on vegetation, the disturbance variable would seem to be most important, although there may be associated changes in stress and competition. Grime offers no explicit measure of disturbance, so the application of the model to recreation pressure is bound to be problematic. In this study an attempt was made to measure disturbance in such a way that an expression could be formulated to relate observed vegetation changes to a measured trampling pressure. If successful, this may then be applied to a model of strategies as a measurable disturbance factor.

There are various ways of approaching an impact study, the methods used will depend on the aims of the study and the time available, e.g.:

(i) "Before-and-after" study (e.g. Burden and Randerson 1972): particularly appropriate to assess the impact of short duration events where it is possible to start the survey before use and count the number of visitors.

(ii) Trampling experiments (e.g. Liddle 1975): if these are to be carried out in the field it must be possible to define areas of no trampling, subject them to measured amounts of trampling, and prevent other interference. It is not possible to simulate conditions of long exposure quickly, so the results are similar to (i) but with more control over the level of pressure.

(iii) Laboratory experiments (e.g. Grime 1979): particularly valuable for investigating comparative resistance of different species, with control over nutrients, temperature and water possible. It may not be possible to simulate realistic conditions for a plant association.

(iv) Correlation exercise (e.g. CC 1971): a comparative study of several sites, where one variable may be altered. Thus, it may be possible to study the effect of different levels of trampling on the same vegetation association, or reaction with varying habitat conditions. There are two main difficulties: controlling access, and ensuring that only one factor varies between survey sites.

The studies on Beacon Fell were started some time after the area was developed for recreation, so approach (i) was not possible. Approaches (ii) and (iii) were ruled out by lack of time and resources for experimental work, and the impossibility of controlling access. Thus approach (iv) was adopted. For this method to succeed, it was necessary to identify sites of differing levels of use, but with similar background characteristics. If this could be achieved, then observed differences in the vegetation could be attributed to recreation pressures.

An initial survey was carried out to establish the characteristics of the vegetation of the northern half of the Fell. A set of one-metre square quadrats was located by the use of random-number grid co-ordinates. The species list produced was analysed to establish the main associations present (after Williams and Lambert 1959). Based on a Chi-Square measure of association, this technique extracts groups of species that consistently occur together. One problem of the technique is that it relies on the presence or absence of the species from a sample of quadrats assumed to be independent. The use of random-number grid co-ordinates to locate the quadrats helps to reduce bias, but the technique is still partly dependent on quadrat size. As noted by Greig-Smith (1964), when the scale of the natural pattern of the vegetation is greater than the size of the quadrat used, single species stands may be over-recorded. With the mixed acidic grassland the one-metre square quadrat should be adequate, but the problem must be held in mind in interpreting the results.

The effect of trampling may be related to the disturbance of people within a site. Pressure can be analysed in terms of points (individual focus, e.g. the Summit), lines (the linear track of footpaths), and areas (zones for particular activities). The importance of footpaths is obvious, and as a result they have received the greatest attention. However, the path may only cover a small proportion of the total open area. It was felt appropriate to try to assess the wider impact in terms of damage to the vegetation as a whole. Two studies were devised, one to monitor change on a footpath, and the other to assess disturbance in larger areas.

As has been shown, vegetation may respond to disturbance in a variety of ways. The complexity of the response means that it would be unwise to rely on one criterion in trying to establish the level of disturbance. An index was devised that would combine three of the most obvious and frequently reported changes: in the amount of bare ground, in the vigour of plant growth, and in the floristic structure of the community. In each case the changes were measured against the conditions considered "normal", the structure of the acidic grassland found to be characteristic of the area.

The three areas for detailed examination had been located to show some consistency in their physical and vegetational characteristics, while at the same time providing contrasting levels of use. It was felt that the normative approach was appropriate in an area of long term human use; comparison with areas of no history of use might be misleading, and there was insufficient time available for field work monitoring current changes.

The three sites are located along the path that follows the boundary wall of the plantation from the Summit of the Fell west to the perimeter road. The Summit area is the main focus of the whole Fell and receives the heaviest use. The path does not lead directly to a car park, so use drops off progressively with distance from the Summit. This intuitive sequence was later confirmed by field work designed to assess the density of recreation use at these and other sites.

A continuation of the same ridge path was used for the linear survey. In this case, a site was selected to the east of the Summit, on the section of the path that leads to the Quarry Car Park; this being sufficiently close to show similar ecological conditions, but far enough away not to interfere.

(a) Sampling Techniques

(i) Linear - three transects were laid out at ten metre intervals at right angles to the main path. Contiguous one-metre square quadrats were used to form the transects. Species cover of vascular plants was recorded, with an assessment of median height and bare ground.

(ii) Area - a systematic method of quadrat sampling was used. A ten-metre square grid was laid out over the sites; the quadrats were placed at the intersection of the grid lines. Random number locations might be preferable on statistical grounds, but the initial survey did not suggest a regular pattern in the vegetation so the more rapid technique was adopted. A systematic grid facilitates field work, as a straight line can be fairly accurately paced out and the position of the intersections located. The samples cover approximately 4% of the area of each site, although it should be noted that the use of a regular rectangle means that each site includes an area of closed plantation not available for survey. The local frequency of all vascular plants was recorded by percentage shoot cover.

The quadrats were considered to form the centre of a ten metre by ten metre square, and the information was used as a sample for that square. Density diagrams were drawn up for each species, as well as for percentage bare ground and median height.

(b) The Disturbance Index

Various indices have been used to indicate combined measures of trampling or damage. In the Pennine Way Survey an "Index of Extent" was used, formulated from the total width of the "obviously trampled" vegetation, adjusted by the width of the bare ground less that of any undamaged vegetation. There was little theoretical justification for the measure which was 'an arbitrary calculation which simply gave double weight to bare ground'. The report adds that the index 'was found to integrate the data reasonably well' (CC 1971, 36).

In this survey, a measure of disturbance was required for a series of quadrats, many of which did not fall directly on a path. Thus all factors were measured relating to the area of the quadrat. Three variables were used as surrogates of damage: bare ground, height and plant association.

(1) Bare ground

Most associations will incorporate more or less bare ground; the completeness of the cover depends on the structure of the community. The continued regeneration of a stand will usually depend on the periodic appearance of bare earth, to allow seed to set for further growth. However, such bare areas will be transient and a small proportion of the total.

Bare ground may also be due to large-scale disturbance, such as the up-rooting of a tree or heavy trampling. Bare ground created by human activity tends to be longer-lasting, it may be spatially more concentrated or show a recognisable pattern; it will usually involve a larger proportion of the total area. Thus, it was considered that the larger areas of bare ground reflect a greater degree of disturbance.

A simple scoring method was devised, measuring the amount of bare ground in sample plots.

Amount of bare ground	Score
None	0
1 - 10%	1
11 - 30%	2
30 - 50%	3
> 50%	4

(2) Vigour of Plant Growth - Height

One simple way of assessing the vigour of plant growth is to measure the average height of the stand. Obviously height will vary between different associations, but between similar associations some correspondence may be expected. Uninhibited growth will usually yield a higher stand than that achieved by plants growing under stress or disturbance. Trampling will also reduce vegetation height, by physical damage to shoots or through the medium of soil, where compaction may inhibit root growth.

The moorland association on Beacon Fell normally achieved a growth within the range twenty to fifty centimetres, with most stands averaging thirty to forty centimetres. Disturbed areas showed greater variation, whatever the cause of the disturbance. Heavy trampling may stunt growth or flatten plants or, indeed, cause their loss, leaving bare ground. Disturbance may also weaken the association allowing invasion by more robust species, which are often larger than the original species, e.g. Rubus fructicosus, Epilobium angustifolium. Thus, if the standard of thirty to forty centimetres is taken for the undisturbed community, deviations from this, in either direction, could be interpreted as indication of disturbance.

Height	Score
$<$ 10 cm	4
10 - 19 cm	3
20 - 29 cm	2
30 - 40 cm	1
41 - 50 cm	2
51 - 60 cm	3
$>$ 60 cm	4

The average height of the vegetation was assessed by taking the median value from five points in each quadrat; the median was preferred to the mean as the latter may lead to bias in favour of flower or fruiting heads.

(3) Floristic Structure of the Community

Disturbance may cause either a loss or a gain in species; those plants intolerant of disturbance will rapidly be lost, but if their place is taken by other species favoured by the new conditions, then the stand may record an increase in diversity. Extreme disturbance will usually result in the loss of all species, so the count drops.

The problem is to distinguish areas of disturbance in the earlier stages of change, before irreparable damage is done.

There are several ways of assessing the floristic structure of a community, but a simple indication is given by species diversity. If a standard can be established, then variations from it may be an indication of disturbance. The number of species is important, but in a sample study using relatively small quadrats, the habitat status of the species is a more appropriate guide. Thus, the species were placed in categories according to their most frequent associations; habitat labels were devised according to the descriptions in Clapham, Tutin and Warburg (1962).

I Moorland

Deschampsia flexuosa
Vaccinium myrtillus
Molinia caerulea
Calluna vulgaris
Empetrum nigrum
Nardus stricta
Galium saxatile

II Damp moors, bogs

Erica tetralix
Juncus effusus
Vaccinium oxycoccus
Juncus squarrosus
Eriophorum vaginatum

III Meadows and natural grasslands

Anthoxanthum odoratum
Rumex acetosa
Carex nigra
Galium hercynicum
Poa annua

IV Scrub

Rubus fructicosus	Epilobium angustifolium
Dryopteris sp.	

Any quadrat recording exclusively moorland species is designated as category I, even if only two of the species in the assocation are represented. This was considered to be the purest association, representative of the area before disturbance (see Chapter Five, I). Any species recorded outside this group was considered to be an invader, and the quadrat was grouped with this species. Thus, a moorland association that included Dryopteris sp. was classified as category IV.

Scores were alloted to the floristic categories according to the degree of change from the original community:

		Score
Category I	Moorland Association	1
Category II	Moorland with Bog Species	2
Category III	Grassland Species	3
Category IV	Waste and Scrub Species	4

Finally, an index was complied using the three measures together. It was hoped that this approach would overcome the problem of the natural variation in the community. The three variables obviously measure rather different factors, but if they can be used to indicate disturbance, then some correspondence between them would be expected. The scoring system was adjusted to allow for the fact that "bad" damage would result in a higher proportion of bare ground but a lower stand, thus the negative correlation of the raw scores became a positive correlation in the scaled values.

The Index of Disturbance was recorded as the summed score for each of the three measures, for each quadrat in the sample, thus

$$ID = hi + bi + fi \quad \text{where i is the score in each factor}$$

The index ranges from one to twelve, but due to the natural occurrence of some bare ground in the background community, and variations in height and species composition, a score under four is considered to be representative of the original community.

The use of such a scale is obviously highly subjective. There was no objective way of assessing relative importance, so the three factors were taken to be of equal importance. The resulting scores could be assigned to individual quadrats and mapped.

IV Visitor Characteristics and Site Perception

(a) Questionnaire Design and the Control of Sampling Error

The information required fell into two sections - factual data concerning the characteristics of the visitors, the reason for their journey, length of visit, and so on, and attitudes relating to their impression of the site, interpretation of landscape, and perception of crowding. Alternative methods of gaining the information were considered; for example, a cordon survey with car registration check will give an accurate measure of length of stay, observation can specify activities. However, much of the information could only be provided by asking opinions; once the questionnaire technique had been adopted, it seemed reasonable to collect all the relevant information in this way. Although it is always desirable to minimise the length of an interview, it is pointless to duplicate effort to derive information independently that could quite simply be produced by questioning.

The questionnaire technique has many advantages, but two points are particularly pertinent - it is the only way to gain insight into attitudes and all values can be related to specific groups - thus it is possible not only to state what proportion of visitors stayed more than six hours, but also to assemble a profile for that specific group. The technique has disadvantages, not only in the length of time necessary for design, execution and analysis, but also in the control of error. The main sources of error arise through the sampling necessary, interviewer bias, and inaccurate answers. Careful questionnaire design should reduce bias and ambiguities, although malicious inaccuracy is a problem that cannot be measured easily.

One problem that must be tackled early is the question of the sampling frame and sampling method. Although the background population is fairly easily defined as all the visitors to the site, the sampling frame is inevitably restricted to those there at the time of the survey. The techniques employed may reduce it still further, perhaps to the people using a particular path or car park. For the pilot study a range of times and places was used; although this makes it almost impossible to assess the sampling fraction, it was felt necessary to get an impression of the full variation likely to be encountered. The results showed that the characteristics did not vary significantly between visitors at different times, thus in subsequent work the survey was restricted in time, by sampling a few busy days, and in the people contacted, by concentrating on motorists. The restriction to motorists should not lead to unreasonable bias as the pilot study showed a very small number arriving by other means; the change in technique to a postal questionnaire allowed the sample size to be greatly increased, and concentration on limited days made it possible to calculate the sampling fraction and observe a common base for questions of crowding perception, etc.

One other sampling problem was encountered. One of the objectives involved the isolation of visitor "types". Ideally, a study should work on a cascading system, one general survey leading to a more specific one. Thus, if an initial survey identified the groups, a subsequent one could be used to investigate intragroup variations or alternative reactions to a common situation. A stratified sampling technique could be used to ensure sufficient respondents of each type to allow statistical analysis. In practice, time permitted only one main study on each site, so an attempt had to be made to cover the variations from one sample. To this end, it was necessary to collect as large a sample as possible at one time, to allow the selection of subgroups at a later stage.

The use of a large sample size helps to reduce sampling error, but this is still a problem for some of the smaller subsets.

e.g. Question Five:

Did you set out with the intention of visiting this site?

Beacon Fell Yes 78.9% No 21.1%

$n = 527$

The standard error $= \sqrt{\frac{p\%q\%}{n}} = 1.78$

Thus, the 95% confidence limits give a range of 75.3% to 82.4%. A confidence interval of ± 3.5% is quite reasonable on a response of this nature.

Problems occur on the questions that are more evenly balanced, or where the sample size is reduced in a subset.

e.g. Question Nine:

Did you have a picnic while on the site?

Beacon Fell Yes 52.2% No 47.8%

$n = 527$

SE = 2.18 - giving 95% confidence interval of ± 4.36%.

Thus, the true value could be slightly less than 50%. Although the difference is not great, it would be wrong to state categorically that more than half the visitors will have a picnic on the site.

e.g. Question Twelve:

Would you prefer there to be less people on the site?

Easter	Yes	36%	n = 349
Summer	Yes	41%	n = 178

SE Easter = 2.56 i.e. 36 ± 5%

SE Summer = 3.68 i.e. 41 ± 7%

The smaller sample size of the pilot study means that the confidence interval is greater; the overlap between the two is considerable, and hence the difference may not be significant.

This problem becomes acute when there is an attempt to extract some of the more unusual groups. As sampling errors are a function of the square root of the sample size, it would be necessary to increase the sample size fourfold to decrease the error by a factor of two. Had it been practical to stratify the sample, it might have been possible to achieve an adequate sample size in some of the smaller subsets. As it is, interpretations relating to the smaller groups must be treated with great caution.

Once the information required has been established, composition of questions is fairly straightforward (Davidson 1970 a and b). The questions fell into three groups: factual information concerning the trip, such as the reason for the journey, activities engaged in and length of stay; factual information concerning the personal characteristics of the visitors, such as age, party structure and socio-economic group; and perceptual information concerning interpretation of site, such as likes and dislikes, reaction to crowding and site description (copies of the Questionnaires used are in Appendix V).

An initial pilot was carried out at Easter 1974 to test questionnaire lay-out, and to establish groups for the pre-coded questions (reasons, mode of transport, length of journey, activities). This survey was not formally structured, so the responses were discarded. A full pilot study was carried out in the Summer of 1974, with a combined interview and follow-up postal reply. As a result of this experience some questions were dropped and the survey methods altered, but the continued questions were kept to the same format, so the responses to the pilot study were retained.

Two main problems were encountered, one concerning survey techniques, the other the actual questions used. The interview method is very time-consuming; even with the bulk of the questions in the postal reply, it was still not possible to complete more than four or five in an hour. This meant that many days would be necessary to produce a reasonably large sample; weather conditions would vary between days and crowding may be more or less obvious, so the responses would not be easily comparable. An attempt to overcome this problem by using several interviewers on one day was defeated by appalling weather. It would be far too expensive to keep interviewers on hand, waiting for a good day. The alternative was to rely entirely on a postal questionnaire. A high response rate had been achieved in the postal return section of the pilot study, so this suggested that a fully postal technique might be successful. With questionnaires prepared in stamped addressed envelopes it was relatively easy for two workers to cover the whole site quickly, thus allowing a large sample to be collected at one time. The extent of the sample was improved, as questionnaires were left on cars in all the car parks and along the roads, but the technique automatically excludes anyone arriving on foot.

The second problem concerned the attitude tests. The inclusion of a semantic differential in the interview was not very successful. The technique was unfamiliar to most of the respondents (and the interviewers) and required lengthy explanation and prompting, thus the replies were subject to interviewer bias. It was decided that the more straightforward adjective check list would be more appropriate for the postal questionnaire, and in practice this was answered well.

The responses to the survey on Beacon Fell were satisfactory and the technique was adopted at the Trough of Bowland. It was not possible to improve the methods by the use of stratified sampling because of the lack of resources. A stratified sample can only be carried out by an interviewer, and in view of the lack of time for surveying it was decided to use a postal questionnaire again. The questions were kept the same, so that the responses would be comparable.

The results of all the questionnaires were coded and stored in the computer. Analysis was made by use of the Statistical Package for the Social Sciences available at Hull University and also at Trent Polytechnic (Nie 1975).

(b) Surveying Techniques

(i) Beacon Fell

The pilot study was conducted over ten days in the Summer of 1974. In an attempt to cover the full variety likely to be encountered, weekdays, weekends, and Bank Holidays were included. Unfortunately the weather was very variable, and so bad over the August Bank Holiday that the survey was abandoned with only fifteen interviews completed.

Interviews	208		
Reply sheets not returned		19	9%
Withdrawn incomplete		11	5%
	30		14% (lost)
Total response	178		86%

Only three people refused an interview, and the majority of those interviewed returned their reply sheets. Tests were carried out using car registration numbers as an indication of origin (Duffell 1975). Although there were reservations over this technique, only cars less than three years old being used, there was no significant difference in the origin of those who replied and those who did not.

The survey was carried out in three car parks (Fell House, Sheepfolds and Quarry) and on one footpath (Fell House to Summit). The interviewers were instructed to contact as many groups as they could, stopping the next party they met on completing one interview.

It was not possible to reach a reliable estimate of the sampling frame or the background population, but 7693 cars were recorded in the whole period of the survey.

It was decided that it was not practical to try to gather information for all conditions. The evidence of the pilot study suggested that there were few differences in visitor characteristics between weekdays and weekends or holidays, although there were rather more retired people in the former. As there was interest in reaction to crowding, it was necessary to ensure that some of the responses applied to a busy time. Surveying by the new methods required only two days, so it was decided to concentrate on busy days. Consequently the main survey was carried out over the Easter Bank Holiday (Sunday and Monday) 1975.

Distributed	500		
Not returned		140	28%
Withdrawn		11	2%
	151		30% (lost)
Total response	349		70%

Analysis of car registration numbers was used to test the origins of the non-respondents, and no significant difference was found between them and the respondents. The questionnaires were left on cars parked on the Fell in the survey period (1200 hrs to 1700 hrs), although the circuit walks necessary to cover all the car parks and road means that some short-stay visitors may have been missed. There was no independent check on cars, but information from the traffic census suggests approximately 3000 cars visited the Fell in the two days, thus the sample represents approximately 10% of visitors. A record of the location of each car and the number of other cars in sight from that place was made separately.

(ii) Trough of Bowland

The success of the postal technique at Beacon Fell was encouraging, and a similar technique was adopted for the Trough of Bowland. This was a more difficult site to cover as it is not defined in any way. The length of road involved necessitated transport, and when it was busy it was difficult to find somewhere to park while working. With hindsight, a bicycle would be more suitable than a car!

The survey was carried out over two weekends in August 1975.

Distributed	602			
Not returned		257	43%	
Withdrawn		14	2%	
	271		45%	(lost)
Total response	331		55%	

The lower response rate was disappointing, but not unexpected. Again, tests showed no significant difference in origin between respondents and non-respondents; there was no way of assessing their similarity on other factors. There was no independent traffic census; a census in July suggested a possible traffic of 2000 cars on a busy day, which would give a sample of between 4% and 8% on each day.

However, an unknown number would not stop, and were therefore excluded from the sampling frame. Of the stoppers, it is likely that the technique would show a bias in favour of those enjoying a longer stay. Thus it is probable that the sampling fraction was slightly larger than that estimated, but with a bias in favour of people stopping for several hours. Nevertheless, the method will give a representative sample of those who use the road as a recreation site.

Chapter Four

PARTICIPATION PATTERNS

I Annual and Seasonal Trends Based on the Beacon Fell Traffic Census

(a) Total Counts

The traffic census produced a count of the total number of cars entering Beacon Fell Country Park (Table 4.1). Surveys carried out by Lancashire County Council for the Countryside Commission Sample Counts 1974 - 7 recorded a fairly consistent car occupancy rate of 3.2 people/car. This gives the following estimates for the total number of visitors:-

1971	274307	1976	392448
1972	273936	1977	357859
1973	294810	1978	299238
1974	297930	1979	267818
1975	369104	1980	318138

Arithmetic mean for decade: 314558

The initial plot of monthly totals (Figure 4.1) shows the pattern in some detail, but the trend is confused by two problems: the random element of the day-to-day weather may cause fluctuations, and Bank Holidays consistently produce peaks. The height of the peak depends largely on the weather, and especially on the weather for the time of year. Most Bank Holidays occur in a predictable pattern, but Easter may fall in either March or April. The Easter weekend frequently

Table 4.1 Beacon Fell CP Traffic Census - Cars Per Month

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
January	2850	2782	2769	2922	4779	5250	4761	4291	2981*	4782
February	4102	4140	4920	3628	6453	6723	6155	4999	4533	6721
March	3980	7860	8327	8362	9281	6800	6675	9808	3546	6167
April	11805	7911	12473	13273	7377	16020	10161	7055	9257	11190
May	9263	7846	9688	10587	16183	8777	9314	8870	9198	10200*
June	8533	7335	8703	9897	11794	11548	13600	11070	8604*	7986
July	13196	14779	12284	9660	12825	20937	13260	10332	11075*	9919
August	10164	10861	12881	13869	17870	16612	17167	14414	12122*	15802
September	7924	9114	9304	7364	10591	12000	12657	8851	8093*	8793
October	6816	6101	5130	4799	8640	7392	8314	6206	7250	9880
November	3175	3045	2771	4431	5064	4013	4836	5100	4359	4241*
December	3913	3830	2878	4311	4488	6568	4931	2516	2615	3737*
TOTAL	85721	85605	92128	93103	115345	122640	111831	93512	83693	99418

* estimated month

Figure 4.1


BEACON FELL COUNTRY PARK :
TRAFFIC CENSUS: CARS PER MONTH
20,000
15,000
10,000
5,000
2,500
J M M J S N
F A J A O D
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980

records the highest weekly total for the whole year, and consequently its timing may significantly affect the shape of the curve in spring.

One method of reducing these problems is to use a moving mean to smooth the curve. Attendance at outdoor recreation sites obviously displays a marked and regular seasonal cycle. Smoothing by use of a time period less than the cycle will remove random fluctuations caused by unseasonable weather and movable holidays, and expose the underlying seasonal cycle and long-term trend (Figure 4.2 - five month period). The use of a time period equal to the cycle will remove the cycle and leave the secular trend (Figure 4.3 - twelve month period).

The plot for the decade shows a number of distinctive features. There is a rhythmic cycle related to the seasons; the amplitude increases to 1976 and then declines to the end of the decade. Irregular variations occur within this cycle due to holidays and exceptional weather conditions. The secular trend shows a build-up to 1976 and then a fairly sudden decline. A crude linear trend line for the decade shows a continued growth, being influenced by the occurrence of the maximum values in the latter half of the seventies. A simple diagram representing deviation about the mean annual total demonstrates the pattern for the decade very clearly (Figure 4.4) and also suggests a relationship with the weather. The years of 1975 and 1976 are remembered for the prolonged drought that caused such problems for the management of water resources. The hot, sunny weather also encouraged a remarkable number of visitors to the site. The mid-seventies were also notable for relatively mild winters, reflected in the greater number of visitors between November and February.

Figure 4.2

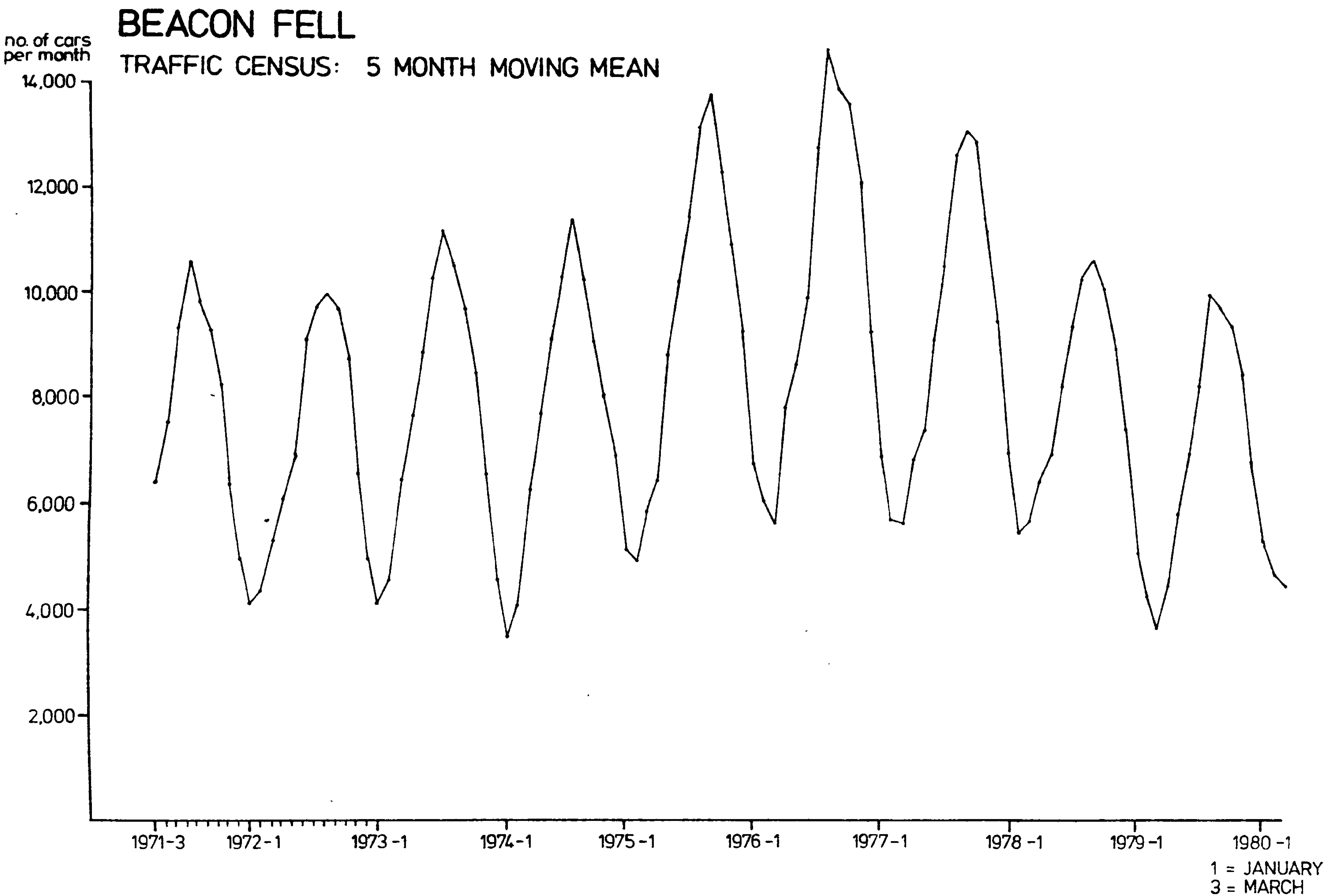

BEACON FELL
TRAFFIC CENSUS: 5 MONTH MOVING MEAN
no. of cars per month
14,000
12,000
10,000
8,000
6,000
4,000
2,000
1971-3
1972-1
1973-1
1974-1
1975-1
1976-1
1977-1
1978-1
1979-1
1980-1
1 = JANUARY
3 = MARCH

Figure 4.3

BEACON FELL

TRAFFIC CENSUS: 12 MONTH MOVING MEAN

Figure 4.4

BEACON FELL ANNUAL TRAFFIC CENSUS

Initial analysis of the first six years of this series gave the impression of an ever-upward trend, with predictions varying only with the type of growth curve anticipated. This growth is reflected in much of the literature of the mid-seventies, especially in the concern expressed over physical erosion and site capacity. Examination of the whole data set shows the fallacy of this expectation. The estimate for 1979 was the smallest annual total for the decade, and the more reliable count for 1978 showed a substantial decline. The estimate for 1980 shows a recovery towards the mean total for the decade, but both the last two years contain substantial periods of estimates which prevent conclusive comment.

It is dangerous to make any substantive predictions of total involvement in informal recreation from the evidence of one site. However, the trends depicted do seem to correspond with the information that is available elsewhere. Despite reservations about the sample used, the Countryside Commission Sample Counts report a similar trend of dramatic growth to 1976, and then a substantial decline (Table 4.2 (a)). Data for Edale in the Derbyshire Peak District shows a peak in 1978, but there was a marked decline to 1979, with 21% fewer visitors recorded at the Information Centre, and the estimate traffic census shows 11% fewer cars (Table 4.2 (b)). Between 1978 and 1979 traffic on Beacon Fell declined by 10.5%.

Analysis of attendance data at National Trust properties shows no such decline, but there is a marked interruption in the growth in 1975 and 1976 (Stoakes 1980). Stoakes links the changes to the effect of the rising cost of recreation trips, noting that the substantial increase in the cost of petrol in 1974 was not felt in real terms until

Table 4.2 Countryside Recreation Data

(a) Attendance at Countryside Commission Trend Sites

Cars counted one Sunday each in June, July, August and September

26 Country Parks	1974	1975	1976	1977
Total cars	174066	192223	230928	165033
Median summer Sunday	1220	1512	1695	1111
Mean weather score	6.3	6.7	7.8	5.5

23 Picnic Sites				
Total cars	77279	80202	97650	73007
Median summer Sunday	409	471	561	407
Mean weather score	6.5	7.2	8.0	5.7

Weather scores - crude total, range: cold and wet 3

hot and sunny 9

Source: Countryside Commission 1977

Table 4.2 Countryside Recreation Data (continued)

(b) Visitors in Edale

Visitors to Edale Information Centre (April - March):

1968/9	18613	1974/5	49689
1969/70	25536	1975/6	49200
1970/1	28821	1976/7	51329
1971/2	37567	1977/8	63130
1972/3	38375	1978/9	49477
1973/4	47549		

Estimate total vehicles in Edale (including local traffic):

1977	214497
1978	225347
1979	199322

Source: Phillips 1981

a year or two later. He suggests that petrol is a relatively minor factor in the total cost of such a trip and reduction in numbers is more likely to be influenced by increased entrance charges. The evidence is inconclusive; the rather different character of most National Trust properties make them an unsatisfactory surrogate for countryside sites. It is possible that the fine weather of 1975 and 1976 encouraged many people to substitute a day out of doors (as at Beacon Fell) for a day indoors at a stately home, regardless of the relative cost of the two expeditions.

Stoakes also notes the importance of holiday-makers; over half the respondents participating in countryside recreation in a survey in 1977 (CC 1979) did so while on holiday. The increased costs of holiday-making may discourage some trippers, and hence reduce the overall participation in countryside recreation. However, it should be noted that an increased number of day trips might be substituted for a holiday away from home. If such a change took place, it would be reasonable to expect an increase in the number of visitors to sites providing a regional focus, with perhaps a decline in the holiday areas more remote from the centres of population. This may be important for such sites as Beacon Fell, which has a regional catchment; of those interviewed (Summer 1974, Easter 1975) only 8.7% stated that they were on holiday.

In examining the traffic census for Beacon Fell the correspondence between the annual trend and the weather conditions is remarkable, and it is tempting to look no further for an explanation (Figure 4.4). The evidence from the questionnaire survey suggests that the total number of visitors had not increased greatly in 1975, but that the

PAGE
MISSING
IN
ORIGINAL

regular visitors were making more frequent trips (over 60% had been at least three times before). This is also suggested in the Countryside Commission survey which estimated an increase in trip frequency of 41.7% in this area between 1972/3 and 1975/6. There is also some evidence that changes in 1974 as a response to petrol price increases were found in a reduced travel distance rather than a reduction in the number of trips undertaken. In local terms this could mean the use of Beacon Fell for a day out rather than a drive to the Lake District. It is possible that the decline witnessed in 1978/9 is of the same nature, an adjustment of trip frequency and of destination rather than an absolute decline in participation, partly as a response to the economic and energy situation and partly as a response to the poor weather.

An alternative interpretation may be made by considering the pattern of participation in sporting and recreational activities and its relationship to the social and economic status of the population. The importance of mobility, especially as expressed in car ownership, has increased dramatically over the last two decades (124%), due to increased affluence and a reduction in the real costs of motoring (Table 4.3 (a)). The increase was largely related to income, and consequently spread down the socio-economic groupings as disposable income increased. It has been observed that the use of a car for informal trips is at a maximum in the second or third year after its acquisition. After that time, the use pattern settles down as the car becomes a standard piece of family equipment, i.e. the motive of use for its own sake declines reducing the pressure to make trips for no other reason. This may result in a surge of participation in association with an increase in the proportion of households with access to a car. The

Table 4.3 Countryside Recreation Participation Data

(a) Car Ownership and the Costs of Motoring

	1970	1972	1975	1978
Numbers of cars/000 population	220	240	260	260
% households with a car	51.6	53.3	57.0	57.6
% households with two or more cars	7.0	8.0	10.6	12.4
Price indices at 1975 prices				
Food	100	100	100	102
Housing	94	96	100	103
Clothing	79	96	100	106
Television rental	55	64	100	117
Purchase of motor vehicle	129	155	100	138
Running of motor vehicle	91	97	100	108

Source: Social Trends 1981

staggered rate of acquisition moving through the socio-economic groups may lead to a ripple effect, resulting in mounting numbers at the sites. A continuation in the rate of growth would depend on a continued supply of "new" owners, to replace those whose participation rates decline after the initial impulse.

Car ownership has now reached very high levels in the upper socio-economic groups, thus there can be little increase in ownership (and use) here. These upper groups can be said to be operating at saturation level, there being little or no latent demand waiting on improved mobility (although other factors, such as leisure time, may be important). Latent demand may be present in some of the lower groups where car ownership levels are less (Table 4.3 (b)). Although some evidence suggests that informal countryside trips are less popular with these groups, it is difficult to separate lack of demand and lack of opportunity (Fitton 1978). With the current economic conditions, a continued expansion of car ownership is unlikely, so some demand may remain unsatisfied through lack of mobility. This would result in levelling off the rate of growth and may even lead to a decline in the total numbers participating.

Thus it could be suggested that the remarkable increases in participation in informal recreation observed in the late 1960s and early 1970s were linked to the proliferation of car ownership, and especially its dissemination throughout the groups where latent demand was likely to be at a maximum. As this demand is satisfied, and the novelty wears off, it may be expected that the participation rates would settle down, causing a reduction in the rate of growth, if not actual participation. However, expectations based on past patterns

Table 4.3 Countryside Recreation Participation (continued)

(b) Perceived Constraints on Visiting the Countryside

Occupational group:	Not enough time	No Car	Not enough money	% participating at least once last summer 1973	1977
Employers/Managers	64	5	3	55.8	55.2
Professional	73	4	5	57.1	54.1
Intermediate non-manual	56	6	6	48.7	49.3
Junior non-manual	48	16	4		
Foremen/supervisors	50	9	7	41.7	45.4
Skilled workers	57	11	6		
Semi-skilled manual	45	18	7	35.6	34.5
Unskilled workers	37	16	10	32.2	31.6

Source: General Household Survey 1973, 1977;

Countryside Commission 1977 (Fitton 1978) must be treated with extreme caution as 'the "leisure revolution" has been accompanied by, and to some extent has fostered, great social changes, and it seems inevitable that the relationship between social variables and leisure habits will continue to be transformed' (Coppock and Duffield 1975, 81).

Mercer also considers the danger of assuming that the report of one trip, or trial of a new recreation activity, will necessarily lead to habitual participation. It may be that fashions occur in recreation, as in many other social phenomena, so that sudden increases in particular activities may be influenced by "faddishness", and that there may be a 'novelty phase of frequent participation which is itself short-lived' (Mercer 1979, 111).

If these trends are borne out by future studies, it may be concluded that changes in participation are likely to arise from two main sources. The most immediate influence is undoubtedly the weather; a repeat of the fine summers of 1975/6 could choke the sites again. The impact of economic pressure is more difficult to assess, but it seems unlikely that major changes will occur unless the recession bites to such an extent that some motorists are actually "driven off"the road. Those who have cars will continue to use them, although they may choose sites closer to home and avoid places charging for admission. Such consumer preference could increase the impact at such informal sites as Beacon Fell and may lead to yet more pressure on farmland and the open moors.

(b) Use of Fell Roads and Car Parks

The traffic census data has been used to count the number of cars entering the Country Park. It has had to be assumed that each gate records an equal number of cars entering and leaving. However, the one-way system makes it likely that some cars will enter by one gate and leave by another. Brock Gate gives the main access from the A6 (Lancaster, Preston and M6) and Loud from the B5269 (Longridge). Both carry signposts to guide visitors from some distance away (see Figure 2.1). Rigg Gate gives an alternative route to Chipping and Longridge. The siting of the Crombleholme Gate is such that it is mainly used as an exit. The roads leading up to it are narrow and the route is not clearly marked; entry to the Fell road is by a sharp uphill, left-hand bend, difficult to negotiate. However, approaching from the Fell road, it forms an inviting exit for anyone wanting to travel south. Thus, it is likely that most cars recorded here are leaving, having entered elsewhere.

In the calculation of missing readings, it was observed that the proportionate share of traffic for each gate shifted slightly in the course of the decade, although the order of importance remained the same:

	1972/3	1976	1978/9
Brock	50	44	47
Rigg	16	14	17
Loud	25	31	25
Crombleholme	9	11	11

(NB: these changes were incorporated into the calculation of missing readings)

The changes are not sufficiently large to suggest a shift in the catchment area, but a change in routes is possible. An Information Centre and Café was opened at Carwegs in 1976, and this probably accounts for the greater volume of traffic recorded at Loud, the nearest gate. An alteration was made to the approach signposts at the same time, also favouring Loud Gate. However, the increase was not maintained; this is not surprising as it is unlikely that regular visitors would make repeated stops at the Information Centre.

The evidence of the questionnaire survey suggests that Beacon Fell has acquired a substantial regular clientèle. As these visitors become more familiar with the site, they can be expected to use the most convenient route for their journey, and to rely less on the signposts. Thus more visitors from the south and east would use the country roads to approach the Fell, and not drive past it on the A6 only to turn back later as directed.

There is one other problem associated with the traffic census. The location of the site is such that few people other than the residents of the immediate area would use the Fell roads as through routes to other destinations, but the census can give no indication of how many of the visitors actually stopped. Evidence from the questionnaire survey suggests that the majority of visitors arrive on the Fell with the intention of stopping for at least an hour, but the sampling technique prevented any contact with those who did not stop. This is unlikely to cause severe distortion, and may only be a consideration on the busiest days when the Fell becomes very congested. On these few days (fine Bank Holidays and Summer Sundays) it is possible that the recorded total includes a proportion who did not find anywhere to park, or were put off by the crowds. It is impossible to find out how large this proportion may be without carrying out an elaborate cordon survey, either taking car registration numbers and timing entry and exit, or interviewing all drivers as they leave.

It is reasonable to assume that most visitors approach the Fell with the intention of stopping. Evidence from the questionnaire survey also suggests that the majority of the visitors are not put off by crowding. Thus, the conclusion can be made that the only significant factor likely to prevent people stopping is not being able to find a parking place. Observation suggests that something in excess of 600 cars can park on the Fell at one time, including a substantial number in unlikely places along the roads. The number parked in any one day will depend partly on the length of stay. On the very fine days the majority stay for at least half the day and picnic, so it is reasonable to set parking capacity for a peak day at approximately one and a half times the counted maximum. Thus for Beacon Fell the physical capacity on a fine day may be about 1000 - 1400 cars.

An average "busy" day records over 1000 cars; the maximum number recorded to date was 1941 on Bank Holiday Monday, Easter 1976*.

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* August Bank Holiday 1976 might have been higher - the estimated total for the weekend was 3099, taken from the weekly reading, therefore the estimated total for Sunday was 2170. Unfortunately no records were taken for the weekend. (NB: earlier evidence suggests possibility of overestimating weekend totals from weekly recordings in the summer)

On such a very busy day, as many as 20% of the recorded visitors might have difficulty finding somewhere to park. Such conditions are exceptional, and it is unlikely that parking space would be a problem on more than two or three days in any one year.

II Sample Site Observations

(a) Diurnal Variations

The traffic census provides a count of the total number of people entering the site, but for detail of diurnal variations and distribution the sample observation data was used. A compilation plot was drawn up showing the intensity (mean number/hectare per hour) recorded on each of the survey sites throughout the day (Figure 4.5). The plot showing all five sites together is rather confusing, but the mid-afternoon peak shows clearly (1500 - 1600 hrs). A mid-morning peak is also apparent on the Summit. Treating the "walking" and "picnicking" sites separately, a distinct pattern emerges (Figure 4.6). A bimodal distribution for the "walking"sites is shown, with the morning walk 1030 - 1130 hrs and the afternoon walk 1430 - 1630 hrs clearly distinguished. On the "picnicking" sites there is no morning peak, but a steady rise to midday, and then a rise again to the tea-time peak. This pattern accords with expected picnicking activities.

Two points should be considered in interpreting these plots. On "picnicking" sites "settled" groups may stop for some time, and so may be recorded more than once in the same place. On the "walking" sites most people are on the move, and so will only be recorded once (although the same people may be caught again at another site). Thus the "walking" sites may experience a greater turnover of people for the same apparent count. In terms of feet on the ground there is no difference; there was no attempt to measure the damage potential of sitting and walking. The second point concerns the choice of "picnicking" sites, and may cause the picnicking pattern to be somewhat

Figure 4.5

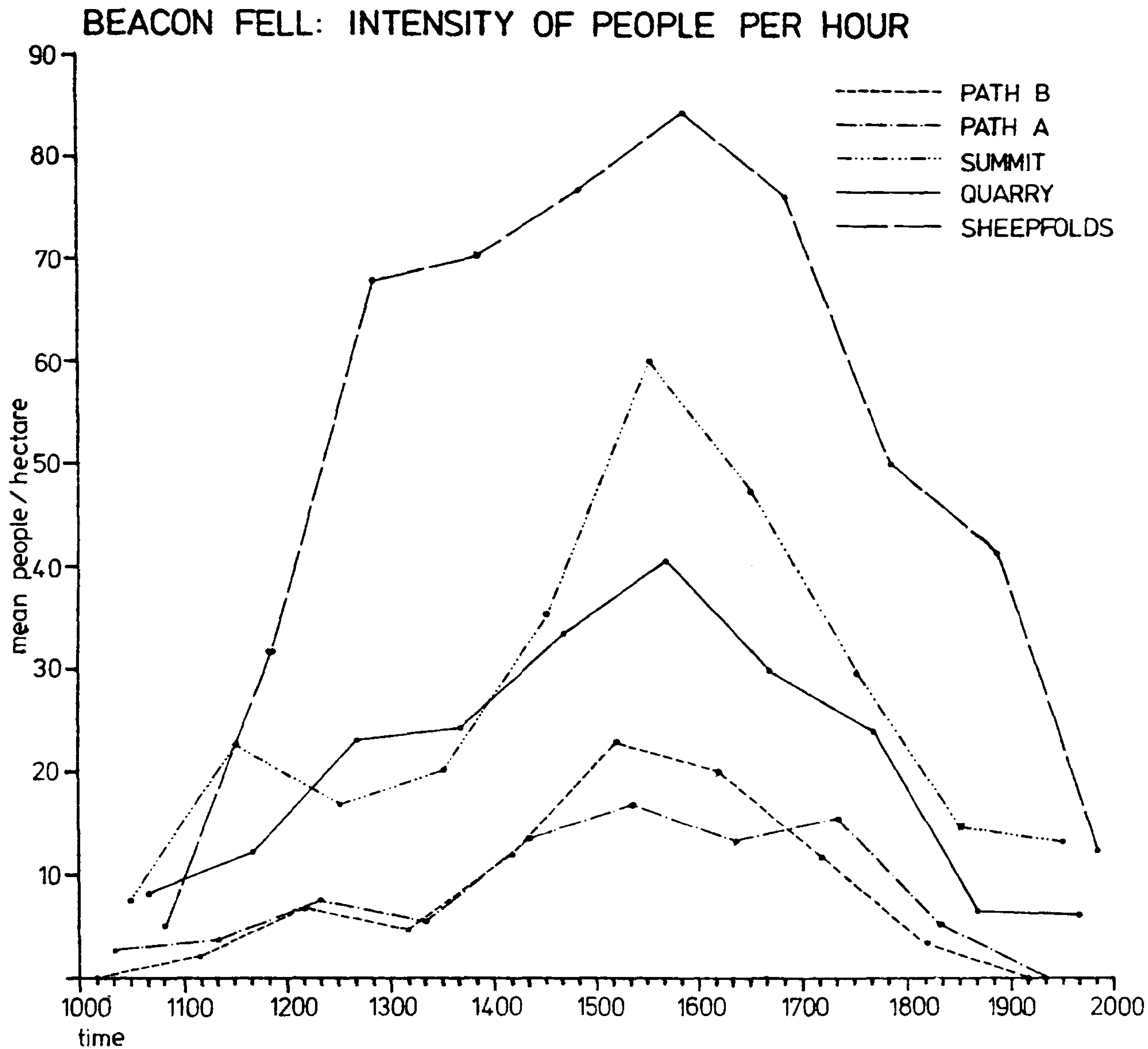
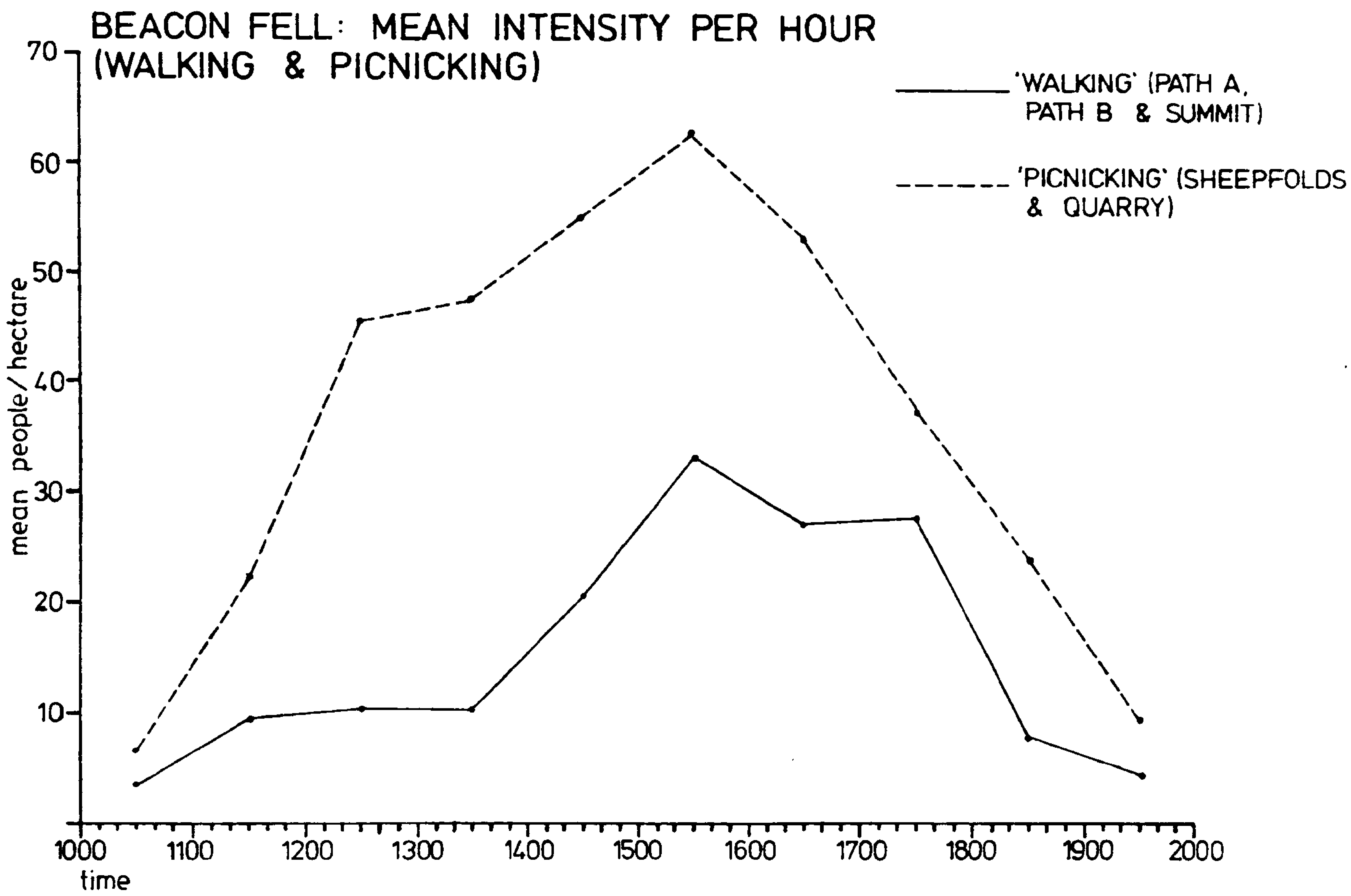

BEACON FELL: INTENSITY OF PEOPLE PER HOUR
PATH B
PATH A
SUMMIT
QUARRY
SHEEPFOLDS
mean people / hectare
90
80
70
60
50
40
30
20
10
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
time

Figure 4.6


BEACON FELL: MEAN INTENSITY PER HOUR
(WALKING & PICNICKING)
'WALKING' (PATH A, PATH B & SUMMIT)
'PICNICKING' (SHEEPFOLDS & QUARRY)
mean people/hectare
70
60
50
40
30
20
10
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
time

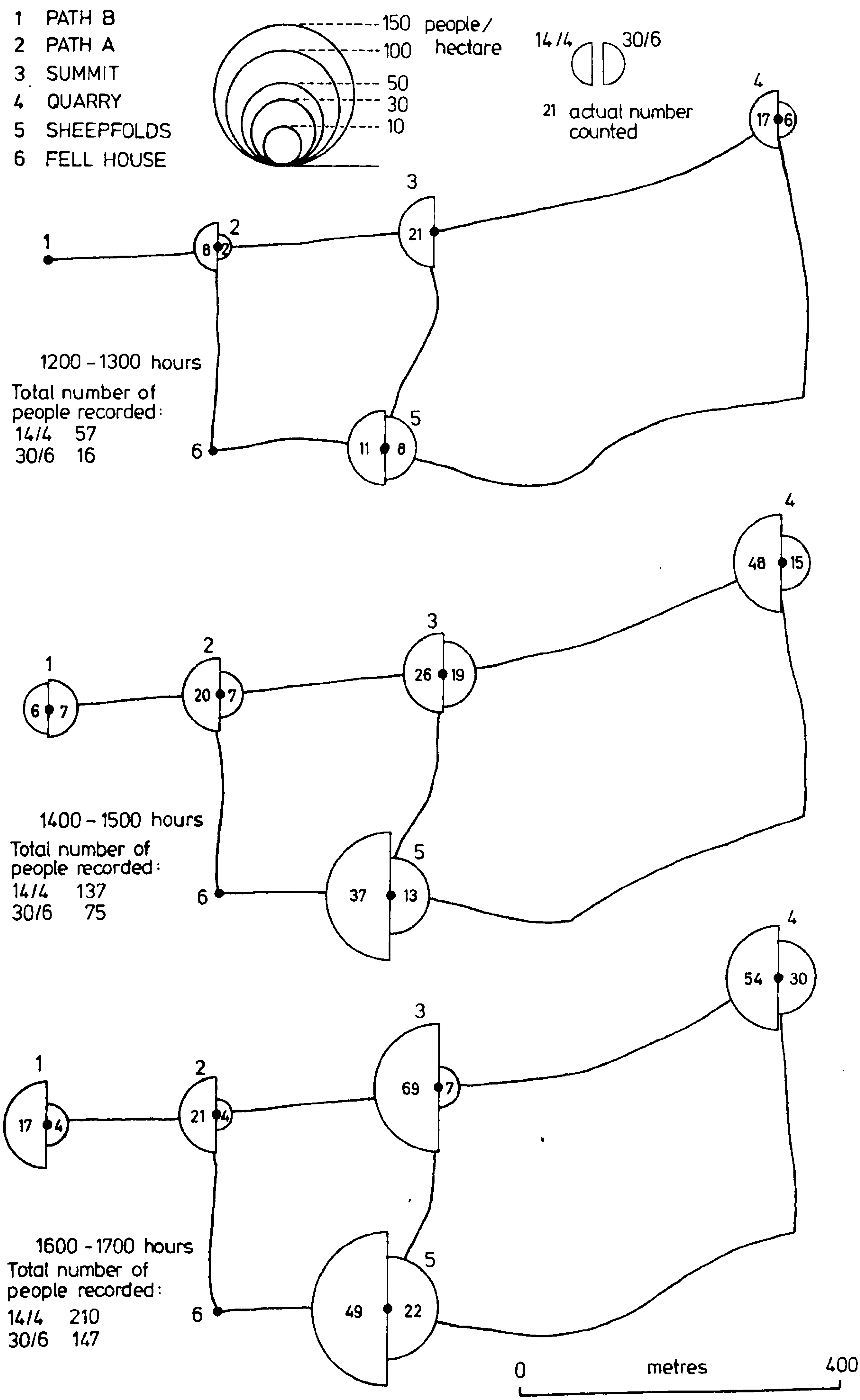
masked. The Quarry site surrounds a car park and the Sheepfolds site straddles a main footpath, so both will record a fair number of walkers as well as picnickers. At most times walkers outnumbered picnickers at all sites. Thus, the total for the "picnic" site actually records picnickers and walkers together. Without the effect of the walkers, a slight decline between dinner and tea may be expected. However, it was observed that, on "good" days (fine, hot, and especially if a Bank Holiday), people out for a full day tended to occupy a picnicking place early, and then take turns to walk. Thus, for any one group the number of people actually sitting down in the chosen picnic place may fluctuate through the day, as the more energetic go off and play games or walk, returning to eat and rest.

An attempt was made to estimate the flow of people around the Fell, and show the relative popularity of the sites studied. The busiest period within these records was the Easter Bank Holiday, when a total of 4493 cars were recorded over the weekend (Friday to Monday inclusive). A series of diagrams has been drawn to compare Easter Sunday with an average Sunday later in the year (Figure 4.7). As the records were taken in series, the counts are not strictly comparable, but an indication of pattern may be gained by taking each plot as a sample for the hour. However, the time lag may be important; a reading taken at 1310 may, in fact, be more like the dinner-time period of 1200 - 1250, than the later period up to 1350 that it will represent.

The nature of the records prevents the compilation of a true flow diagram, but the proportional circles used give some impression of relative distribution throughout the day. All the main foci are represented, although there was no attempt to count the numbers of people at

Figure 4.7

PROPORTIONAL DIAGRAMS TO SHOW INTENSITY OF USE ON TWO SUNDAYS: 14/4 (Easter) & 30/6



Fell House. It should be remembered that plots represent <u>one</u> count in the hour, with all the sampling problems that implies.

An analysis of proportionate differences is difficult as each count represents a sample for the hour and may, or may not, be representative of the true density. However, the following general observations can be made. The Bank Holiday Sunday consistently records a greater number (with the exception of Path B at 1410), and the totals show a substantially greater number. (NB: the weather was fine and sunny on both days, although Easter was a little warmer) The walking sites generally record less than the picnic sites, with the exception of the Summit on Easter Day. In terms of distribution around the Fell by number, the usual rank order is Path B (least), Path A, Sheepfolds, Quarry, Summit (most), except at peak picnicking times when the Sheepfolds and Quarry may surpass the Summit. This agrees with the subjective impression that the Summit was the most densely used of the sites. However, when the intensity of use is considered, the mean ranks give Path A (least), Path B, Summit, Quarry, Sheepfolds (most). This confirms the distinction of walking and picnicking sites, with the greatest pressure on the site displaying both characteristics. The "slower start" on 30th June probably reflects the difference between a "normal" Sunday, when most people have dinner at home and then go out, maybe with a picnic tea, and a Bank Holiday, when more people make a full day trip.

Car park counts were made at the same time as the people counts, but these were not very useful. Only the Quarry is big enough to record a "true" pattern, i.e. it could be said to reflect the number of cars on the whole Fell. Fell House (the upper area only was recorded) and the Sheepfolds are relatively small car parks and rapidly fill up on busy days. Thus, the upper area of Fell House was usually full by midday (about thirty-five cars), and although there might be some movement, the numbers stayed steady until late afternoon. The greater capacity of the Quarry meant that it was usually not full, and shows an increase to an afternoon peak (circa 1500 to 1600 hrs) when it is steady on a busy day at approximately fifty cars (see Plates 5 and 6). These counts give little impression of the total number of visitors, nor of the car parking problem. When it is busy, visitors stop in every conceivable place, and were even seen to remove barriers, carefully replacing them after parking their cars on the grass verges!

The mean number of cars recorded each hour was calculated over the survey period (Figure 4.8), but this plot also suffers from sampling problems: it averages out Bank Holidays and quiet weekdays. Counting once an hour may not provide a true estimate for the hour, but the static location of cars in relation to people reduces this problem. The plot shows a similar diurnal trend to the people counts, usually peaking at 1530 and 1630 hrs. There is some evidence for a slight time shift between the periods, with visitors coming later but staying longer into the evening in the summer. This does not necessarily mean that individual visits were longer; there may simply be more evening visitors in the summer. In fact, the questionnaire survey did show some variation in trip length, with more longer trips in the summer, but the differences are not statistically significant.

Plate 5 Beacon Fell: visitors arriving at Fell House Car Park on a Sunday afternoon. Warden's hut is on hill to right, with toilet block in trees to left.

Plate 6 Beacon Fell: Quarry Car Park, note people sitting *in* the car park, and use of picnic table nearby

Figure 4.8


MEAN CAR PARK COUNTS
FELL HOUSE CAR PARK
(UPPER AREA)
mean number of cars
20
15
10
5
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Summer
Easter
QUARRY CAR PARK
mean number of cars
15
10
5
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Summer
Easter
SHEEPFOLDS CAR PARK
mean number of cars
20
15
10
5
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Easter
Summer

Length of stay	Summer (Pilot)	Easter (Main)
0 - ½ hr	1.1 %	3.7 %
½ - 1 hr	11.2 %	13.5 %
1 - 2 hrs	34.3 %	39.5 %
2 - 4 hrs	39.9 %	35.0 %
4 - 6 hrs	11.2 %	6.0 %
6 hrs	2.2 %	2.3 %

NB: in both surveys visitors were contacted before 1700 hrs, so any evening visitors would not be included.

A cordon survey was carried out on Sunday, 8th July 1973 for a study by Lancashire County Council. It produced a split plot showing arrivals and departures (Figure 4.9), which seems to suggest short morning visits and longer afternoon visits (van Wijngaarden 1973).

The authors of this report noted that the traffic census recorded 270 vehicles more than the cordon survey, and assumed these to be visitors entering the Fell after the survey finished at 2000 hrs. However, it is necessary to deduct any day visitors still on the Fell at 2000 hrs staying, perhaps, to admire the magnificent sunset over Morecambe Bay. By my estimate taken from the graph presented, there is a discrepancy of about ninety-five cars between arrivals and departures before 2000 hrs. This leaves 175 cars unaccounted for. Another deduction should be made for any cars arriving between the reading of the meter (0900 hrs) and the start of the cordon survey (1030 hrs) on the Sunday morning. Thus, there may be about 150 cars recorded between 2000 hrs Sunday and 0900 hrs Monday. At 11% of the Sunday total (twenty-four

Figure 4.9


BEACON FELL TRAFFIC CENSUS 1973
Source: A.O.N.B. Bowland Study Lancs C.C.
INFLOW
OUTFLOW
INFLOW > OUTFLOW
OUTFLOW > INFLOW
no. of cars
150
125
100
75
50
25
10 00
11 00
12 00
13 00
14 00
15 00
16 00
17 00
18 00
19 00
20 00
time in hours

hours), this is a far more likely estimate of evening visitors than the 270 (20%) given in the report.

Evening readings were made on Sundays between 29th July and 28th October 1973, with the meter read at 1800 hrs (see Appendix IV). The Bank Holiday weekend records the highest proportion of evening visitors (25%), the other weekends averaging 13%. It is likely that these figures are also inflated by day visitors leaving late. The most obvious case is the Bank Holiday, but it is noticeable that whereas proportions are in the range of 14 - 18% in August (excluding the Bank Holiday), by October the range had dropped to 3 - 5%. This suggests that the true proportion of evening visitors (i.e. those arriving after 1800 hrs) is relatively small, and virtually insignificant once the evenings draw in.

(b) Site Contrasts

The original dot maps provided a good visual impression of spread useful for initial consideration, but cannot be used for quantitative analysis. (See Figure 5.7)

Choropleth maps were drawn and show intensity of use per unit area (Figure 4.10) representing all the people recorded. Isopleth maps (Figure 4.11) were drawn from the same data, using the centre of each grid square as the reference point. These maps emphasise the lineal spread of people, the intensity necessitating the use of a "stepped" interval.

Figure 4.10 Beacon Fell: Intensity of Use - Choropleth

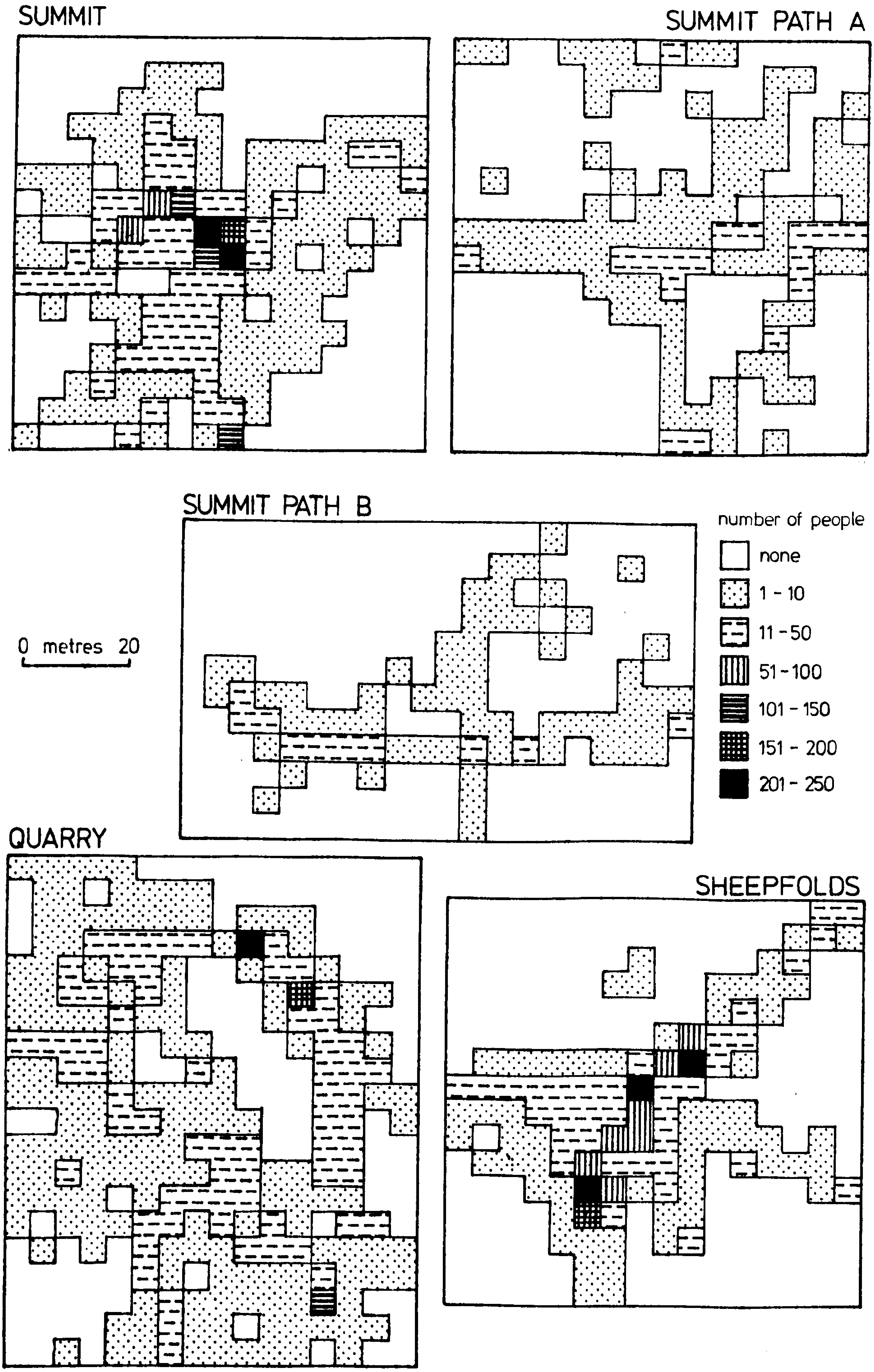
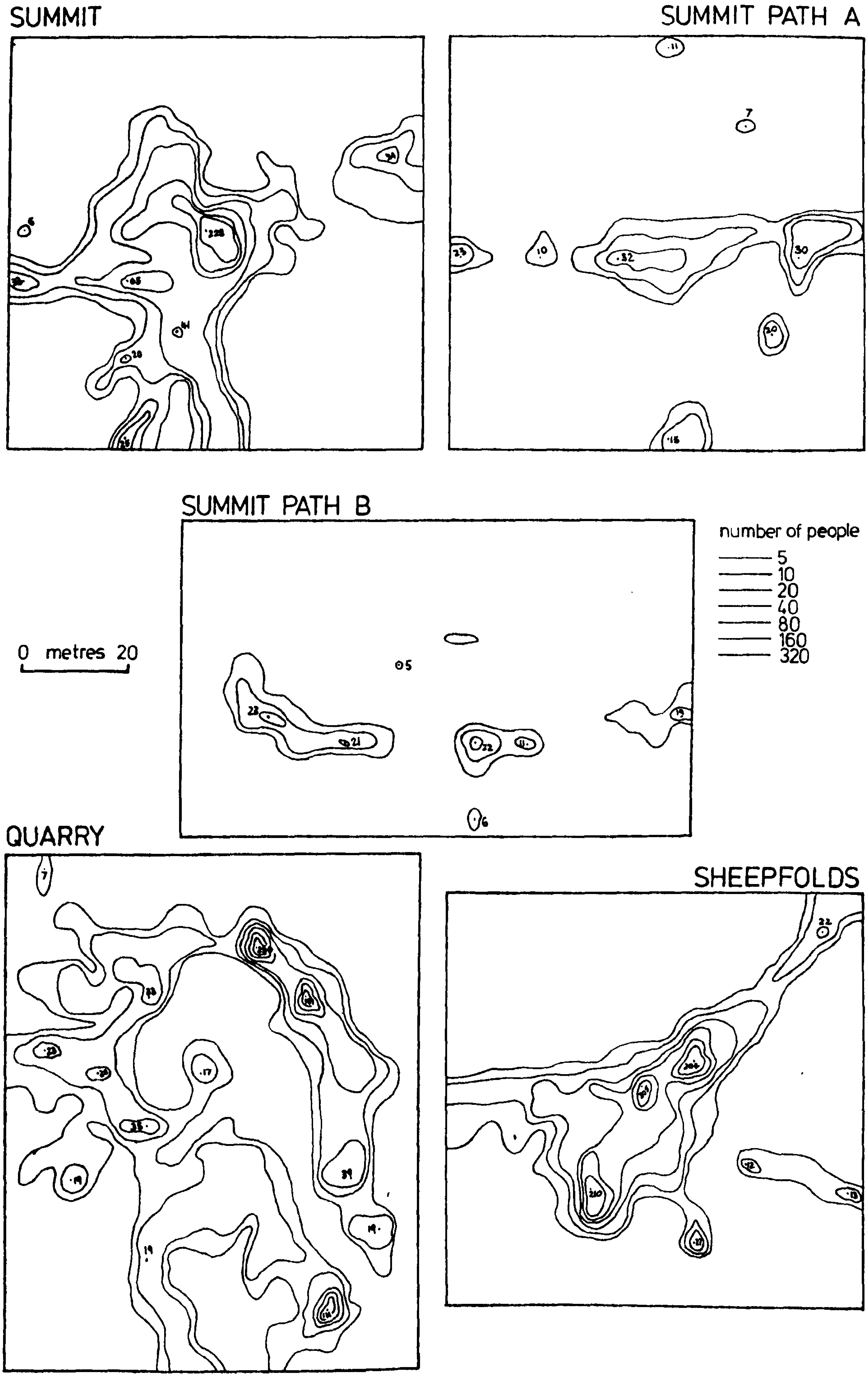


Figure 4.11 Beacon Fell: Intensity of Use - Isopleth



Further dot maps were drawn to distinguish picnickers and walkers for each site (Figures 4.12 - 16). The "walking" maps give a striking impression of favoured routeways, and were useful in the discussion of vegetation damage. The "picnicking" maps show the favoured picnic spots (excluding the preselected picnic-table locations). A set of maps was drawn to show the developing picnic pattern through one busy day, with all picnickers.

The importance of the routeways is clearly marked on the "walking" sites, but the popularity of the main surfaced footpath (Fell House - Sheepfolds - Summit) can also be picked out on the Sheepfolds map. The main footpaths can be traced across the maps: the Summit Path, with low intensities on Path B but steadily picking up through Path A to the Summit; the surfaced path through Sheepfolds to the Summit; and the continuation of the Summit Path from the Summit eastwards to the Quarry. The clusters of people found at the road end of the Summit Path on Path B (Figure 4.12), were recorded on Easter Bank Holiday, when the car parks were full and road parking extended to this point. This approach presents quite a steep pull up to the Summit, and many people never made it to the top. The distance from the car parks probably accounts for the lack of picnickers here (too far to carry all the paraphernalia!); those recorded sitting down were usually just resting.

On Path A (Figure 4.13) the popularity of the diagonal approach to the Summit Path is emphasised by the rough vegetation in this "clearance" area; those using the path are confined by the brambles (maximum path width two metres). The Summit Path shows a fairly abrupt margin on one side (a physical barrier existing in the wall), but a wider spread on the other. Although most people keep to the short

Figure 4.12 Beacon Fell: Intensity of Use, Summit Path B

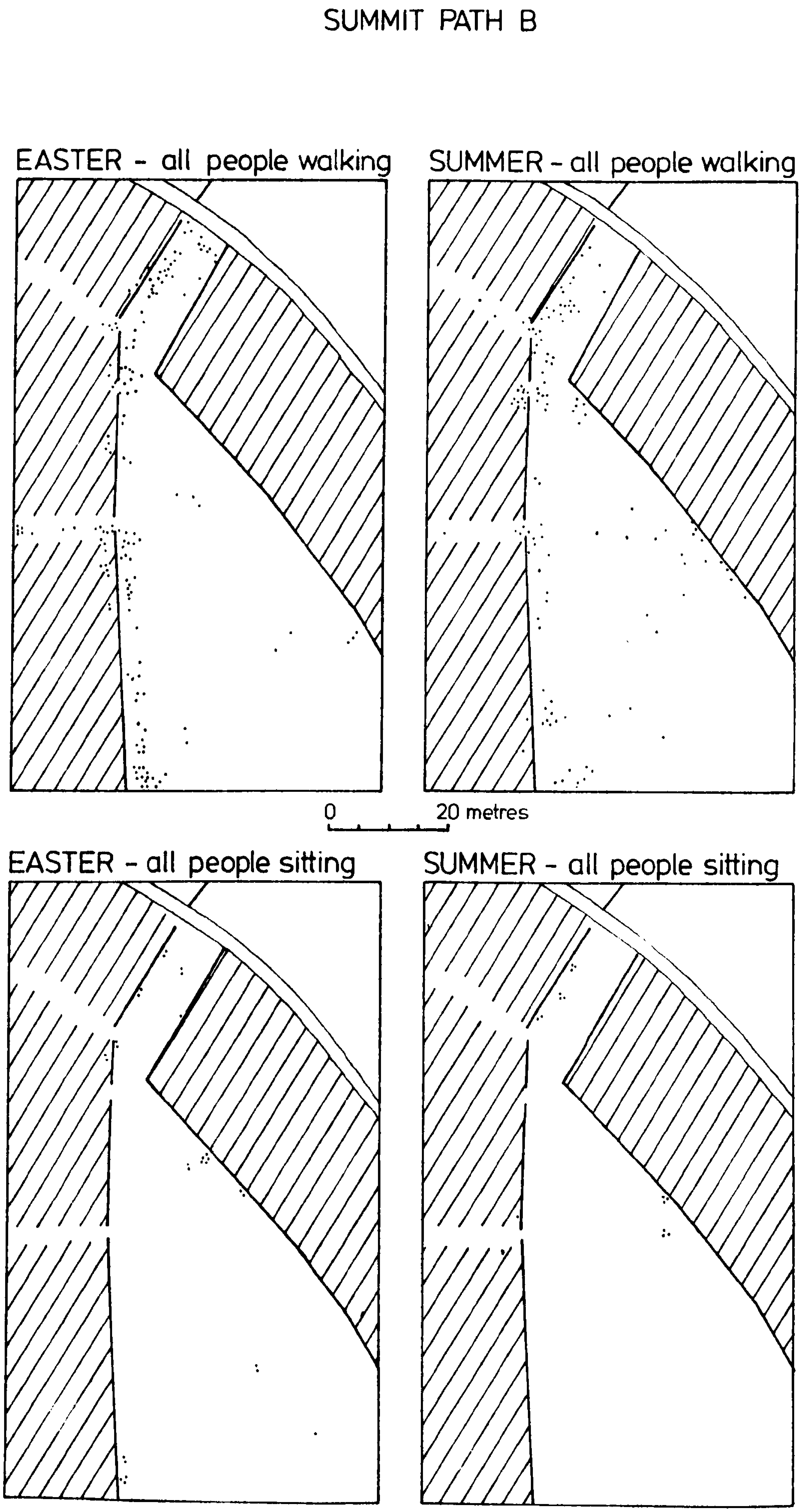
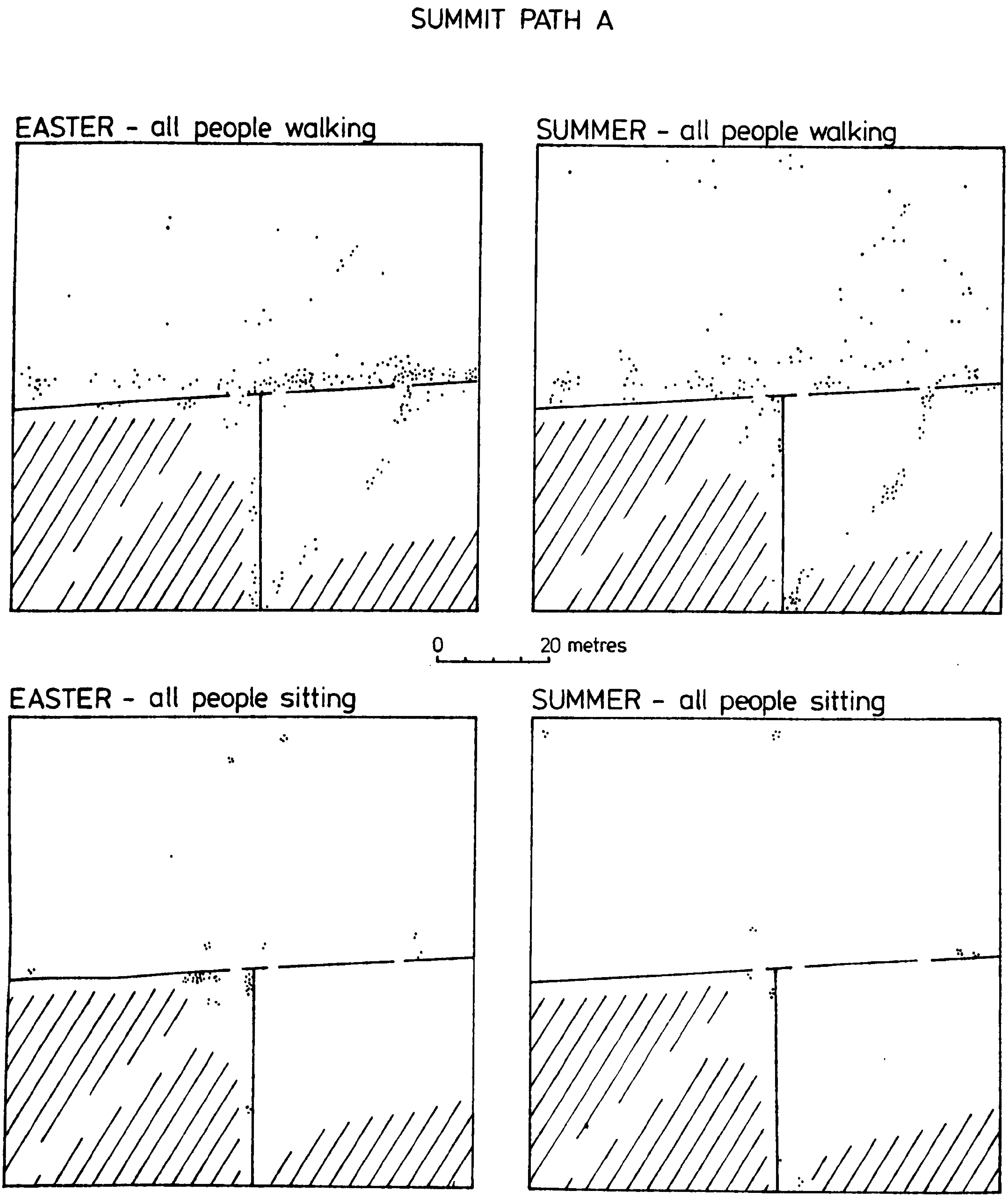


Figure 4.13 Beacon Fell Intensity of Use



grass of the worn track (circa three to four metres), there is no real barrier in the tussock grasses and ericaceous shrubs of the background vegetation. Many people were observed to pause when emerging from the plantation; there is a fine "surprise" view of the Bowland Fells and it provides a suitable opportunity for a rest (this may account for the clusters recorded in the gateways) (see Plate 8). Like Path B, Path A is essentially a footpath site, but it is used as a picnic site by those who are prepared to walk a little further than most from the car park. However, the weather is rarely fine enough for picnickers to take advantage of the view. On most days the shelter provided by the walls proved to be a greater attraction.

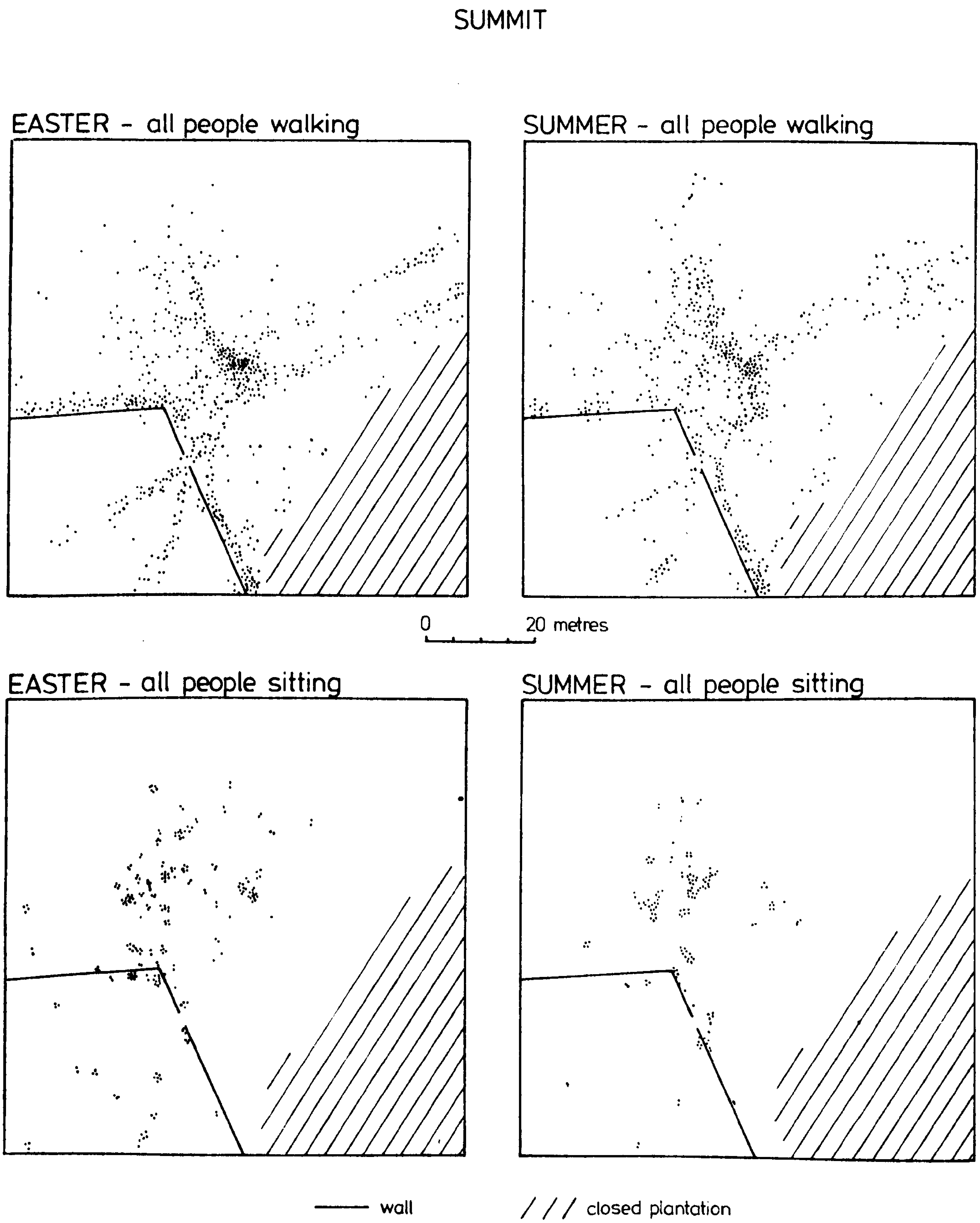
On the Path A map a small number of people can be seen continuing in a north-easterly direction obliquely across the Fell. It is perhaps surprising that more people do not follow this route as it is the only defined right-of-way in the Park. However, the route does not lend itself to circuit walks, and it is more likely to be used by local ramblers walking from home than by Country Park visitors.

The Summit (Figure 4.14) provides an obvious focus for all the main paths, being at once the highest point of the Fell and almost central in location. The site gives an almost complete panorama, sweeping from the Bowland Fells in the north, round the Ribble Valley with Pendle Hill in the distance, past Longridge Fell and out over the Fylde. On a clear day the Lakeland Fells and the Isle of Man can be seen (see Plate 7). The surfacedfootpath leads those unfamiliar with the site up here, and the Nature Trail also passes across the central area. The dot map gives a good impression of the central scatter with paths radiating out. The walls in the south-west confine the spread of

<u>Plate 7</u> Beacon Fell: The Summit on a fine Sunday afternoon. Direction finder on the plinth (supplied by the Ramblers' Association) is a great attraction.

<u>Plate 8</u> Beacon Fell: Summit Path A; the "surprise" view causes many visitors to pause at wall on reaching the Summit Path

Figure 4.14 Beacon Fell Intensity of Use

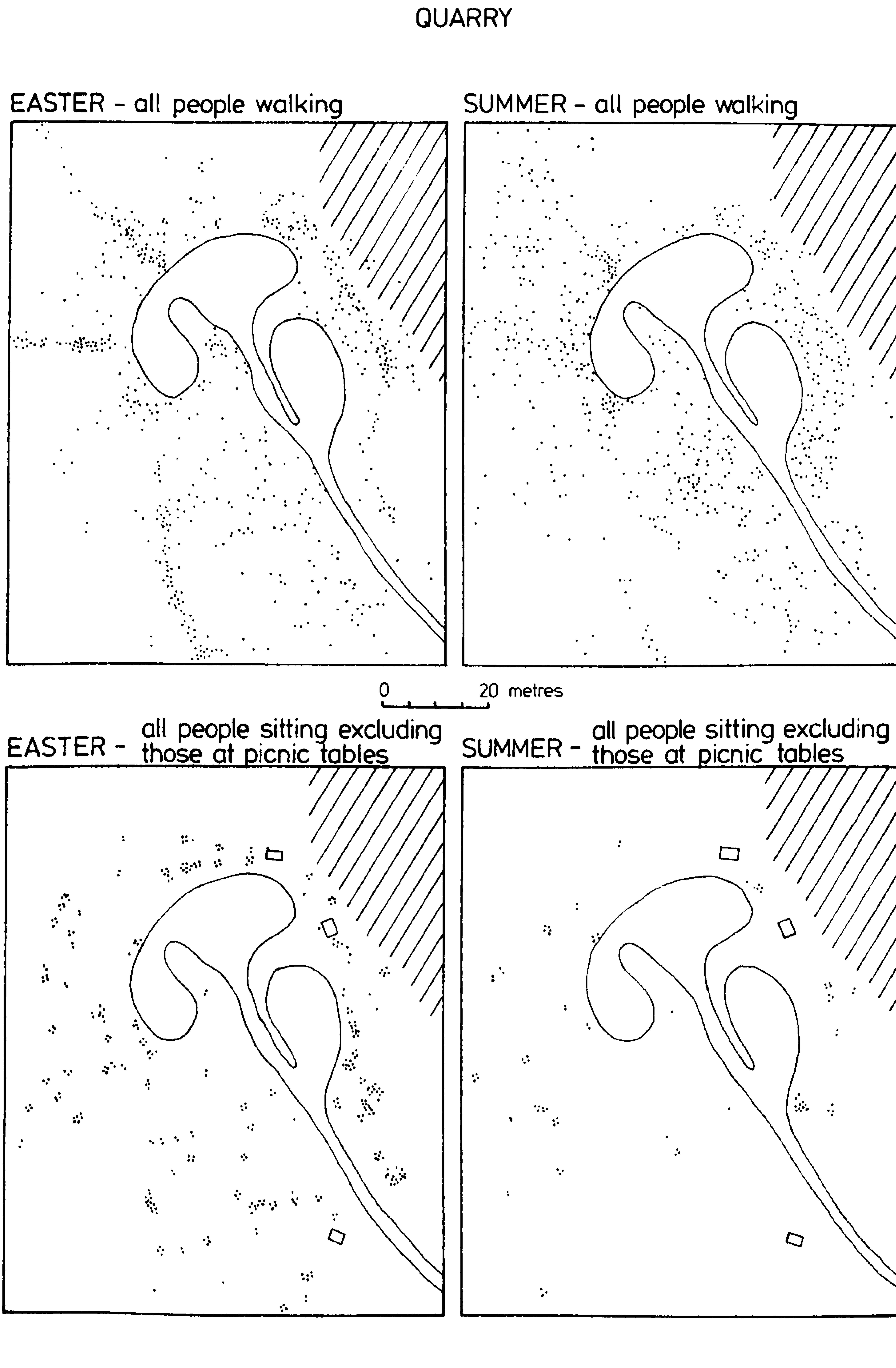


people to some extent, those following the paths through the "clearance" area they define again being confined by the rougher vegetation. The Summit is also essentially a "walking" site; although some people sit and rest a while, few choose to picnic here. Again, the distance from the car parks is the main disadvantage, but the site is too exposed for a prolonged stay except in very fine weather. Those who do picnic here usually take advantage of the shelter afforded by the walls, or some of the deeper hollows.

The Quarry map (Figure 4.15) is unusual because of the "hole" in the middle - the surfaced car park, which was not recorded. The three main approach paths are clearly depicted; most of the people found here are either using this car park, or else walking the Nature Trail, which passes along the western edge of the site. Many of the people recorded on the steeper slopes were in fact children playing, while their parents sat nearby (often in the car!). The two picnic tables that overlook the car park are far more popular than the lower one, which is almost completely hidden from view. It would appear that the view (of the car park, not the Fells) is more important than shelter here. People picnicking in their cars, or in the car park, were not recorded.

It is at first surprising that many people seem to prefer the noisy, dusty conditions of the car park to a grassy bank only a step away. It seems that the poor surroundings are outweighed by the convenience (or safety?) of having the car within reach. People who choose to picnic in this way are obviously the easiest to accommodate, although they take up car-parking space that may be needed on busy days (see Plate 6). It may be reasonable to assume that their visit would be improved if they could be protected from some of the bustle and noise of a large

Figure 4.15 Beacon Fell Intensity of Use



car park. The obvious solution is a car park with many small (car-sized) bays, the disadvantage being the extra space they would occupy. The experimental area in Quarry Wood has not been very successful; possibly it is too secluded, being completely surrounded by plantation and affording no view at all. The bays are rather dark and over-shadowed, and their presence is not obvious to anyone unfamiliar with the site.

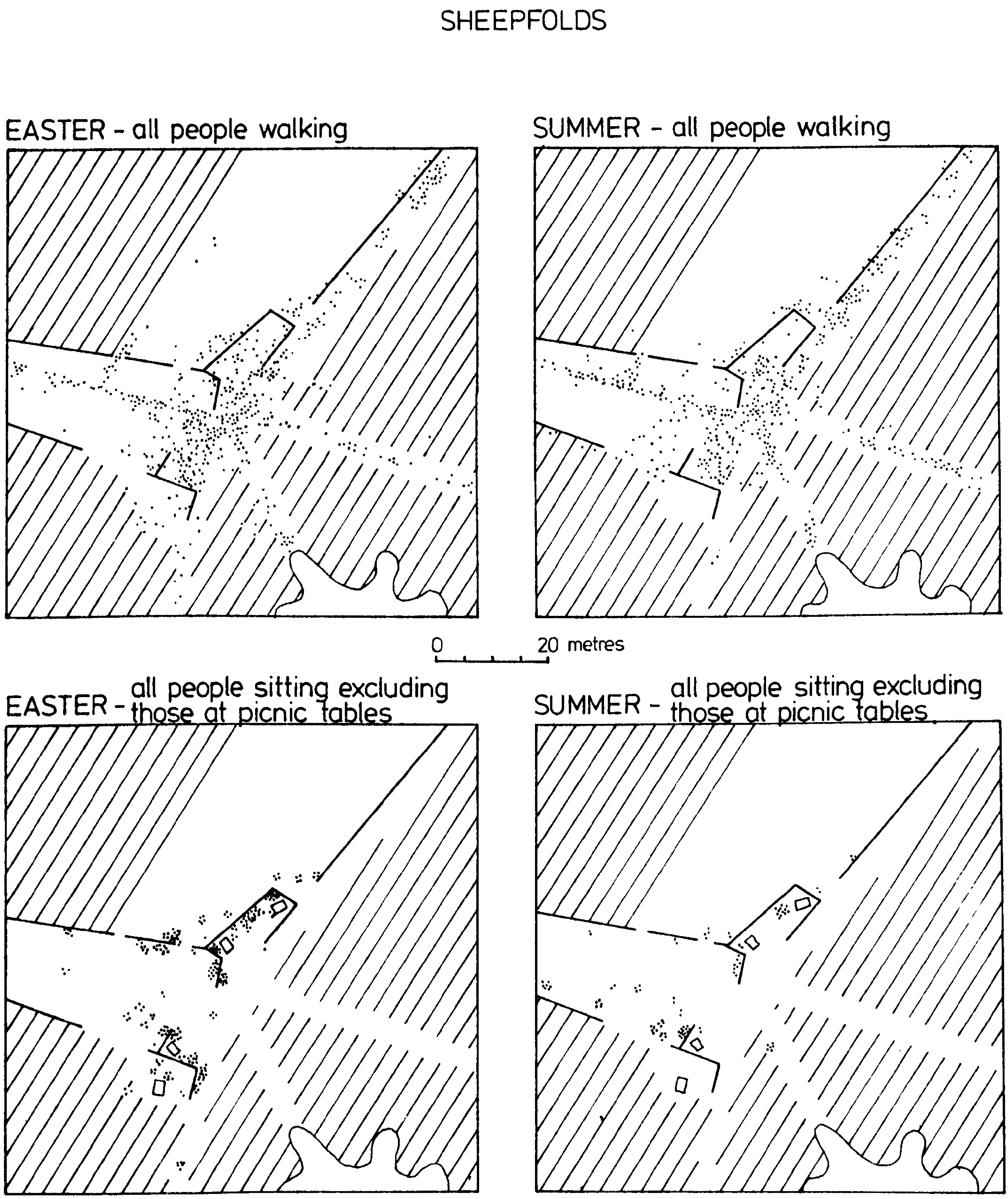
The Sheepfolds site (Figure 4.16) is highly constricted, the main use following the surfaced footpath, with the secondary route along the old approach road to the farm, known as Larch Avenue. The central area is heavily trampled, by walkers cutting the corners, picnickers and children playing. This is one of the few areas of relatively flat ground on the Fell, and when it is not too crowded it is a favourite place for ball games. This is a popular picnic place: in spite of rather restricted views it is in a prime location, not too far from the car parks and with pleasant walks around (see Plate 9).

Comparing the Summer and Easter maps, the smaller numbers in the Summer period are evident. The poor weather is also reflected by the smaller number of picnickers in the Summer. One noticeable feature of the Summer maps is an apparent wider distribution, especially near the Quarry. The effects of children playing cannot be isolated, and the possibility of a larger number of children in the holiday sample was considered. The questionnaire data was examined to see if any seasonal pattern was shown. In fact, in the pilot study (Summer 1974) 43% of the groups included children, whereas in the main study (Easter 1975) 61% of the groups included children. However, as the pilot study was spread over several days, including weekdays, and the main study was

Plate 9 Beacon Fell: Sheepfolds Picnic Site, looking towards Fell House, with view of the Fylde beyond. Walkers are on surfaced path leading to Summit.

Plate 10 Beacon Fell: Bilberry pickers near Quarry Car Park

Figure 4.16 Beacon Fell: Sheepfolds Picnic Site, Intensity of Use



concentrated on the Bank Holiday weekend, this could be interpreted as evidence of more children at holiday times. In fact, the smaller size of the pilot study makes it more liable to sampling error (178 to 349) so the difference may not be significant.

A more likely seasonal explanation for the divergence can be made. On closer examination it can be seen that the wider spread of people is usually associated with the well developed moorland plant association. Although the rough combination of tussock grasses and ericaceous shrubs is avoided for most of the year, midsummer sees the bilberries in season and many people make special expeditions to pick them. Evidence from the pilot study shows twenty-nine parties (16%) giving bilberry picking as one of their activities while on the Fell, indeed five groups (3%) gave this as the reason for their visit. Bilberry picking does not figure in the responses of the main survey as the fruit, of course, would not be ripe at Easter. The attraction of the berries seems to be sufficient to encourage people to penetrate quite dense vegetation in the hope of finding untouched bushes; those near paths were subjected to quite severe physical damage (see Plate 10).

The heather comes into bloom about the same time, and may also account for some of the errant walkers. All the plants are officially protected in the bye-laws, but even with constant vigilance on the part of the Warden and his helpers, it has not been possible to prevent people destroying many plants by picking, and in some cases digging them up. Heather is fairly robust and the effort to pick sprays can cause considerable damage with broken shoots and uprooted bushes.

The bilberry seems to withstand the onslaught remarkably well. The individual plants should not be damaged by having their berries stripped and, unless there is very heavy trampling, they usually recover quickly. The heather is not so fortunate; damaged plants and gaps are plainly visible at the end of the summer, and their loss contributes to path widening. The concentrated attack on the heather is doubly unfortunate; already only a minor member of the community in many places, it risks being lost altogether. The only other plants to be singled out in this way are the Spruce trees, the saplings being a handy size for a Christmas tree; even when it is explained that the trees were planted, many visitors adamantly refuse to see digging up a tree as stealing.

(i) Walking on Beacon Fell

One of the major activities on Beacon Fell is walking. The Country Park provides a variety of walking scenery in a small area. The layout of the car parks and woodlands encourages people to leave their cars and explore the Fell, by introducing short stretches of footpath in series with interesting vistas, "surprise views", and panoramas. Of the people interviewed in the questionnaire survey, 47% said they had come to the Fell specifically to have a walk, and a further 10% gave exercising the dog (and themselves presumably) as the reason for their visit. In all, 90% of the visitors reported taking a walk while on the Fell, but this includes everything from a hobble across the car park to a five-mile hike.

Time and resources did not permit a detailed analysis of walking routes. In the initial interviews for the pilot study many visitors who said they had walked had no clear idea where they had been, which suggested that any attempt at analysis by questionnaire would be unproductive. A question about the Nature Trail* included in the initial questionnaire was subsequently abandoned, since a large number of those interviewed were not aware of its existence (although most of them would have walked part of it, the interviews taking place on the Fell House to Summit section). Studying walks by asking visitors to plot their route on a map was considered, but ruled out because of the difficulties of ensuring reliability when included in a postal questionnaire.

Thus the popularity of the various walkways cannot be quantitatively assessed. However, the site counts show a proportional breakdown that may indicate favoured paths. The frequency of these counts required continued presence on the Fell for long periods during which time it was possible to observe overall use.

The most popular walks on the Fell seem to be as follows:-

From Fell House Car Parks or the Sheepfolds:

to the Summit via (a) the surfaced footpath,

(b) the right-of-way to Path A, then the Summit Path,

(c) the Nature Trail;

return to Fell House by one of the above routes,

or (d) follow the Nature Trail all round,

(e) follow the Nature Trail to the Quarry, and return through the fire breaks to the surfaced footpaths near the Sheepfolds.

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* The use of a Nature Trail was discontinued in 1977

From the Quarry:

to the Summit via similar routes as above;

to the Tarn.

Observation was biassed in favour of these routes as these were the sites taken in by the circuit walks. However, the lack of space for car parking on the north side of the Fell means that most walkers approach the Summit from the south and east. Nearly all the visitors who walk more than half a mile reach the Summit at some stage in their travels. It is the only location that is signposted, it is on the Nature Trail and it is an obvious vantage point.

The initial impression was that the Summit was by far the most intensively used site, and the greatest number of people were recorded here. However, when the total counts are related to the area surveyed it becomes clear that the Sheepfolds receives heavier pressure per unit area (Table 4.4). (NB: it should be remembered that the "intensity" is not a true measure of density but related to 185 readings).

The concentration at the Sheepfolds is probably due to its composite function, it is near a car park, it is a popular picnic site, and it is on the main surfaced footpath. The number of walkers recorded here is also inflated by the fact that many would cross the site twice in a circuit. The enclosed nature of the area means that there is little opportunity for people to spread out. The Summit only receives pressure from walkers as it is well away from the nearest car park (the Sheepfolds). Although most people make for the trig. point, there is far more room to spread out here.

Table 4.4 Intensity of Use

	Total number of people recorded	Area (excluding closed plantation and car park)	Intensity (Total ÷ Area)	Average number of people (Total ÷ 185)
Path B	327	2850 m^2	0.11	2
Path A	583	4650 m^2	0.13	3
Summit	2499	5450 m^2	0.46	14
Quarry	2332	6675 m^2	0.35	13
Sheepfolds	2303	2800 m^2	0.82	13

The analysis of walking can only reach tentative conclusions as it is based on subjective observation and impressions. However, it is clear that use of the area of the Fell is most uneven, with certain key sites taking a vastly disproportionate share of the pressure. This may be an advantage if it were desirable to protect certain areas - e.g. as a wildlife refuge. It shows that the location of car parks and key attractions (Summit, Picnic Sites, Tarn) are crucial in determining the distribution of people. The other observed fact is that the vast majority of visitors keep well on the beaten track, and show no great urge to strike out across the open areas, even when clearly free to do so. This, again, is useful if there is a desire to keep visitors away from a vulnerable area.

However, the vegetation on Beacon Fell is mainly comprised of a rather poor and very common acidic grassland (Chapter Five), thus there is little need to protect areas from pressure. In view of the intended use of the site as a high density Park, this would seem to be counter-productive. It should be possible to increase the number of walkers without increasing pressure in those areas already heavily used if another routeway was designed and signposted. The problem is that without another key attraction, most people will still make for the Summit. However, an alternative "return route" that avoided the Sheepfolds and encouraged use of the northern slopes of the Fell might be a useful improvement.

(ii) Picnicking on Beacon Fell

The second most important activity on Beacon Fell is picnicking. Over 30% of those interviewed gave this as one of the main reasons for their visit, and over 40% actually had a picnic while on the site. Picnic tables have been provided near several of the car parks, and there are also specially designated picnic sites, the Sheepfolds and Fell House being the main ones.

The use of a picnic area is important in determining the overall capacity of a recreation site. Many factors will influence the selection of picnic site, and the choice of where to sit in the available space. Understanding behaviour patterns would aid site design, a vital factor when there is a need to cater for large numbers of visitors in a small area.

Beazley (1969) distinguishes the needs of those on the move, when wide open views may be attractive, from the needs of those looking for somewhere to settle, when enclosed sites are preferred. There seems to be an instinctive force underlying our decisions, making behaviour predictable. Appleton adapts an observation by Lorenz on animal behaviour and suggests a preference for places offering prospects (commanding views of potential prey or danger) and refuges (cover and safety), emphasising the attraction of being able 'to see without being seen' (Appleton 1975, 70). However, the choice is essentially subconscious, and may be influenced by many factors of personality, familiarity with the environment, age, etc. Transitory changes of light or season may also be important, as this description of camping in barren country illustrates:

'The country was flat and featureless; one stretch of camel thorn being about as hospitable as the next. If there was an outcrop of rock, we made for it; usually there was nothing. Then our camps seemed remarkably lonely and vulnerable, pitched just anywhere, with nothing to anchor us in the immense landscape. But as soon as the sun had gone, the whole feeling of the place was transformed. Space was limited by the light of our lamp, the darkness beyond seemed a protective enclosure. We had a warm sense of belonging to this small spot of earth' (Beazley 1969, 33).

This passage is very revealing, attaching equal importance to the need for a focus, or anchor, and the comfort of enclosure. If a site offers no focus or barrier we seek to create one, by fireplace, canvas wind breaks, or arrangement of chairs. We draw boundaries around our claimed space, like any animal marking out a territory. The instinct seems to be particularly strong when we face a new environment. Whether it is the invisible line that divides tent from caravan, or the possession of a table in a cafe, or even space measured in inches in a crowded tube train, we frown on anyone invading our territory, thereby signalling our disapproval and trying to frighten off the intruder.

Favoured picnic spots are treasured, visited time and again, and repossessed with a sense of achievement. The disappointment of finding some unknown person in "your" picnic place may undermine the enjoyment of a whole outing:

'Had they known that the island had already been invaded that day, the plans for their picnic would have undoubtedly been postponed, but once they had moored their boats and dragged the hampers ashore there seemd nothing to do but stay. An entire regiment of English people was scattered all over the island...

Every year Luc had made excursions to the island, and it was evident that he considered it as particularly their own ...

"We look an awful mob, don't we? But we're only thirty-two"

Aside went the branches of the charmed circle; the deep moss groaned and perished beneath the sixty-four advancing feet, and the little Englishman threw the most indulgent smile upon the party of French people ...

The French people sat deliberately down with their backs to the thirty-two English people and ate their hard-boiled eggs and radishes in silence.'
(Kay Boyle Plagued by the Nightingale 1930 (Virago 1981, 76))

While any open field or noisy layby may serve for a quick stop, people usually only linger on sites satisfying the varied requirements of view, shelter and protection. Recognition of these requirements, and features likely to provide them, is very valuable in a study of site use, or when attempting site design.

Beazley suggests a list of factors that may influence the choice of a picnic place. The most obvious feature is the attraction of 'edge or fringe giving partial enclosure' (Beazley 1969, 34). The apparently instinctive fear of open spaces, coupled with an idea of "prospect/refuge", draws the majority to some fixed backdrop; the feature is equally noticeable in restaurants and airport lounges, where corner seats are prized, or failing that, the security of a wall. In the country, hedges and walls are sought out, but ecological boundaries are equally popular.

Fringe effects are most marked along woodland edges; Beazley suggests that a 'primitive fear of the forest' (ibid., 34) is probably the cause. The dark, damp and insect plagued interior might be unattractive for more prosaic reasons! Water has frequently been noted as a prime attractor: 'the infallible lure that draws all of us and, as a magnet, is probably the strongest tool the planner possesses' (ibid., 34). The idyllic scenes of Arcadia beloved by the Victorians frequently included a babbling brook, and the idea is still sufficient for many schemes of landscape analysis to 'add one for water' (Fines 1968).

People are remarkably gregarious; without other features to attract we tend to cling to each other. The first car or picnic party becomes the focus, later arrivals often locating close (but not too close) by. Many picnickers prefer the focus of their car, and whether for security or convenience, they are very loath to let it out of their sight.

The importance of aspect, or the need for shade, must not be underestimated, even with our unreliable summers. Beazley elaborates on the concentrating influence of slope, the technical points of which may be lost on many who instinctively make for a south-facing slope. Depending on the weather, there may also be a desire to have shade nearby (even if only for Granny and the milk), and this again reinforces the value of the "edge" or isolated clump of trees.

In a series of diagrams, Beazley shows how attention to these details may greatly increase the capacity of a site. Her comments are based on subjective observations; however it is possible to provide some evidence from the counts of sites studied on Beacon Fell.

The maps of intensity of use for each site give an indication of how picnicking parties distribute themselves. Two sites, Sheepfolds and the Quarry, were studied in more detail. Maps showing the distribution of people every hour were available throughout the survey period, but in studying picnicking two busy days were chosen, Easter Sunday and Monday. The maps record all people sitting down at the site; walkers and people sitting in their cars at the Quarry Car Park were not included here (Figures 4.17 (a) and (b) and 4.18).

General observation of the maps reveals the following points:

(1) When there is a picnic table available this forms a main attraction. The frequency of use of two tables quite close together on the Sheepfolds site suggests that it is the table that is the attraction, not its situation.

Figure 4.17 (a) Beacon Fell:

SHEEPFOLDS PICNIC SITE - PICNIC PATTERN ON EASTER SUNDAY

Figure 4.17 (b)

PICNIC PATTERNS AT SHEEPFOLDS - continued

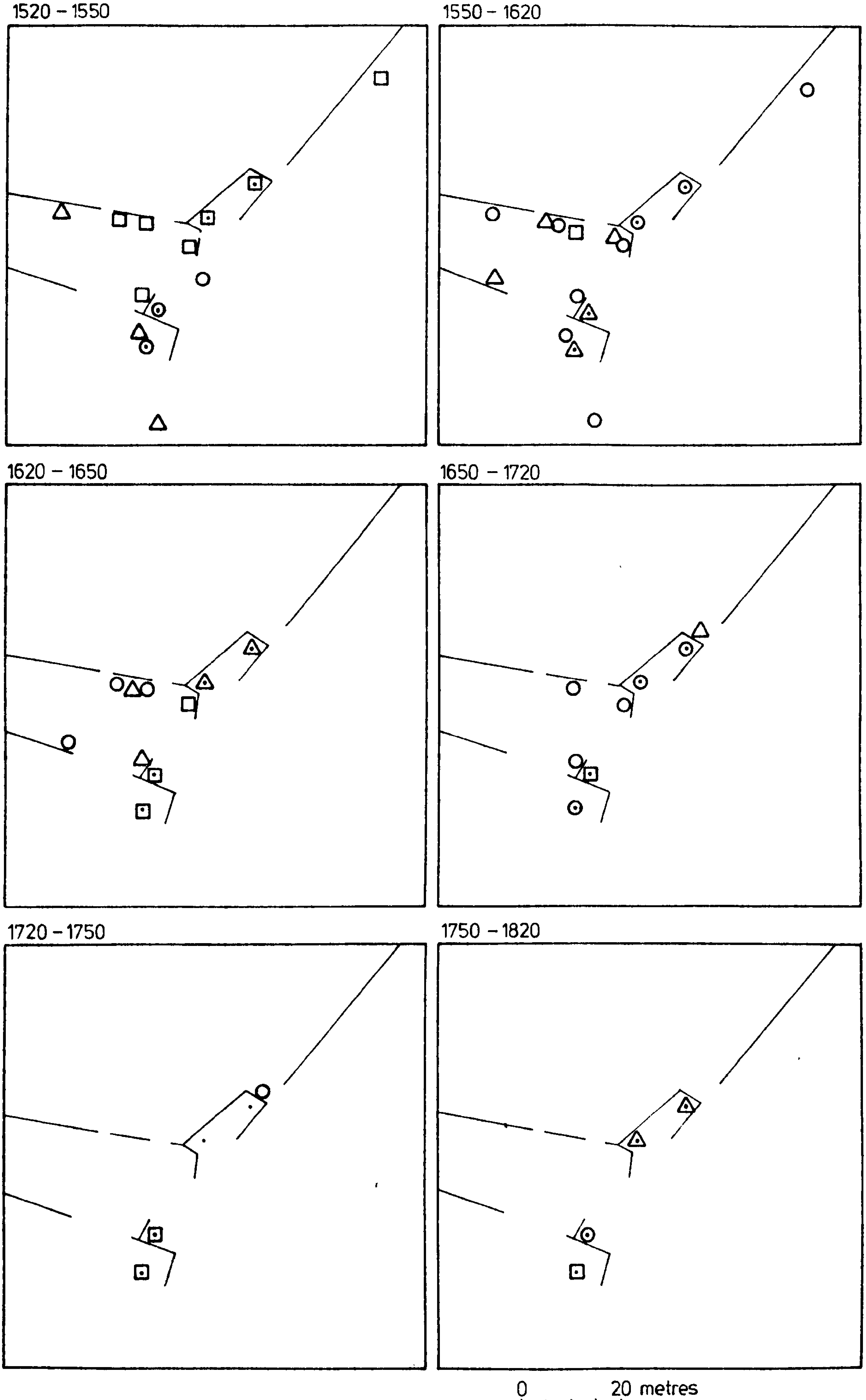


Figure 4.18 Beacon Fell:

QUARRY PICNIC SITE - PICNIC PATTERN ON EASTER SUNDAY

N.B. to save space, 10 metres has been omitted from the top of each quarry study area

(2) Most groups will not walk further than they have to, stopping in the first suitable place. This is probably due to the amount of equipment carried, but at the Quarry there does seem to be an effort to keep the car in sight. This may account for the unpopularity of the sheltered picnic table.

(3) Given the choice, a view is a definite attraction. This need not be an extensive view of the surrounding countryside; there seems to be a compromise between choosing views to exclude most other people, while keeping the car and playing children in sight.

(4) Edge effects are clearly demonstrated. Many groups favour a wall or dense plantation as backdrop or wind break; failing that, a steep slope may serve to block off the rear.

(5) The distance between groups varies with the nature of the site and the number of other groups present. There seems to be an effort to spread out within the favoured area, to maximise the distance between groups. As a site becomes crowded, the distance between groups declines sharply.

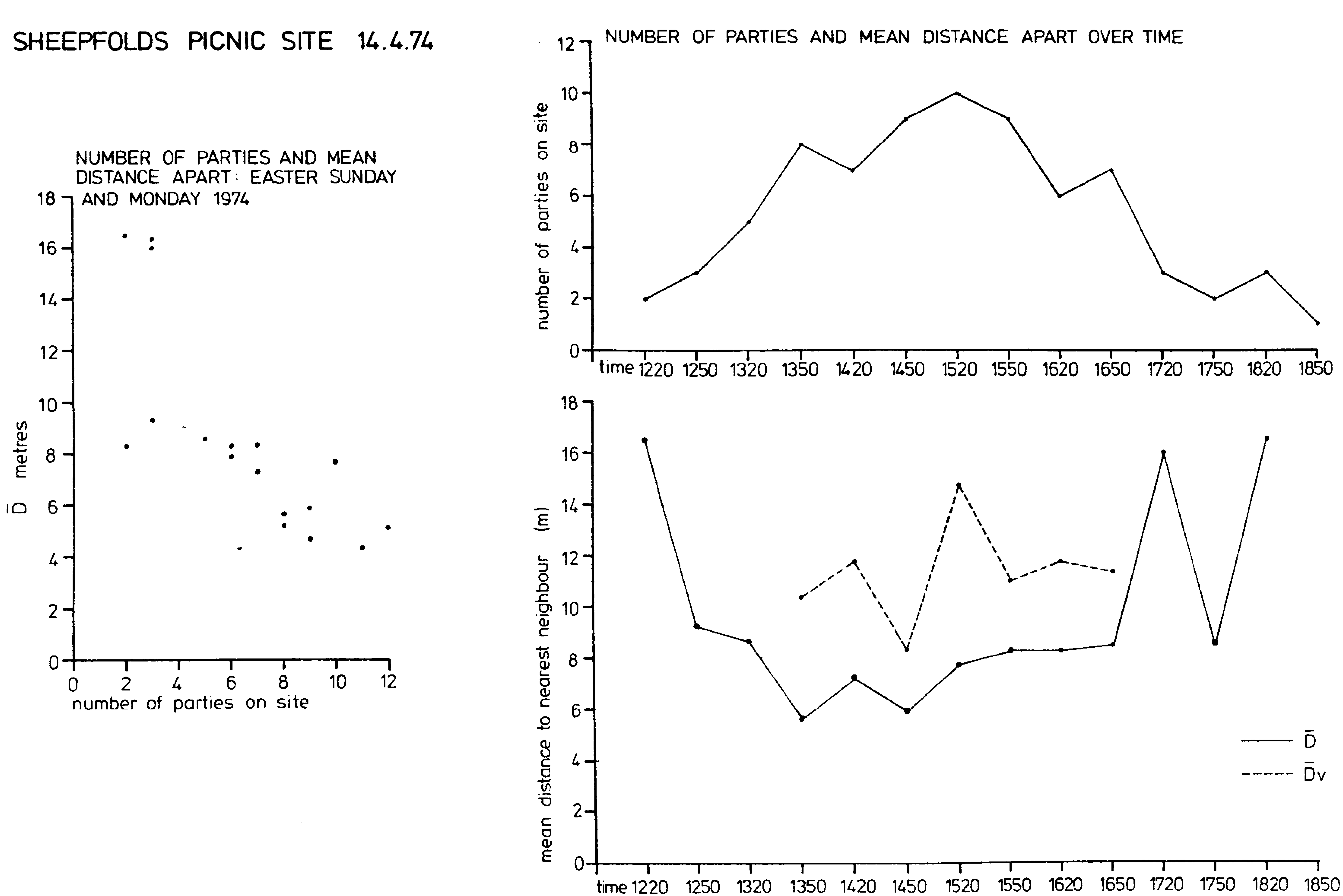
These simple observations mask an interesting process at work. Analysis of the mean distance between groups was used to investigate the patterns. Two problems should be recognised that complicate comparison of the sites. The Sheepfolds is a compact site (picnicking area 0.28 ha) with many "edges"; it is near to, but detached from, the car park. The Quarry is a much larger site (recorded picnicking area 0.67 ha); it has fewer "edges" and the position of the parking area in the centre of the site means that most locations face towards the cars.

Two factors were investigated: the distance between parties, and the pattern made by them in relation to the "fixed" features of the sites. At low densities there is considerable choice and "fixed" features such as the picnic tables are the most important influence on location. As densities rise another factor comes into play, and that is the location of other groups on the site. Other things being equal (i.e. no particularly attractive site vacant) groups seem to locate to maximise the distance between themselves and the groups already present. Parties stay for different lengths of time, so the maps showing the developing pattern through the day are the most useful here.

The hypothesis was formed that picnic parties would locate to optimise the distance between themselves and other groups already on the site. A real measure of the location decision could only be made by plotting the chosen location of <u>each party at the time it was made</u>. This was not practical in terms of survey time, but half hourly plots were made at the Sheepfolds on Easter Sunday. When this data is represented (Figure 4.19) it can be seen that the number of parties on the site increases to the peak picnicking times, with an associated drop in the mean distance to nearest neighbour. Over the two days, the negative relationship between number of parties (P) and mean distance to nearest neighbour ($\bar{D}$) is clearly shown, giving a correlation coefficient of -0.78.

However, measuring distances on a map is not very satisfactory; on the ground it is the number of other parties that is apparent that is the key issue. In a mapping exercise it is not possible to judge noise, but if the mean distance is calculated by measuring the distance

Figure 4.19 Beacon Fell: Sheepfolds Picnic Site, Distribution of Parties



to the nearest neighbour in sight ($\bar{D}_V$) the correlation coefficient drops to -0.61 (both significant at 1%). (NB: if one group is completely hidden from view the effective distance becomes infinite, and the record must be excluded from the analysis.) Thus, by careful location the groups have managed to keep a reasonable distance apart and the decline in apparent distance as crowding increases is less marked.

Initial analysis of pattern shows a set of nearest neighbour indices for the different number of visitors on site all below 0, indicating a degree of clustering. (Minimum 0.53 with nine parties.) (Table 4.5) However, the relationship of R and the number of groups on the site is not consistent. As explained, the number of groups in sight may be a better measure. Using $\bar{D}_V$ instead of D, the measure of R_V is usually greater than 1, and is consistently much greater than R for each level of P. (Maximum 1.77 with ten parties.) This would suggest a more regular distribution, with a more even spread over the available space.

It is not possible to draw any firm conclusions from the nearest neighbour analysis for two reasons. The small number of plots analysed means that it is not possible to be sure that the results, particularly the differences between R and R_V, are significant. The second problem concerns the shape of the site. The calculation of D_{ran} assumes a regularly shaped area, but the Sheepfolds picnic area is star-shaped. In most cases, there is a logical boundary in the edge of the closed plantation, but all the area is not available for picnicking, as no-one would choose to sit on the surfaced footpath.

Table 4.5 Sheepfolds Picnic Site: 14th and 15th April 1974

(records every ½ hr on 14th; every 1 hr on 15th)

Number of parties (P)	Mean distance to nearest neighbour m		Nearest neighbour index		
	$\bar{D}$	$\bar{D}_v$	R	R_v	D_{ran}
2	16.5				
2	8.3				
3	9.3				
3	16.0				
3	16.3				
5	8.6				
6	7.9	11.15	0.73	1.03	10.8
6	8.25	11.85	0.76	1.1	
7	8.3	11.5	0.83	1.15	10.0
7	7.25	11.85	0.725	1.185	
8	5.63	10.38	0.6	1.11	9.35
9	5.9	8.35	0.67	0.95	
9	8.2	11.05	0.93	1.26	8.8
9	4.7	9.9	0.53	1.125	
10	7.7	14.8	0.92	1.77	8.37
11	4.3	7.65	0.54	0.96	7.97
12	5.15	6.75	0.7	0.89	7.64
12	5.13	7.3	0.68	0.96	
$\bar{x}$ = 6.8	$\bar{y}$ = 8.5 m	$\bar{y}_v$ = 10.2			

It would appear that at low densities the location of parties is controlled by "fixed" attractions. The location of the picnic tables and attractive features such as corners between walls is such that the use of these sites alone results in a rather clustered pattern (see Fig 4.17). At higher densities, people spread out over the site, choosing optimum locations to make use of the attractive features but also maximise the distance between themselves and the other groups (Figure 4.20). It is noticeable that people are only found in the central area of the site at the highest densities.

A similar trend is suggested by the data for the Quarry Picnic Site, but there are fewer records in the analysis (eleven over two days). On this site there are fewer "edges" and hence fewer key attractions. There are few obstructions to clear views across the site, so there is little difference between the mean distance to nearest neighbour ($\bar{D}$) and the mean distance to nearest neighbour in sight ($\bar{D}_v$). The variations that do occur show a similar trend to that observed at the Sheepfolds; thus, the correlations of $\bar{D}$ and the number of parties on the site (P) yields a coefficient of -0.82, and that of $\bar{D}_v$ and P one of -0.76 (both significant at 1%). The relationship is also shown on the plot through the day (Figure 4.21).

Analysis by the nearest neighbour technique produces measures of R in the range 0.85 - 1.49 (Table 4.6). There is no consistent relationship with the number of parties on the site, so the distribution appears to be random. Where a different measure for $\bar{D}_v$ occurs there is a move towards a more uniform distribution ($R_v > 1$), but the difference is not significant. Again, interpretation problems occur; the Quarry site is located around the car park, thus the measured area

Figure 4.20 Beacon Fell: Sheepfolds Picnic Site, Key Picnic Places

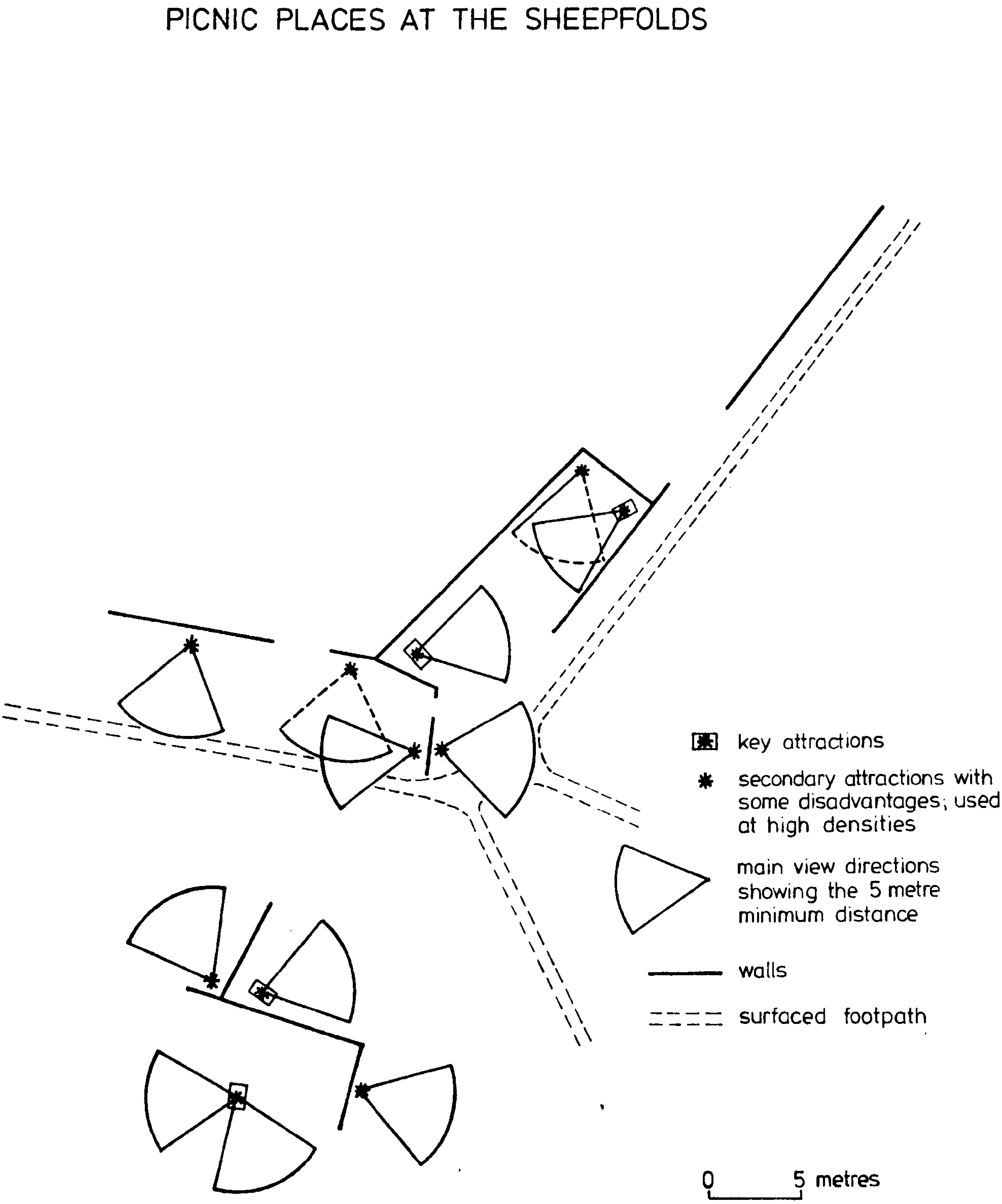


Figure 4.21 Beacon Fell: Quarry Site, Distribution of Picnic Parties

Table 4.6 Quarry Picnic Site: 14th and 15th April 1974

(records taken every hour)

Number of parties (P)	Mean distance to nearest neighbour		Nearest neighbour index		
	$\bar{D}$	$\bar{D}_v$	R	R_v	D_{ran}
3	29.5	29.5	1.25	1.25	23.6
5	24.4	24.4	1.33	1.33	18.28
6	15.4	15.4	0.92	0.92	16.68
9	15.7	15.7	1.15	1.15	13.62
9	20.4	20.4	1.49	1.49	
10	10.95	10.95	0.85	0.85	12.92
12	11.9	16.2	1.01	1.37	11.79
16	11.05	12.45	1.08	1.22	10.21
$\bar{x}$ = 8.75	$\bar{y}$ = 17.4 m	$\bar{y}_v$ = 18.09			

excludes the surfaced centre. This causes two problems - parties sitting in the car park were not recorded, but they would be visible to parties sitting around the edge, and distances were occasionally measured across the car park (see Plate 6).

The Quarry is a much more dispersed site; parties are sitting much further apart, but can usually see each other. At the Sheepfolds the real distances are less, but walls may block the view. It is noticeable that the one location at the Quarry that offers seclusion is not very popular. It may be that people unfamiliar with the site simply do not see the picnic table in the hollow, but there is also the possibility that people choosing the Quarry site prefer the more open views of the higher levels.

The mean distances between groups is thus related to the key "fixed" attractions on the site, and the number of parties present, but the size of the site should not be overlooked.

	Quarry	Sheepfolds
Mean P	9	7
Mean $\bar{D}$	17.4 m	8.5 m
Mean $\bar{D}_v$	18.09 m	10.2 m
Area	7,600 m^2	2,800 m^2

At the peak time recorded Sheepfolds was supporting a density of 0.0043 parties/m^2, or more realistically an even share would allocate a plot approximately 15 x 15 m each. The peak density recorded at the Quarry was 0.002 parties/m^2, giving a plot approximately 22 x 22 m each.

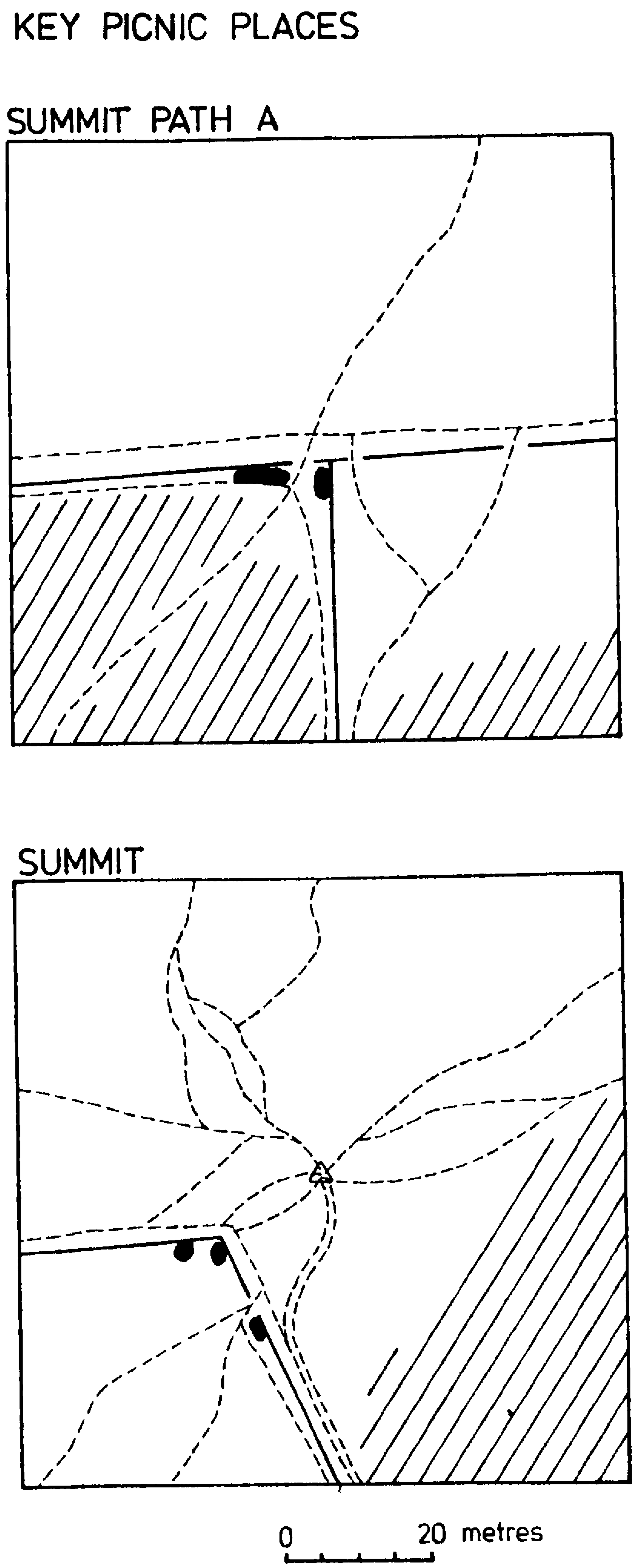
(NB: true densities at the Quarry may be underestimated, due to the exclusion of parties in the car park.)

On both sites the minimum distance tolerated between groups is about five metres, but careful location will usually ensure a greater apparent distance even on crowded days (minimum $\overline{D}_V$ at Sheepfolds 6.75 m with twelve parties present). In this study no account has been taken of party size; a large party will probably occupy a larger area than a small one, just as a party with very boisterous children (or dogs) will tend to keep others at a respectful distance, but the difference does not appear to be significant at the densities measured.

This study emphasises the importance of "edges" and "foci" on picnic sites, the former having a strong effect on capacity and apparent crowding, the latter influencing pattern. Thus Beazley's observations on the probable effect of modifying site design appear to be borne out. The original dry stone walls of the Sheepfolds seem to be particularly effective, providing sufficient "edge" greatly to increase the capacity of a small site without appearing out of place. It is doubtful whether such an effect could be achieved at the Quarry. The use of trees and bushes would be more appropriate here, but the size and open aspect of the old Quarry is such that it would be virtually impossible to achieve an equivalent sense of enclosure here.

Study of the picnicking maps of the other sites show a similar range of favourite places, this time without the artifical constraint of picnic tables. Edge effects are clearly seen on Path A (Figure 4.22) where a small corner of flat, enclosed land seems to be very attractive. The walls have a multiple function of screen, back-rest and wind-break

Figure 4.22 Beacon Fell: Summit and Path A, Key Picnic Places



on what would otherwise be a very exposed site. On all but the~~y~~ very best days, the Summit is too bleak for a long stop, so few people picnic here. Many of those recorded as sitting down were in fact resting. The only popular location for a picnic is again in a corner, defined on two sides by walls. It is also on a south-facing slope with a good view through the tree tops to the sea.

III The Trough of Bowland

The Trough of Bowland was chosen as a site of contrasting character with Beacon Fell, but close enough geographically to have a similar catchment area. The Trough road is the only route to cross the central area of the Bowland Fells; although narrow and tortuous in places, it is a vital access road for those living in the area. It crosses the watershed between Langden Brook (flowing south to the Hodder and Ribble) and the Wyre (flowing north and west).

The road passes through bleak country between Winfold Fell and Blaze Moss, giving car-borne visitors their nearest impression of wilderness. This area contains some of the classic Bowland scenery, the very scenery that led to the designation of the Fells as an Area of Outstanding Natural Beauty. It also forms a suitable "scenic" route to the coast for those travelling from the industrial towns of Lancashire.

The Trough of Bowland passes through country that is probably one of the closest approximations to "wilderness" in England. If wilderness is to be measured by the absence of people, or noticeable human activity, then the central areas of the route would certainly qualify. Obviously the presence of the road will prevent any true feeling of wilderness, and the occurrence of buildings and plantations lowers its value in certain places, but the overall impression is of open, spectacular scenery. The question arises, however, how important is this scenery to the recreation experience? What features particularly attract people; do they interpret the area as wilderness, and if so, do they like it? On busy days the presence of a steady stream of traffic along the road would prevent any impression of wilderness, even for the most blinkered observer. How much of this traffic could be happily accommodated elsewhere? It seems likely that many of the visitors are not looking for a "wilderness" experience at all, in which case there is even less of a case to argue for their destroying the impressions of others who really are trying to "get away from it all".

Thus, the Trough road typifies the character of Bowland, but is under great pressure from the number of visitors. It is not a recreation "site" as such - it has no clearly defined boundaries, and many functions. It could be said that this was exactly the sort of area that would benefit from a filtering and substitution exercise - i.e. providing a suitable informal recreation area to draw off some of the "site-free" visitors and therefore reduce the congestion that is destroying the "wilderness" feeling. Beacon Fell is just such an alternative honey-pot site; a comparative examination of the two sites should be able to assess how far their character and function overlap.

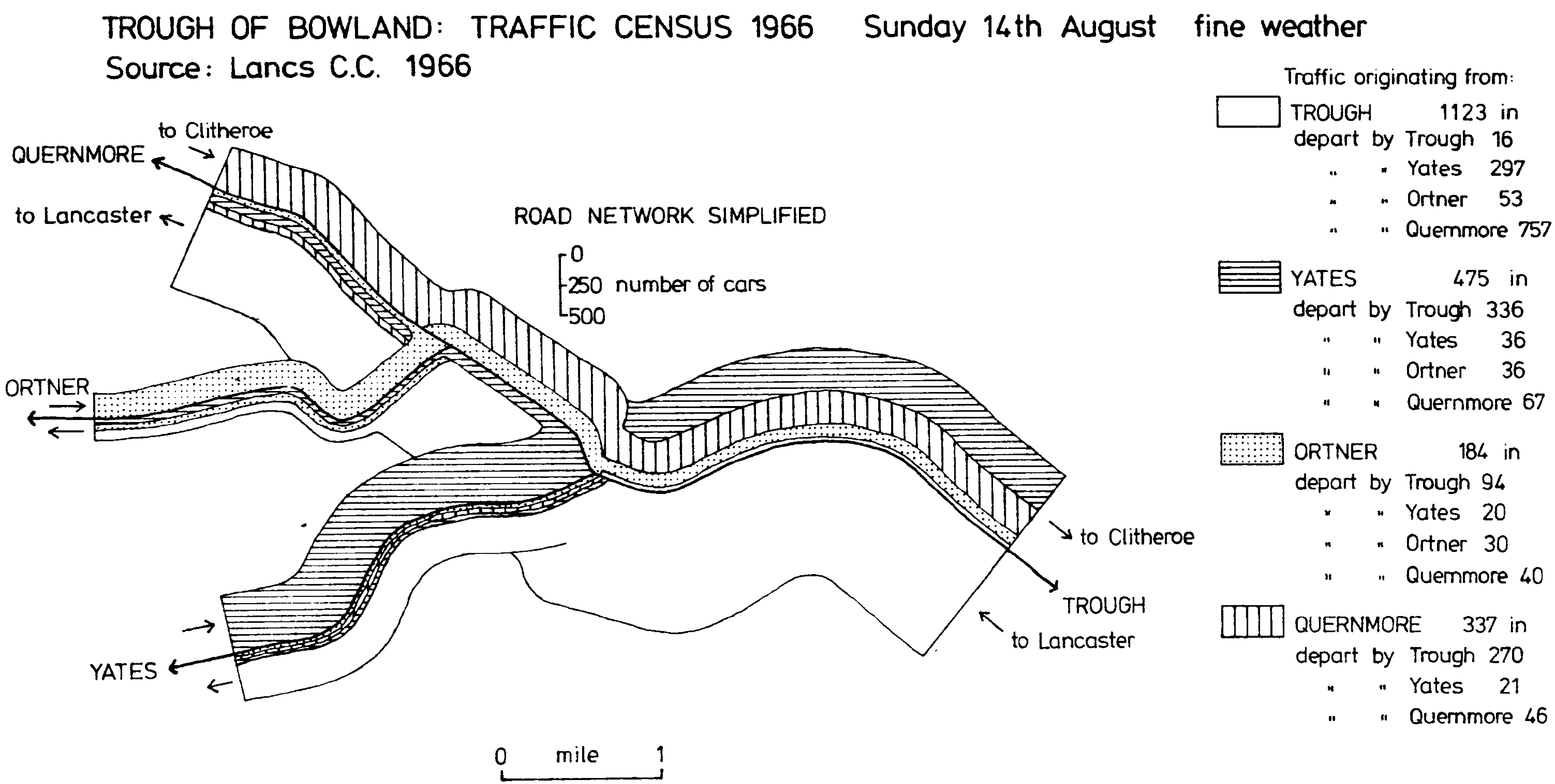
(a) Traffic Flow

Unfortunately there is no data of the quantity and quality of that available for Beacon Fell, and a picture of traffic flows has had to be assembled from two one-day surveys. These surveys are not directly compatible by method, and there are obviously great dangers in assuming too much from the study of single days. However, this is the best information available, and does indicate some features of recreation use. It should be noted that a census survey will include all traffic, whatever its function. Carrying out surveys on Sundays should exclude most work-related movements, so the bulk of what remains in such a remote area will be recreation.

Lancashire County Council carried out a census on Sunday, 14th August 1966. Their intention was to establish the volume of the recreation traffic by counting arrivals and departures through the day (1130 - 1830). They took the registration number of the vehicles so that they could trace movements and calculate the length of stay. Four check points were set up: Quernmore, Yates, Ortner and Trough (at the Grey Stone, then the county boundary) (see Figure 4.23). Movements were counted in fifteen minute periods. Spot checks on cars parking were made throughout the day. The weather was recorded as being fine and sunny.

The total number of cars recorded as arriving in the seven hour period was 2,119; average car occupancy was given as three, so this gives approximately 6,350 people. The total number of cars recorded leaving was 2,022 (6,066 people). The peak movement recorded was between 1500 and 1630 hrs, when there was an average flow of 538 cars/hour in, and 492 cars/hour out. The main route was the Trough road through to Quernmore, which was carrying the bulk of the traffic, although the route via Yates was also very popular. The majority of the cars followed a <u>through</u> route, i.e. they drove through the Trough and did not return by their inward route. The predominant direction was north west, entering along the Trough road, and leaving via Yates or Quernmore.

Figure 4.23 Trough of Bowland: Traffic Flow Diagram 14.8.66



NB Survey ran 1130 - 1830; some cars that arrived in that time were still there when the survey ended.

From the graph (Figure 4.24) it can be seen that the flow is fairly low in the morning, and increases after lunch. The correspondence of the peak flows both in and out (staggered by approximately fifteen to thirty minutes) is not surprising as the survey showed approximately 73% of visitors staying for less than three quarters of an hour. The report states that 'the vast majority are journeying through the AONB on their way to the coast', in which case it is possible that many of the outward journeys would be missed - an early start with the aim of being on the beach for lunch would not be unreasonable; such a scenario would have the party travelling through the Trough before 1130. It was observed that the route became 'very busy' between 1830 and 2000 (the homeward trek) but the survey did not record numbers at this time. Whether or not most people are making for the coast, it is clear from the small number of visitors stopping more than three quarters of an hour that the Trough did not provide the main stop of the day.

A comparison survey was carried out on Sunday, 6th July 1975, to try to establish any change. Without helpers, it was only possible to take a short check on one part of the road; a central point was chosen (Marshaw) since all the traffic actually travelling through the Trough would pass here. The weather was fine and sunny. The results of the survey are given in Table 4.7, with extracted data from the 1966 survey for a comparable period.

There are two main problems in the comparison of these data sets. The two survey points (Marshaw and Trough) record the same road, but are either side of one of the main picnicking areas (Wyreside). The survey in 1975 was not carried on long enough for people who stopped for a picnic to be picked up again on leaving. Secondly, surveying

Figure 4.24 Trough of Bowland: Traffic Graph 14.8.66

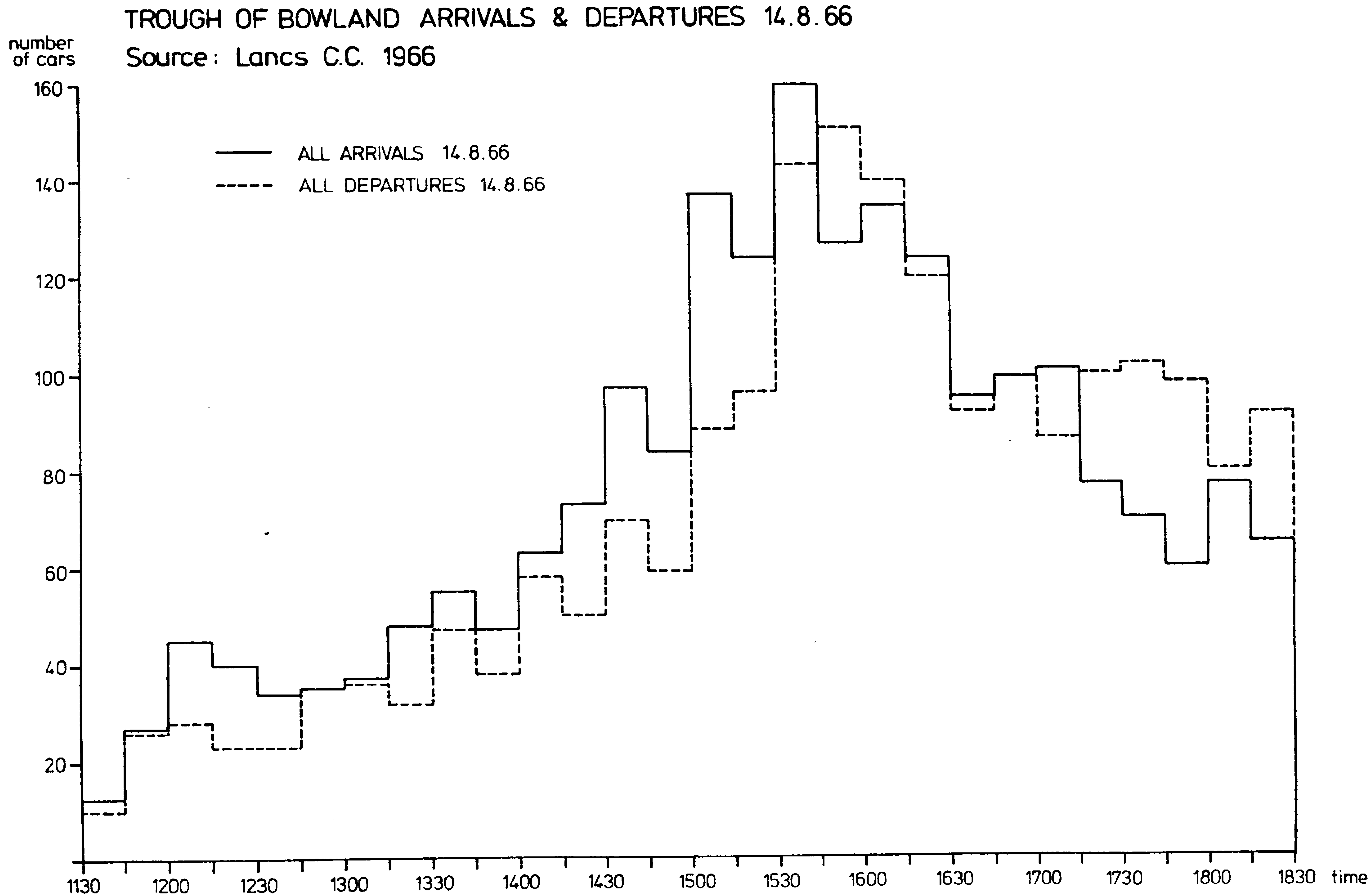


Table 4.7 Trough of Bowland Traffic Census (Marshaw/Trough)

Time Period	To Lancaster		To Clitheroe	
	1966	1975	1966	1975
1445 - 1500	43	62	22	35
1500 - 1515	77	69	25	44
1515 - 1530	62	54	26	37
1530 - 1545	77	59	47	44
1545 - 1600	59	60	57	48
1600 - 1615	55	37	57	44
1615 - 1630	59	38	47	42
1630 - 1645	54	34	19	59
1645 - 1700	54	34	30	50
Total	540	447	330	403
	240/hr	199/hr	147/hr	179/hr

in the middle of the day would automatically exclude anyone driving to the coast, and would probably exclude those coming away as well. Other "pleasure drivers" using the road as a scenic route may be included.

There is little relationship between the different counts, and the differences are not consistent. The 1975 survey records a 19% increase in traffic travelling in the Clitheroe direction, but an apparent decline of 17% in traffic travelling towards Lancaster. This discrepancy could be due to the location of the survey point in 1975 - it was not possible to record "arrivals" in the same way as the 1966 survey. It is possible that much of the traffic passing the Grey Stone (the "Trough" survey point) stopped before it got to Marshaw.

It is not possible to establish routes or calculate length of stay from the 1975 data, but some indication is given by the questionnaire survey carried out (9th and 10th August 1975):

Length of stay		
< ½ hr	19	5.7%
½ - 1 hr	57	17.2%
1 - 2 hrs	79	23.9%
2 - 4 hrs	126	38.1%
4 - 6 hrs	37	11.2%
> 6 hrs	13	3.9%
Total	331	

This shows an almost complete reversal from the 1966 survey, when the traffic survey showed 73% travelling straight through or stopping for less than three quarters of an hour, and less than 10% staying for more than two hours. (NB: the sampling method used would inevitably exclude any motorist who did not stop at all, and may bias in favour of the longer-stay visitors - see Chapter Three (iv))

These observations are further supported by the parking survey. Unfortunately the zones do not overlap exactly, but some comparisons can be made:

1966	Trough Road	(excluding Langden)
	1430 hrs	1730 hrs
	34 cars	73 cars
1975	Trough Road	(including Langden)
	1415 hrs	1715 hrs
	270 cars	265 cars

In 1966 the Council estimated the capacity of the Langden parking area to be between 100 and 150 cars, so even if it was absolutely full in 1975, there is still a considerable increase along the rest of the road.

Abbeystead Area

1966	(Abbeystead to Brook House)	
	1430 hrs	1730 hrs
	11 cars	3 cars
1975	(Abbeystead to Dolphinholm)	
	1730 hrs	69 cars

In 1966 the maximum number of cars parked at any one time in the whole area (including Tarnbrook and the road to Quernmore) was 179, recorded at 1630 hrs. A "drive through" count at 1715 hrs on the survey day in 1975 recorded 334 cars on the Yates to Trough road alone (although this <u>includes</u> Langden). In spite of the problems in comparing these two surveys, it is still possible to see that there is evidence for much greater parking in 1975 than in 1966.

The Report from the 1966 survey gave the main function of the Trough area as a scenic route to the coast, this observation being backed up by the recorded number of short-stay visitors. The 1975 survey suggests a change in function by the increase in the number of parked cars, and the questionnaire evidence on length of stay. Further questions revealed that 48% of the visitors came to the Trough with the intention of having a picnic, and 11% of them intended to walk. Investigation of activities produced the following results:

Walk	48%
Picnic	68%
Games	31%
Nature Study	15%
Sat in car	22%
Sat out of car	8%

It is probable that many of those who simply "sat in the car" were short stop visitors, who only lingered long enough for an ice-cream or cup of tea. However, it is clear from the range of activities engaged in, that the site has taken on the function of an all-day picnic stop for many visitors.

The congestion is now acute on busy days, but even an "average" summer Sunday will show many examples of conflict (see Plate 12). Several different courses of action could be taken, but any plans must allow for the fact that this is an "open" site - i.e. it is unmanaged. The easiest course is simply to do nothing and let the residents and visitors fight the problem out between themselves. This is unsatisfactory for many reasons: open conflict harasses the local residents and reduces the pleasure of a recreation outing, physical erosion is damaging the verges and compaction is causing "stag-heading" in the trees. By taking the initiative and publicising the Trough as a "Scenic Route" the Council is already committed to a certain responsibility (20% of visitors reported finding the site through the road signs).

Two alternative practical measures are available to reduce the recreational pressure, by separating the functions. If the road was blocked to through traffic the "scenic drive" visitors would be diverted and the site turned over to picnickers. This drastic measure is not very practical; even if only enforced on Sundays and Bank Holidays it would severely restrict the mobility of the residents (although some may welcome the reduction in through traffic). It can also be said that the site is not very suitable for a mass picnic area - it's the wrong shape, and the open aspect along much of its length would reduce the possible capacity in perceptual terms.

The alternative would be to opt for the scenic drive function, and try to limit long-term parking. The road is eminently suitable for a scenic drive, offering a range of spectacular scenery in a relatively short distance. However, there may be visual objections to double yellow lines in the countryside, and short of erecting barricades or continuous curbs it is very difficult to stop people parking. Restriction would probably only result in yet more damage to the banks and verges as visitors struggle to pull their cars further off the road.

If management in the Trough itself can do little to relieve the problem, then it may be better to seek a solution outside. It has been suggested that many of the visitors are likely to be "site-free"; in fact, 28% of those questioned stated that they had not intended to visit the Trough on the day they actually turned up there. It is possible that a fair number of the rest could be persuaded to go elsewhere if sites offering suitable resources were made available. If this sort of filtering and substitution is to work, then it is necessary to know why people visit a particular site, what they like about it, and how they interpret the landscapes and facilities available.

The Trough road may be divided into a number of distinct zones of varying scenery, facilities and resources. It is likely that people choose their stopping place to suit their requirements. An initial analysis was carried out to establish the characteristics of different sections of the road, so that groups using each zone could be isolated.

(b) Landscapes and Parking

Each stretch of road was evaluated on two scales, one to assess its landscape characteristics, and one to assess the advantages for picnicking. The measures used are obviously highly subjective. In the "landscape" scale, the ideal has been taken to be a wilderness, in this case open moorland with the naturally occurring vegetation association, with points lost for buildings, obvious signs of management, and alien vegetation (plantations, etc.). The sequence of the scale produces a score of 20 for an ideal "wilderness". None of the sectors in the Trough of Bowland can achieve this, as they are all evaluated from a road, but looking away from the road, some sections show no other sign of obvious interference.

Landscape "Wilderness"

Open views	5	4	3	2	1	Enclosed
Moorland vegetation	5	4	3	2	1	Exotic/agricultural
No trees	5	4	3	2	1	Plantation
"Natural"	5	4	3	2	1	Buildings, etc.

(NB: this scale is based on one interpretation of wilderness, and used under the assumption that this is one of the main attractions of the area. The appropriateness of these assumptions will be returned to later.)

A second scale was set up to measure attractiveness for picnicking, incorporating some of the ideas explored in the Beacon Fell Study. For example, "enclosure" scores highly; trees may give a measure of enclosure to an otherwise open and exposed scene, so may be counted an asset, whether "natural" or not. Practical matters, such as the ease of parking, have also been included. The resulting "view" factor is composite, e.g. Langden Brook scores high for the ease of parking, but the crowding and presence of tea wagons etc. leaves its mark on the view scale (see Plate 12). It is clear from the questionnaire (and the number of people found here) that the practical matters of parking without fear of getting stuck in a ditch, or the availibility of a cup of tea, may be more important for a short stop than a "natural" view. In spite of the fact that most people have come out in search of the countryside, many seem able to mentally paint out all the other cars and just see the view anyway.

Picnic suitability

Enclosed	5	4	3	2	1	Exposed
"Natural" view	5	4	3	2	1	Artificial
Parking easy	5	4	3	2	1	No parking possible
Access to water	5	4	3	2	1	No surface water visible

To a certain extent these scales are inevitably contradictory, because they are assessing the landscape and resources from different points of view. If the "wilderness" really is the main attraction of the area, then it seems reasonable to assume that most people would seek to balance a good score on that scale with a reasonable score on the picnicking scale. If the latter is most important, then there may be reason to suspect that the "wilderness" factor is not highly rated. The results of the scalings are shown in Table 4.8 and Figure 4.25.

Plate 11 Trough of Bowland: Zone I, popular picnic area near Marshaw. At busy times visitors drive right under the trees.

Plate 12 Trough of Bowland: Zone VII, Langden, the most popular stopping place. Note tea vans and coach.

Table 4.8 Landscape Zones in the Trough of Bowland

(zones numbered as in Figure 4.25)

Zone 1	Wilderness	1 + 1 + 2 + 1 = 5		
Marshaw to Tower Lodge	Picnic	4 + 2 + 5 + 5 = 16		
Zone 2	Wilderness	1 + 1 + 1 + 1 = 4		
Tower Lodge to Trough Bridge	Picnic	5 + 2 + 4 + 5 = 16	+ 1	= 17
Zone 3	Wilderness	5 + 5 + 5 + 4 = 19		
Trough Bridge to Grey Stone	Picnic	1 + 5 + 1 + 1 = 8		
Zone 4	Wilderness	5 + 5 + 5 + 4 = 19		
Grey Stone to Sniddle Holes	Picnic	1 + 5 + 1 + 1 = 8		
Zone 5	Wilderness	4 + 5 + 2 + 1 = 12		
Sniddle Holes to Trough Barn	Picnic	2 + 5 + 3 + 3 = 13		
Zone 6	Wilderness	4 + 4 + 3 + 2 = 13		
Trough Barn to Sykes	Picnic	2 + 4 + 3 + 5 = 14		
Zone 7	Wilderness	3 + 3 + 2 + 4 = 12		
Sykes to Langden Brook	Picnic	3 + 2 + 5 + 5 = 15	+ 1	= 16
Zone 8	Wilderness	4 + 4 + 2 + 3 = 13		
Langden Brook to Stone Oak	Picnic	3 + 3 + 3 + 4 = 13		

Correlation of scores on W and P produced

a coefficient of – 0.9

Figure 4.25 Trough of Bowland: Landscape and Picnic Zones

It is immediately obvious that there are contradictions in this scheme, mainly in the interpretation of natural and the scoring of water. The problem hinges on the interpretation of natural wilderness as moorland which excludes the presence of both trees and streams, features usually considered "attractive" and frequently considered "natural" (even plantations). It is not within the scope of this assessment to test the interpretation of trees in the landscape, but in giving low scores to tree-lined streams on the "natural-artificial" construct, the scale probably goes against the majority of visitors' impressions. For this reason, an extra "bonus" point has been given on the picnicking scale where there is a combination of trees and water easily accessible from the road. Indeed, the scenery of the Wyreside picnicking area (zone 2) presents an idyllic pastoral scene, the ideal many planners would aim at (see Plate 11).

The most striking feature of the results is the apparently repellent nature of this interpretation of wilderness as far as picnicking is concerned. This is partly a practical problem, the lack of parking space on the narrow road over the col being reflected in the score, but few other factors making a "good" picnic site are found here (see Plates 13 and 14). Given free choice (i.e. on quiet days when there is a choice of stopping place) most people still make for the stream-side sites where the trees contribute to the sense of enclosure. Access to water is a particularly attractive feature, reflected in the trouble many people take in getting their cars to the water. An assessment of possible parking places made on a quiet day grossly underestimated the number, partly through underrating the persistence and stubbornness of those determined to get their cars up impossibly steep verges, but also

Plate 13 Trough of Bowland: Zone III, approaching the Grey Stone of Trough

Plate 14 Trough of Bowland: Zone IV, looking from Sniddle Holes, note difficulty of stopping on the narrow road

because it took no account of space by the stream side, on the assumption that no road and soft ground would prevent access (mainly zone 2).

The popularity of Langden Brook is indicated by this scale - it offers many advantages for picnicking (ease of parking, access to water, partial enclosure) without sacrificing too many "wilderness" points. The popularity of the Wyreside site is based on a landscape of a completely different character - the Arcadian pastoral scene of babbling brook, soft grass, grazing sheep, all bathed in a soft light diffused through scattered trees. If it is, perhaps, not quite rugged enough to be truly "picturesque", it is curious that the features that so enchanted the Victorians still find favour today. This site has the added advantage of allowing picnickers to get right in to the scene, and become part of it, rather than just admiring it from a distance. The main problem here is that the whole impression is destroyed if too many people are in view; on quiet days picnickers are quite happy to stop and sit by the road, however it is noticeable that on busy days drivers take their cars much further off the road, perhaps in an attempt to retain a little seclusion.

The choice of visitors was reflected by the questionnaire survey. The surveying technique was to make a drive through the site, leaving questionnaires on all parked cars encountered. The results showed the predominance of Langden (zone 7) and when grouped as "wilderness" (3 and 4) or "picnicking" (1, 2 and 7) the preference for the latter became clear:

	Proportion of replies
Zones 3 and 4	3%
Zones 1, 2 and 7	77%

The scarcity of people in the "wilderness" section was partly due to the difficulty of parking here, but made it impossible to produce a sample group sufficiently large for statistical analysis.

Chapter Five

RECREATION IMPACT ON VEGETATION

I Beacon Fell: The Ecological Background

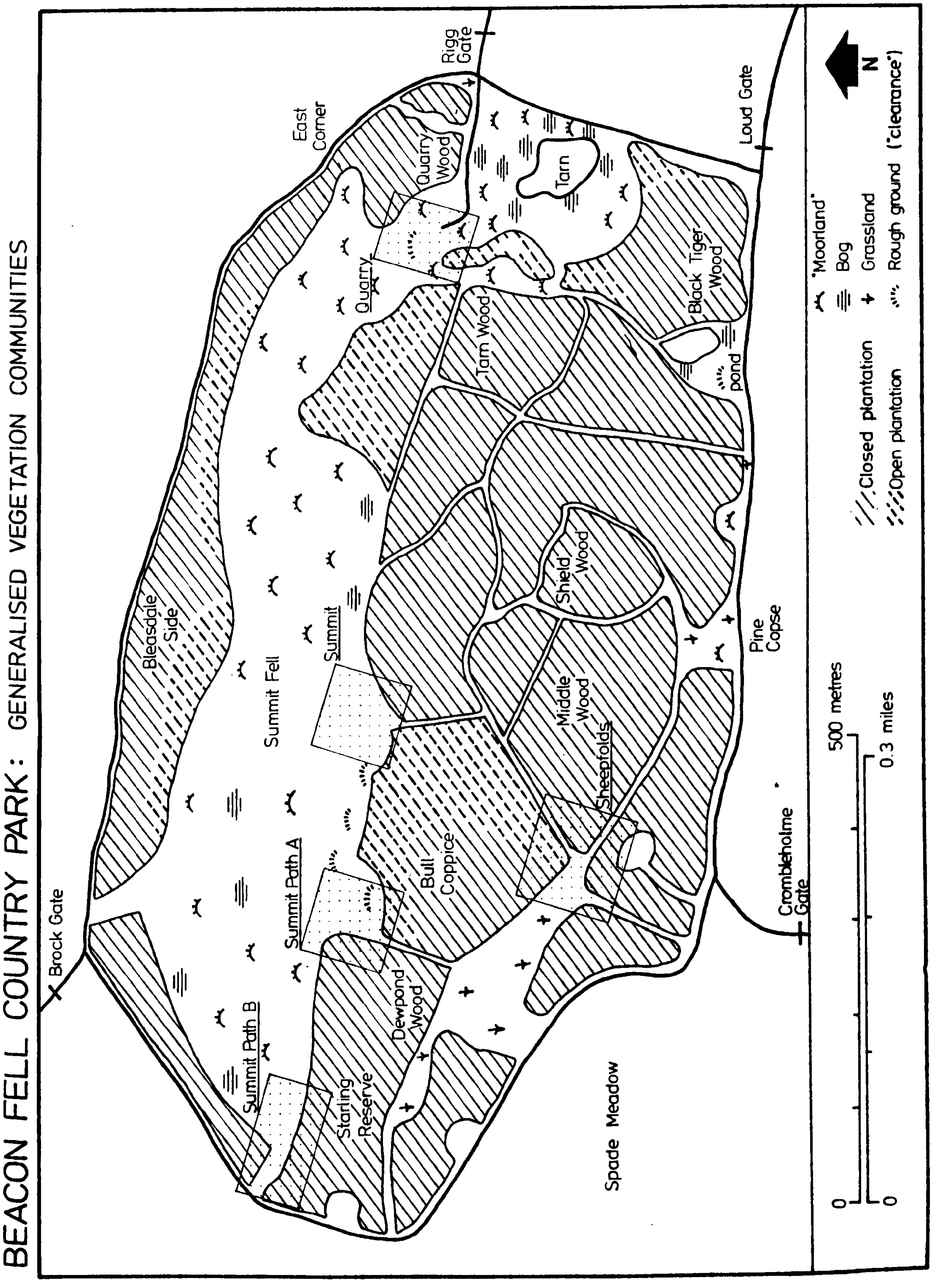
Substantial areas of the Fell have been planted with coniferous trees, following the practice of land management at the time the Fell was a water catchment. The most common tree is *Picea sitchensis*, but *Larix decidua* and *Pinus silvestris* are also noticeable and give valuable landscape interest, e.g. the former in the outlining of Shield and Middle woods, the latter on the south of the Summit, where the Nature Trail emerges from the plantations. The plantations have never been managed for timber; the closely planted trees have grown up with branches interlocking from a low level, resulting in an impenetrable thicket. Some brashing has opened narrow paths, but these are dark and uninviting. There is a deep litter of needle leaves, but few herbs can tolerate the dark, dank conditions.

For the purpose of the survey, a plantation was considered to be "closed" when the trees were sufficiently close together to prevent people walking easily between them, and "open" when the trees did not form a barrier to movement (see Figure 5.1). Some footpaths have been forced through "closed" plantations, but these are generally too narrow and enclosed to support ground vegetation, so do not form a separate vegetation unit (see Plate 15). The fire-breaks are wider and the penetration of light in sheltered conditions allows the development of an interesting micro-unit. Some of these show a great variety of species, with a particularly vigorous growth of *Vaccinium myrtillus*.

Plate 15 Beacon Fell: Summit Path B, gap through wall to "closed" plantation. There is a narrow footpath here but few use it.

Plate 16 Beacon Fell: The Tarn, seen from Quarry Car Park. People are sitting at lower picnic table of that site; car has been driven between posts to get it off road.

Figure 5.1 Beacon Fell: Vegetation Map



However, the presence of Molinia caerulea here is a problem. Being a deciduous grass it yields a deep litter of dry leaves in the autumn, forming a considerable fire hazard. Concern has been expressed about the increased danger here, and the possibility of ploughing the fire-breaks has been discussed. This would obviously improve their efficiency in checking an outbreak of fire and allowing access for vehicles, but would greatly reduce their ecological and landscape interest.

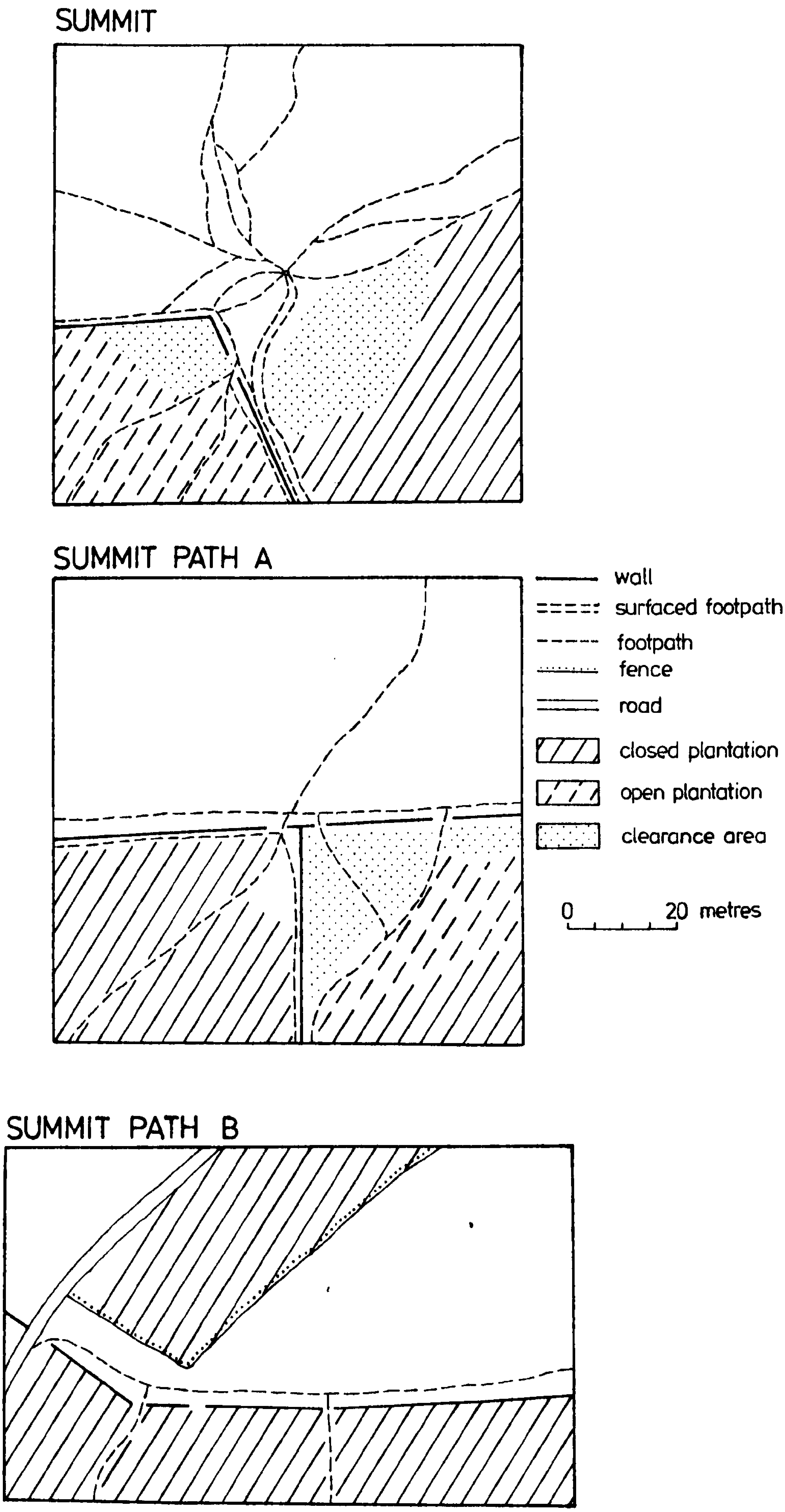
Three areas outside the plantations have received particular attention in the Council's redevelopment plan. The original site of the farm at Fell House has been extensively redesigned and landscaped, with walkways, planted grass sward and picnic tables. The Warden's hut is located here. The old farmyard is used as a hard standing car park, with trees planted along the road to form a screen. The old quarry has also been redesigned and landscaped, and now forms a popular three-tier car park. The banks have been restored or graded and picnic tables positioned at various levels. An associated car park has been cut into the adjacent plantation. Nearby, the Tarn was dug in a previously boggy area to provide a source of water in case of fire, and to add scenic interest (see Plate 16). The third area of deliberate change is the Sheepfolds picnic site. Part of the adjoining plantation has been cleared to form a secluded car park with parking bays surrounded by trees. A surfaced footpath leads from Fell House car park, via the Sheepfolds, to the highest point on the Fell, which forms a popular view point. The Nature Trail was laid out to continue the circuit round the east side of the Fell, passing above the Quarry and returning to the Sheepfolds through Shield wood.

The degree of deliberate change and continued maintenance in these areas reduces their value as sites for the study of natural vegetation responses, thus attention was directed towards the remaining areas of acidic grassland found on the north side of the Fell. The intention was to survey the existing vegetation to determine the plant associations present. The selection of sites of differing levels of use, but with similar ecological conditions, would allow an assessment of the degree of change that could be attributed to recreation. It was anticipated that there would be a fairly consistent relationship between level of use and vegetation damage; a formal expression of such a relationship would be valuable in management, and in planning future development for this and other sites.

The location of the most popular car parks causes a concentration of people in the triangle defined by Fell House, the Sheepfolds and the Summit, with an extension to the Quarry in the east. There is a progressive decline in the numbers recorded along the westward extension of the Summit path. The three sites selected for the vegetation survey were positioned along this path, thus including a high density site (the Summit), a medium density site (Summit Path A), and a low density site (Summit Path B) (see Figures 5.1 and 5.2). The Summit-Quarry footpath provided a suitable site for detailed path study, being close enough to the other sites to be in comparable ecological conditions, but outside the immediate study area.

Two areas of recent clearance affect the vegetation of the survey areas. In the south west corner of the Summit site, <u>Pinus sylvestris</u> has been felled, resulting in a sudden resurgence of the shrubs and

Figure 5.2 Beacon Fell: Vegetation Survey Sites



herbs. This is probably due to the combined effect of increased light reaching the ground and the removal of root competition for nutrients, allowing previously suppressed species to develop. A similar area of clearance is found in the southern part of the Summit Path A site, south of the boundary wall. Here a very dense growth of shrubs confines walkers to a narrow path. The profusion of plants, including Rubus fruticosus, Epilobium angustifolium, Anthoxanthum odoratum, and Pteridium aquilinum, suggests the disturbed nature of the site and the opportunities for invasion (see Plate 17).

(a) Edaphic Conditions

Beacon Fell forms an outlier of the Bowland Fells, and shows a similarity in soil associations with the main mass of the uplands. The parent materials are Carboniferous Millstone Grit, sandstones and shales, with variable drift cover. Halls and Folland (1970) show that the distribution of soil series in the area may be related to relief, with the peaty gleyed soils on the Wilcocks association on the slopes of the foothills merging into the Rivington series brown earths where the coarse textured Head or outcropping sandstones improve drainage. The associated vegetation is characteristically dominated by Nardus stricta, Molinia caerulea and Eriophorum vaginatum, with Deschampsia flexuosa and Vaccinium myrtillus on the drier ground.

It is noted that with assisted drainage, liming and fertilizing, these soils are capable of supporting good grazing grasslands; all these operations have been used in the past. The subsequent extension of the tile-drain network by the water authority was designed to speed runoff. There is some evidence that shrinkage and erosion took place as the

Plate 17 Beacon Fell: Summit Path A, "clearance" area

Plate 18 Beacon Fell: Summit Path A, "background" association, *Vaccinium myrtillus*, *Molinia caerulea* and *Eriophorum vaginatum* noticeable here.

peaty gleyed soils dried out. Such changes would favour the plants of the drier associations. However, as this system has fallen into disuse, some pipes have become blocked, and waterlogging is again becoming a problem. This is particularly acute where wet areas are crossed by footpaths, and some remedial ditching has been necessary.

The soils were sampled in conjunction with the vegetation survey, five random samples being taken from each of the three sample sites. The soils are fairly uniformly fibrous in structure, with variable amounts of peat. There is a dense root mat made up of *Molinia caerulea* and *Deschampsia flexuosa*. The soils are very dark brown to black in colour; the profiles variable in depth, reaching grey clays in the deepest pockets.

	depth:	maximum slope:	pH:
Summit	15 - 35 cm	10.0°	5.2 - 5.7
Summit Path A	22 - 130	5.5°	5.2 - 6.0
Summit Path B	18 - 107	7.25°	5.5 - 5.7

overall slope: Summit to Path B 4.75°

The main difference may be seen in the slope and soil depth, the Summit having the thinnest soils and greatest slopes. Some hollows provide slightly deeper soils, but erosion is evident and gullies are forming. The hollows show signs of poor drainage, but the rest of the site is relatively well drained. Path A is midway down the slope and shows a greater depth of soil, and slightly higher pH. Path B is similar in characteristics to Path A, except at the extreme western end where the path falls quite abruptly to the road.

The local variations in drainage, soil depth and slope may contribute to the detail of the pattern of the vegetation, but there were no significant differences between the three sites chosen. Thus it can be assumed that any marked variation in the vegetation would reflect differences in use.

(b) Vegetation Associations

An initial survey was carried out to establish the characteristics of the vegetation in the survey areas. A set of one metre square quadrats was located by the use of random number grid co-ordinates. A species list was compiled from this information (Table 5.1) The only consistent association found was that between Deschampsia flexuosa, Molinia caerulea and Vaccinium myrtillus (see Plate 18). This group sometimes includes Calluna vulgaris, but where Eriophorum vaginatum was recorded, these two made a separate group. The other groups were made up of residual species of low occurrence, usually reflecting the more disturbed areas of the Fell.

In the initial survey thirty-seven different species groups were recorded, composed of the fifteen species in various combinations. Three-species groups were most common (see Figure 5.3) with Deschampsia flexuosa, Molinia caerulea, Vaccinium myrtillus and Anthoxanthum odoratum being the most frequently recorded species.

From Table 5.2 it can be seen that, even allowing for a different number of quadrats, Site 1 records less variety than the other two sites. The greatest diversity is shown by Site 2, with a greater number of species, and more groups of four or five species. The importance of

Table 5.1 Beacon Fell - Vascular Plants

(a) Species recorded in random quadrat survey

<u>Anthoxanthum odoratum</u>
<u>Calluna vulgaris</u>
<u>Carex nigra</u>
<u>Deschampsia flexuosa</u>
<u>Dryopteris sp.</u>
<u>Empetrum nigrum</u>
<u>Epilobium angustifolium</u>
<u>Eriophorum vaginatum</u>
<u>Galium saxatile</u>
<u>Juncus effusus</u>
<u>Molinia caerulea</u>
<u>Rubus fructicosus</u>
<u>Vaccinium myrtillus</u>
<u>Viola riviniana</u>

(b) Additional species recorded during survey for disturbance index

<u>Agrostis tenuis</u>
<u>Erica tetralix</u>
<u>Juncus squarrosus</u>
<u>Nardus stricta</u>
<u>Poa annua</u>
<u>Polygala vulgaris</u>
<u>Pteridium aquilinium</u>
<u>Vaccinium oxycoccus</u>

Figure 5.3 Beacon Fell: Species Densities Recorded

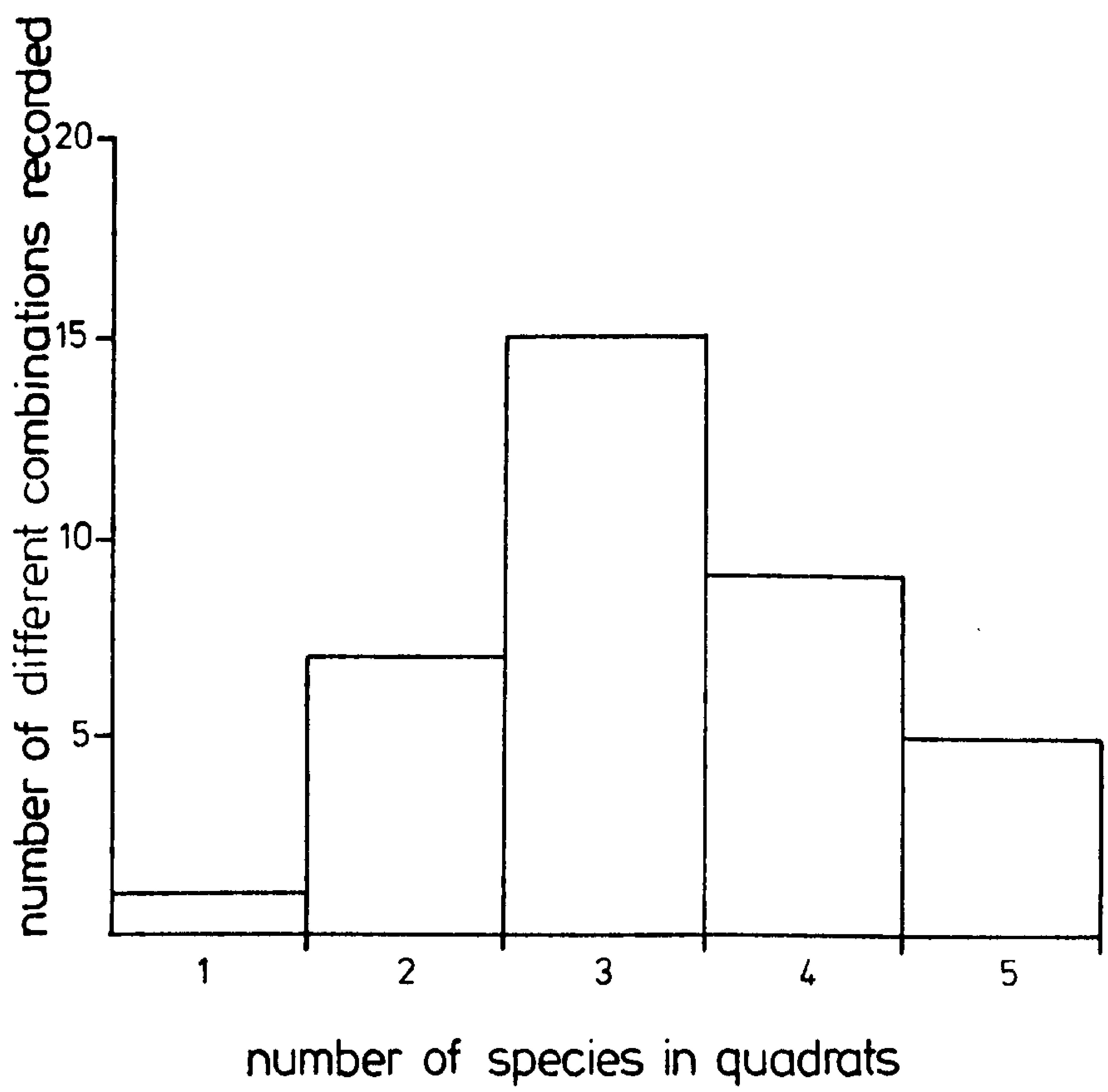


Table 5.2 Random Quadrats: Species Groups

	No. Sp. in Group	No. different Sp. combinations		
			Total	10
Site 1			No. Quads	30
Summit Path B	1	0	No. Sp.	10
	2	3		
	3	6		
	4	1		
	5	0		
Site 2				
Summit Path A	1	1	Total	17
	2	4	No.Quads	53
	3	5	No. Sp.	15
	4	4		
	5	4		
Site 3				
Summit	1	0	Total	20
	2	5	No. Quads	39
	3	8	No. Sp.	15
	4	6		
	5	1		

quadrat size is indicated by the number of different species combinations recorded in what is a relatively species poor area.

An assessment was made of the structure of the community for each site based on the dominant species in the field layer. Following convention, a constant species was considered to be one with a frequency of 80% or more, i.e. occurring in at least 80% of the quadrat samples (Harrison 1971). The frequency of the three most common species in the area studied is given in Table 5.3. The only constant species recorded over all three sites is Deschampsia flexuosa. Molinia caerulea is always abundant and on Summit Path B it achieves the status of secondary constant; Vaccinium myrtillus also occurs frequently.

The use of constant species helps to isolate the most frequent association. In this case the results may be a little misleading, as both the Summit and Summit Path A sites include areas of recent clearance. The absence of Molinia caerulea from these areas depresses the frequency of it being recorded, thus reducing it from constant status for the site as a whole. However, its almost universal occurrence in the quadrats away from the clearance shows it to be a constant of the background community. The presence of Deschampsia flexuosa on the cleared sites indicates that it may be better able to tolerate slight shading and so was present under the trees.

The vegetation of the areas of recent clearance also contributes to the species diversity of the sites. The greater variability recorded on Site 2 is due to a greater number of quadrats in the

Table 5.3 Local Frequency of the Three Most Common Species in the Survey Area

Summit	Deschampsia flexuosa	96%
	Vaccinium myrtillus	74%
	Molinia caerulea	48%
Summit Path A	Deschampsia flexuosa	98%
	Vaccinium myrtillus	49%
	Molinia caerulea	74%
Summit Path B	Deschampsia flexuosa	94%
	Vaccinium myrtillus	28%
	Molinia caerulea	84%

clearance area recording such species as Rubus fruticosus and Dryopteris sp. Thus, in this case, disturbance leads to an increase in diversity.

The importance of the two grass species (Deschampsia flexuosa and Molinia caerulea) obviously characterises the vegetation as an upland grassland. However, the presence of the ericaceous shrubs shows the relationship with the moorland communities. Duffey et al. (1974) considers the acidic grasslands to be the most widespread types of semi-natural grassland in Britain. The conditions of the upland habitats vary considerably, but a common factor in a soil of low pH (3.5 - 6.0) and low base status (particularly calcium). Duffey explains the difficulty of describing characteristic floristic composition where slight differences in topography or the presence of base-rich flushes can cause a mosaic of different communities in a small area. 'There is little doubt that in these communities variation is continuous so that the classification of a particular grassland may be sometimes a matter of opinion' (Duffey et al. 1974, 64).

In the classification suggested by Duffey the association found at Beacon Fell would approximate towards the Molinia grassland, although Deschampsia flexuosa has obviously achieved more than co-dominant status here. The variation is probably due to human intervention. Pearsall (1968) notes the susceptibility of Molinia to grazing; the fresh spring shoots make it a favourite "early bite". Many years of grazing could have weakened the Molinia community, a state compounded by subsequent management, particularly drainage, resulting in slightly drier soils than would otherwise be expected. These conditions could favour the spread of Deschampsia flexuosa. The tussocks formed by both Molinia caerulea and Deschampsia flexuosa can be very large, and tend to exclude other species. The grasslands 'present a characteristically under-grazed appearance, the herbage being from 30 - 40 cms tall and often heavily tussocked' (Duffey 1974, 66).

Investigation of the physical characteristics showed minor variations as expected. The soils were generally consistent between the three sites, except where hollows caused locally poorer drainage. These areas showed a greater number of "bog" species such as Juncus effusus, Erica tetralix and Eriophorum vaginatum.

The general term "semi-natural moorland" will be adopted to describe the vegetation on Beacon Fell as the association is essentially composed of species normally found in the upland moor and grassland communities, in spite of the modifications to structure and composition. The community has been greatly influenced by human activity, particularly the practices of grazing and land drainage. The fairly recent cessation of grazing could allow the re-establishment of Molinia caerulea as a dominant, but now other forces are coming into play.

Within the context of the expected limited diversity of the moorlands and acidic grasslands, the recording of several additional species more characteristic of scrub and woodland is evidence for supporting the view that disturbance has resulted in an increase in species number. However, most of the invading species are ruderals, taking advantage of transitory conditions, especially in the clearance areas.

It may be anticipated that if left alone, in time the moorland species would regain dominance, but perhaps with a rather different community structure.

The inclusion of two areas of recent clearance within the survey sites led to some problems of distinguishing between specific disturbance (clearance) and general disturbance (recreation use). An attempt was made to devise a means of assessing disturbance from the vegetational response. The current source of disturbance is related to the use of the Fell as a recreation site. As shown in Chapter Two, trampling pressures are still something of an unknown quantity. Trampling has varied effects on different ground conditions or species groups; it is difficult to isolate a single disturbing factor. Thus information was collected from a number of different sources to make a composite index of disturbance. It was hoped that the combined effect of several factors would reduce the bias of considering one factor alone. The correspondence of scores on the Disturbance Index and People Counts was investigated by mapping and correlation analysis.

It should be noted that both the key variables (the Disturbance Index and the People Counts) are surrogates for the target variables (disturbance and trampling pressure). Any relationship between the target variables may be partially obscured by random or biassed differences between them and their surrogates. This may be illustrated by the grid squares recording "no people" in the survey period. If there was a perfect relationship, this <u>should</u> equate to 1 on the Disturbance Index. In fact, the count of zero people does not mean that the square was <u>never</u> walked on, but that no-one was recorded in the period of the survey. Natural variation in the background vegetation means that there is no single measure of "no disturbance". These problems mean that a perfect relationship cannot be expected, therefore the results must be interpreted with care.

II Vegetation Response to Disturbance

(a) Transects

A heavily used footpath is easily picked out by eye, but it may not be immediately obvious what causes the distinction. The trampled vegetation frequently shows a different colour, especially in flowering and fruiting seasons, and bare ground may be exposed. The use of a quadrat survey records the actual differences (see Figures 5.4 and 5.5).

In this case, the community shows a response that can be traced across all three transects. The cover of plants is reduced and the ericaceous shrubs are completely lost, the height of the stand is greatly reduced and the amount of bare ground increases. There is insufficient data to make conclusive comments about the relative resistance of the local species, but it seems that Molinia caerulea survives the longest. However, the amount of bare ground suggests that there is a lack of naturally "resistant" species in the local community. The paths are approximately 3 - 4 m wide, with a central trampled area of continuous bare ground and merging boundary.

The Disturbance Index picks out the course of the paths, and shows how they run together across the three transects. In this case, it should be noted that there is little variation in the species present, so the Index records changes in height and bare ground. These variations are adequate to distinguish the heavily trampled areas.

Figure 5.4 Beacon Fell: Layout of Transect Survey

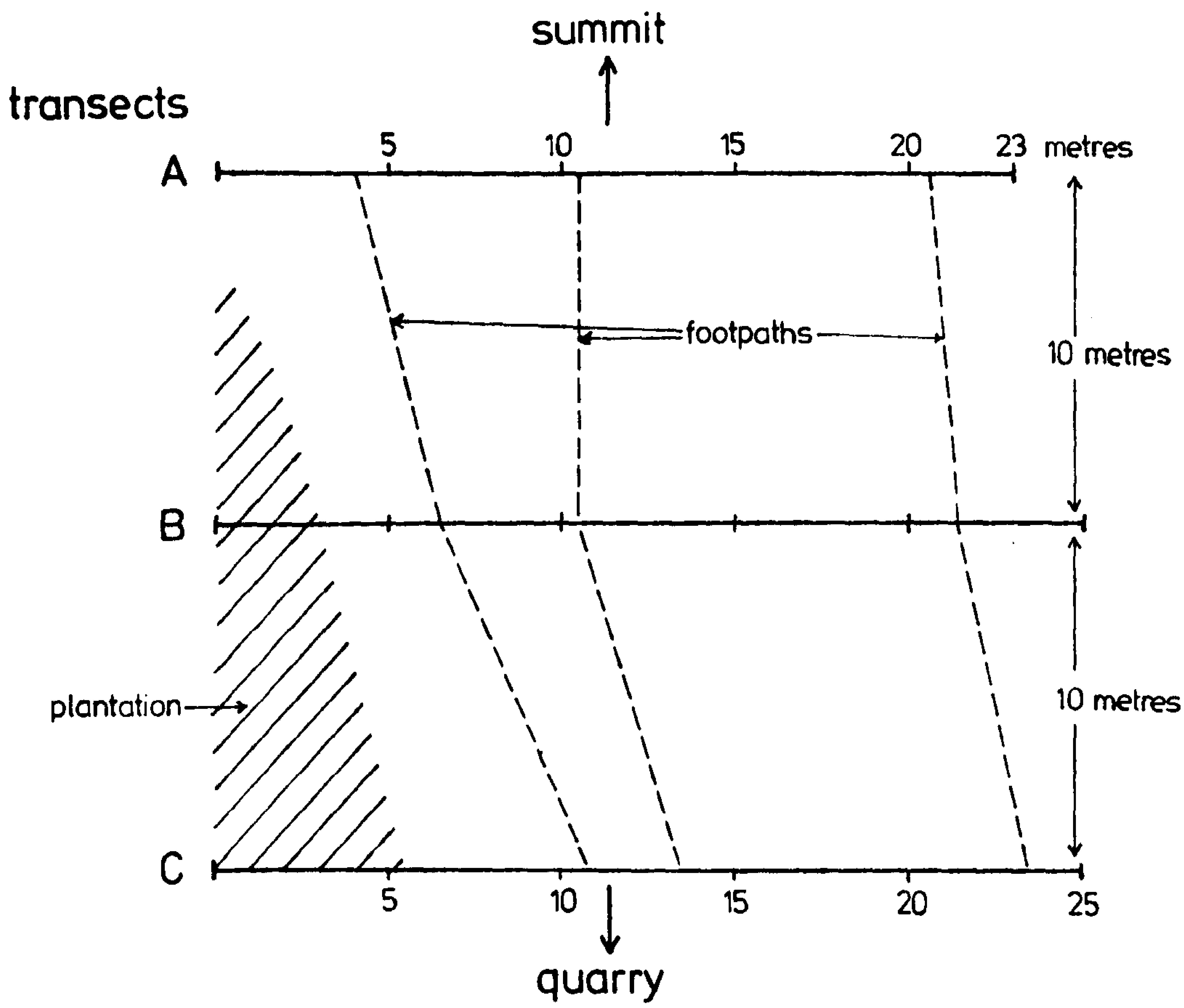
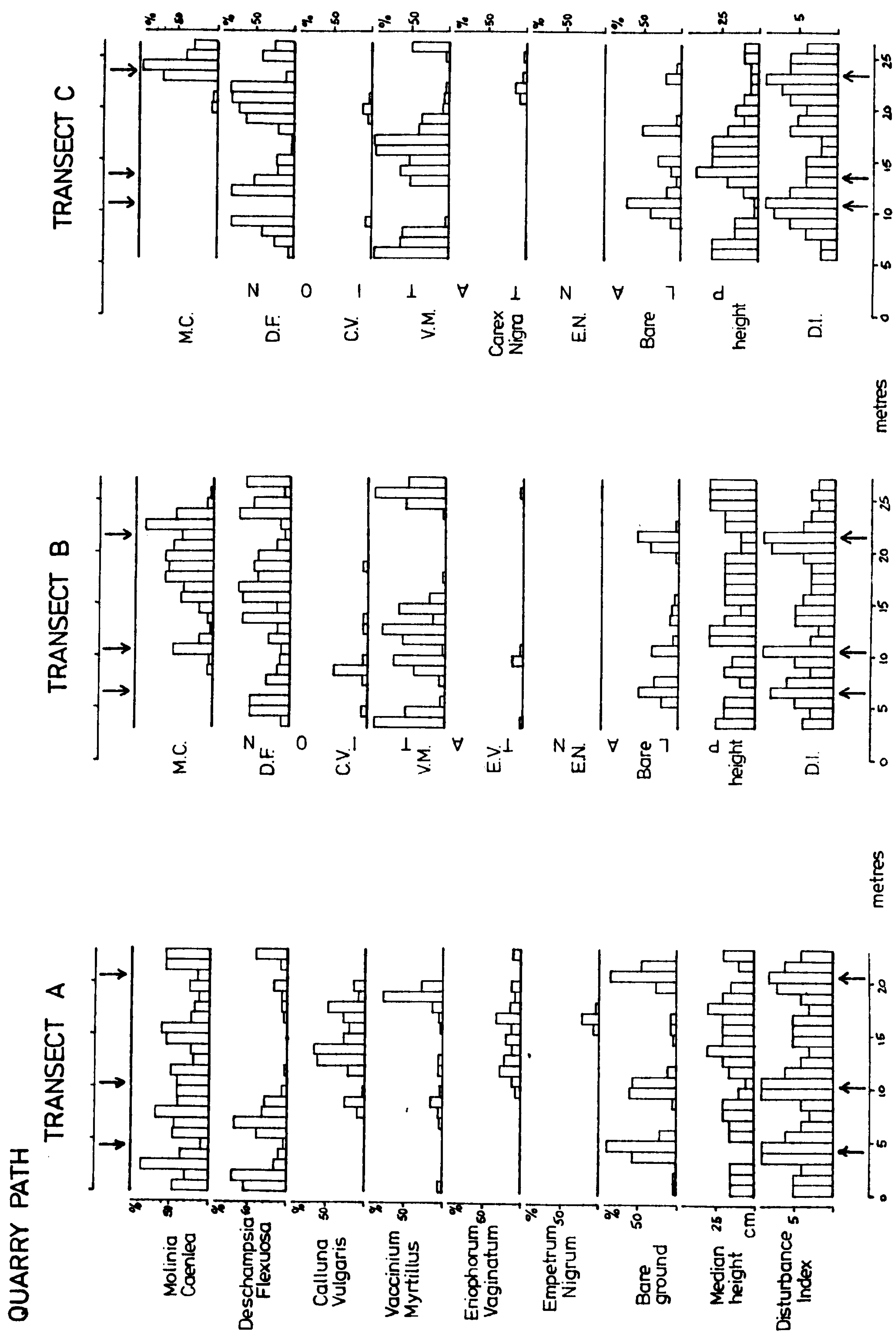


Figure 5.5 Beacon Fell: Transect Survey Results



(b) Areas

Diagrams to represent the Index of Disturbance and the intensity of use were drawn to the same scale, so that comparisons could be made between trampling pressures and vegetation damage (Figures 5.6 and 5.7). It is immediately obvious that a rough relationship does exist; however, there are two problems that frustrate a straightforward analysis.

The Index of Disturbance measures variation from an assumed "normal". It was originally thought that the main cause of disturbance was trampling, however study of the maps shows that the areas of recent clearance generally score high on the Disturbance Index. Thus the inclusion of such areas in two of the study sites leads to confusion.

As noted for the linear transects, the changes in height and bare ground indicate areas of trampling. The lack of "resistant" species in the background community results in an increase in the amount of bare ground in trampled areas. The area scoring high on the floristic category are generally in the clearance areas where removal of the background vegetation and recent felling of trees has left areas of disturbed ground not subject to intensive trampling, although the classic gateway sites are important near footpaths. These clearance areas attract the ruderal species more commonly found in scrub and grasslands. It is relatively easy to delineate the clearance areas and so it is possible to treat them separately where necessary. Their inclusion is valuable from one point of view: it draws attention to the relative importance of different forms of disturbance. In this case, it is quite clear that clearance leads to disturbance over a wide area, whereas trampling is generally concentrated along linear routes.

Figure 5.6 Beacon Fell: Distribution of Disturbance Index

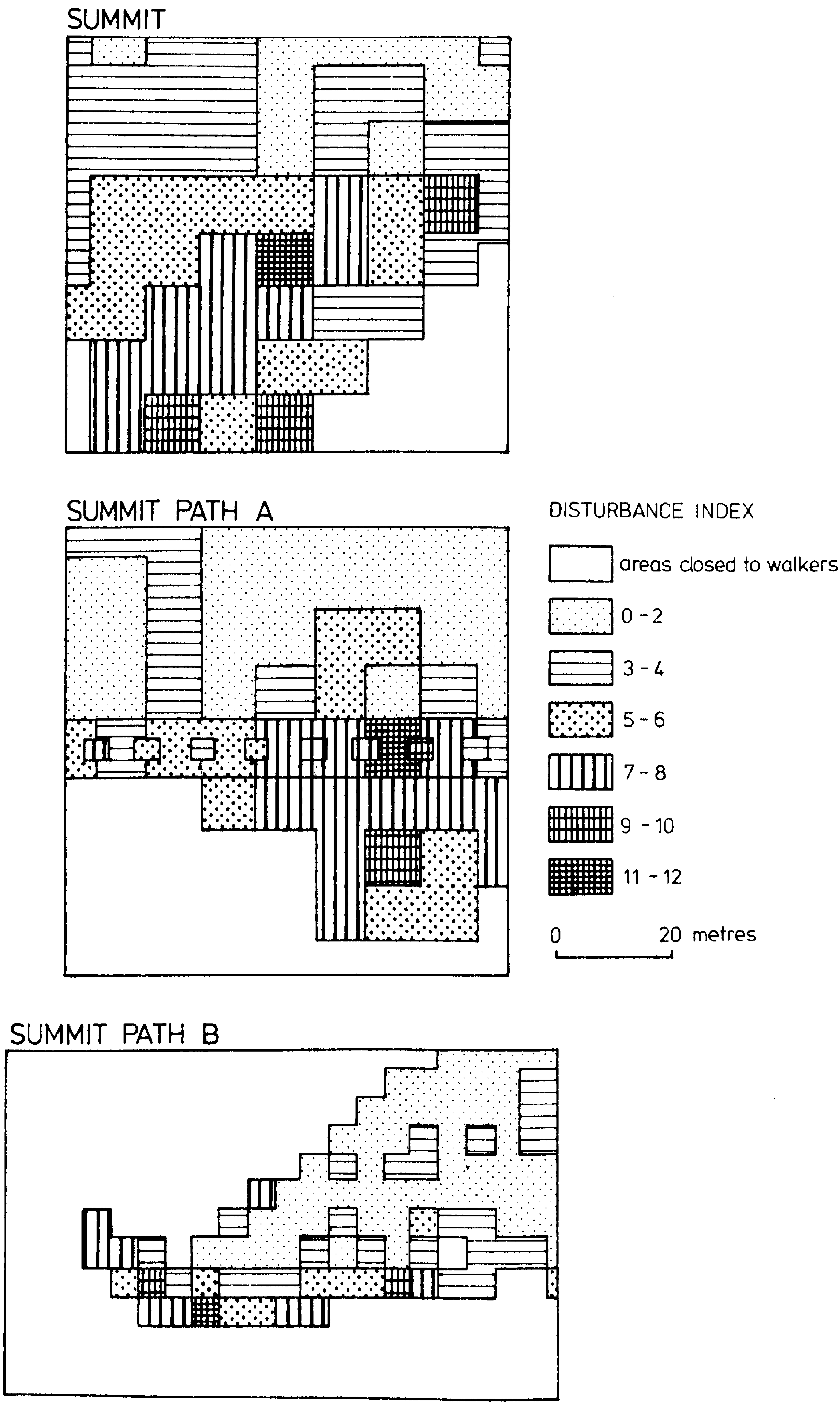
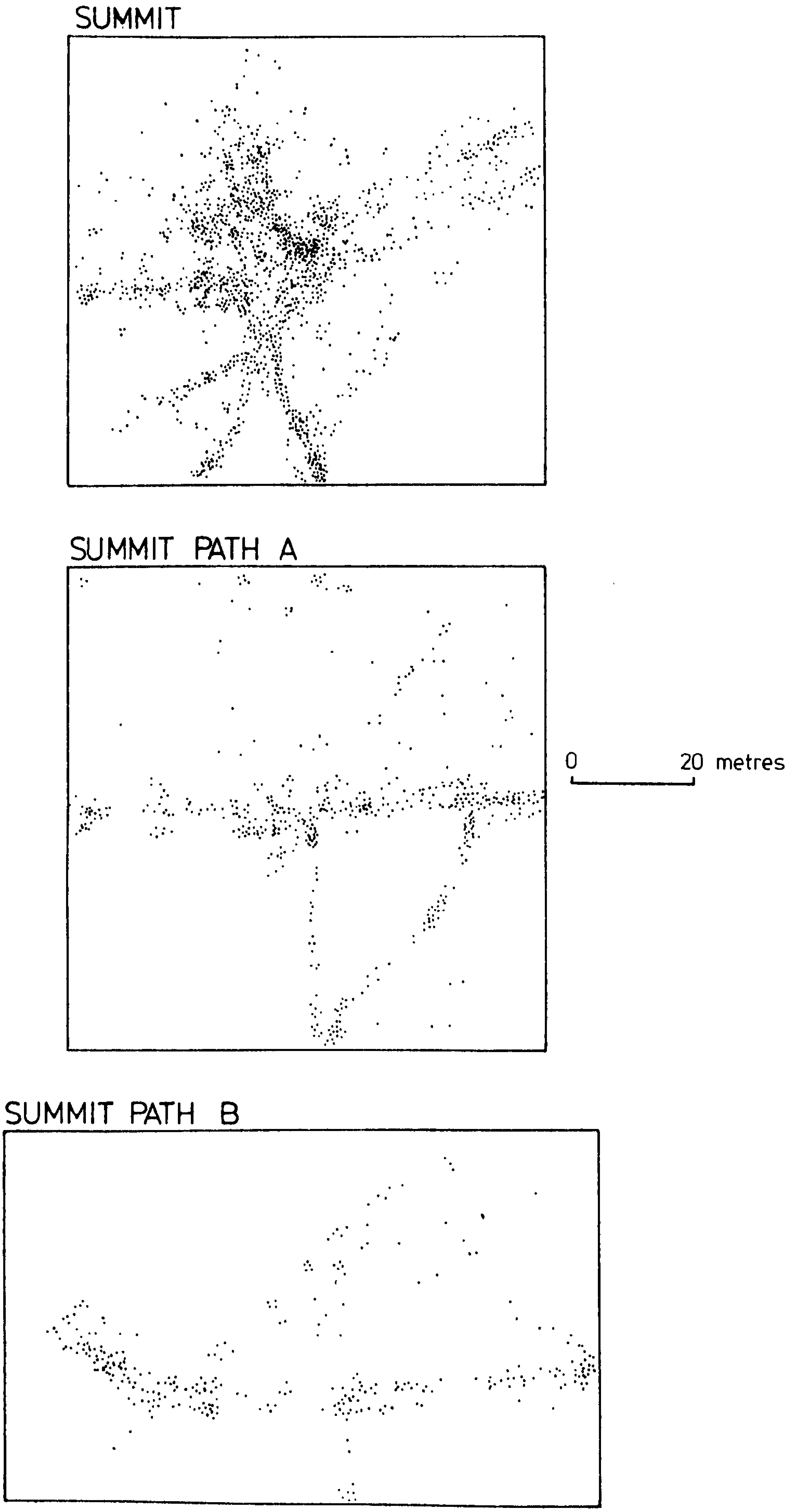


Figure 5.7 Beacon Fell

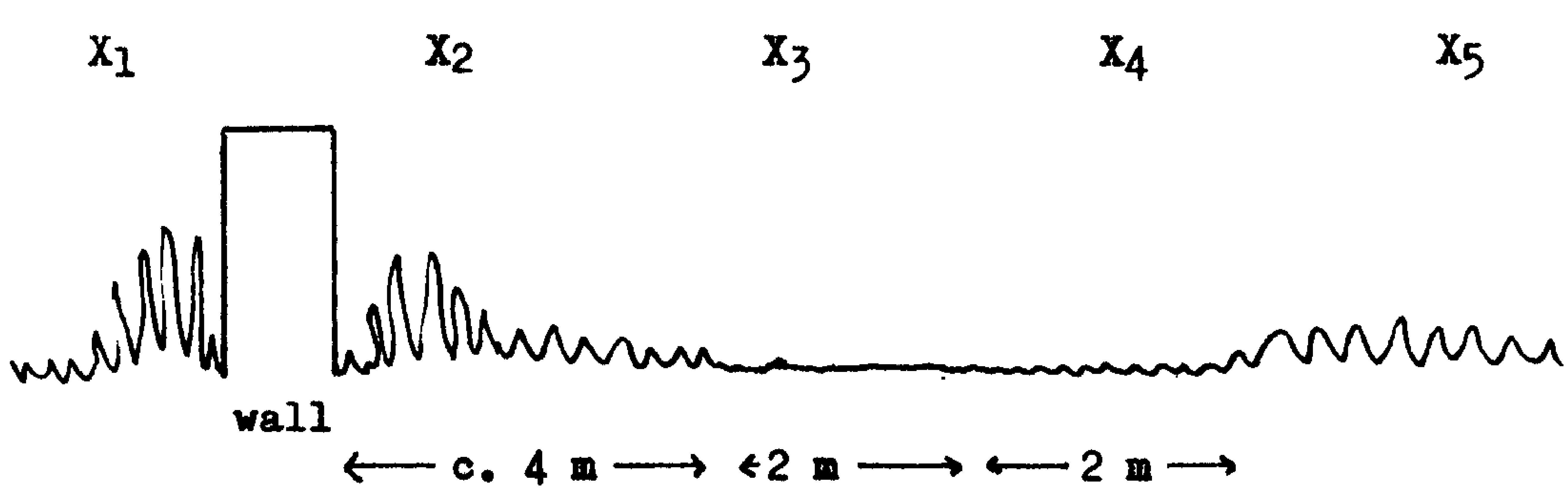
DISTRIBUTION OF PEOPLE: TOTAL COUNT



The second problem is more difficult to resolve. The Index of Disturbance is calculated for a one metre square quadrat located in the centre of each cell in the ten metre square grid. It was intended that the quadrat should act as a sample for the grid square, for comparison with the intensity of use. However, the people counts covered the whole area of each square.

From the dot maps it is clear that the majority of use is linear, spread out along the footpaths (see Plate 19). Relatively few areas attract a wider spread of use. This leads to difficulties in analysis. The path transects show that the zone of intense damage may be quite narrow, the main path is about four metres wide, but the smaller ones are often less than two metres. Where a footpath crosses a grid square there is a high probability that it will not touch the centre of the square, thus it would not be recorded in the vegetation survey.

Figure 5.8 Main path: typical cross-section



X_1 Rank vegetation with "scrub" species if in clearance area

X_2 Rank vegetation typical of "gateway flora"

X_3 Maximum damage, often largely bare

X_4 Flattened, but not badly damaged

X_5 Little apparent damage

Plate 19 Beacon Fell: view from Summit towards Parlick Fell, people approach hill directly, and few stray off a narrow beaten track

Plate 20 Beacon Fell: Unauthorised cause of erosion at Summit

The grid was located in such a way that the main path was recorded, but the path was not exactly aligned with the grid, so the position of the quadrat varied. As shown in Figure 5.8, a relatively small difference in distance could produce a very different result. In other parts of the site there was a strong possibility that the narrower paths would be missed altogether (Figure 5.9).

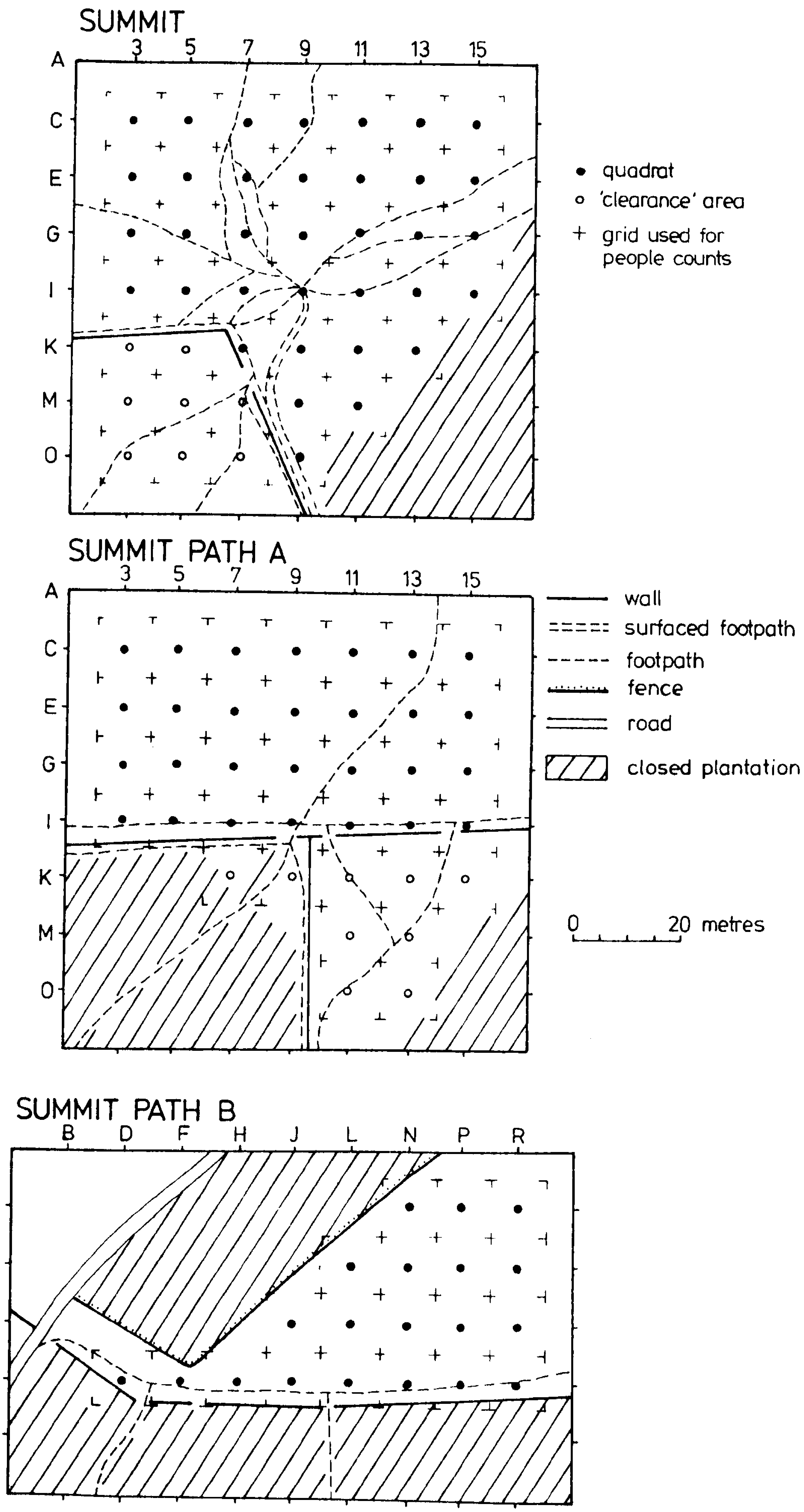
Thus, where a footpath crosses a grid square the measure of intensity of use rises, but the assessment of disturbance depends on whether the quadrat hit the path or not. In general, a greater degree of disturbance is recorded in association with the footpaths, but statistical analysis proved inconclusive.

The initial hypothesis was that the intensity of use would be reflected in the state of the vegetation, such that as the level of use increases, the state of the ground deteriorates. Correlation of Disturbance Index (DI) and people counts (P) produced the following results:

Summit	$r = 0.46$	$(n = 43)$	
Path A	$r = 0.51$	$(n = 38)$	
Path B	$r = 0.45$	$(n = 20)$	(One tailed test significant at 5%)

(Note: all "edge" quadrats had to be excluded as the people counts cover less than the 10 x 10 m grid square, and therefore would not be comparable with the rest.)

Figure 5.9 Beacon Fell: Location of Quadrats Used in Analysis



The coefficients show the predicted direction of relationship, with DI increasing as P increases. However, the relationship is not very clearly marked. Two problems reduce the value of the correlation: the clearance areas confuse the pattern and the relationship with use is not a straightforward linear one.

Investigation of the relationship between P and the background variables of DI revealed that in the clearance areas (eighteen quadrats) there was a correlation of -0.83 between P and Floristic category. This is not surprising as the large brambles and other scrub plants found in these areas actually repel walkers. However, the existence of a strong negative correlation with one factor undermines the value of the Index. To remove this complication, the quadrats in the clearance areas were dropped from the sample for all subsequent work.

Both the Summit and Path A sites contain areas of recent clearance; when these are removed from the sample, the following coefficients are found:

Summit	$r = 0.56$	$(n = 35)$
Path A	$r = 0.71$	$(n = 28)$

Thus, the relationship with people (i.e. trampling) is more clearly marked when the confusion of recent clearance is removed. It may seem surprising that the more heavily used site produces the less convincing result; however, examination of the maps showing the location of the quadrats used to produce the disturbance index shows that on the Summit much of the heavily trampled area is "missed", whereas on Path A the main footpath is recorded (Figure 5.9).

The relationship between intensity of use and ground damage is not a straightforward linear one (see Figure 5.10). The trend of the scatter is complicated by a cluster of quadrats with low use counts, and a few with very high counts. When P is transformed onto a logarithmic scale, a more linear trend is revealed (Figure 5.11). (NB: any quadrat where P = 0 is excluded from this plot) This would suggest that the low levels of trampling are very important in initiating damage. Once trampling pressure is established, small increases in numbers are less important (i.e. the damage is already done). Thus there may be a noticeable difference in conditions between sites recording 10 passages and those recording 20, but the difference between 100 and 110 is virtually insignificant.

An attempt was made to produce a predictive model based on regression analysis of the log-transformed data. Selecting the quadrats recording 1 or more people only, a sample of 70 is provided by the three sites together. The correlation coefficient of log P and DI for this set of data is 0.69. With the log of the people count as the independent variable (x) and the disturbance index as the dependent variable (y) a regression of y on x produces the following equation:

$$y = 2.46x + 1.8$$

Resolving the equation produces the following examples:

if $x = 0.7$ (equivalent to 5 people on site)

$y = 3.52$

Fiture 5.10 Beacon Fell:

SCATTER DIAGRAM TO SHOW THE RELATIONSHIP OF THE DISTURBANCE INDEX AND PEOPLE COUNTS ON AN ARITHMETIC SCALE

Figure 5.11 Beacon Fell: Scatter Diagrams to Show Disturbance Index against Log People

if $x = 1$ (equivalent to 10 people on site)
$y = 4.26$

if $x = 2$ (equivalent to 100 people on site)
$y = 6.72$

if $x = 2.7$ (equivalent to 500 people on site)
$y = 8.44$

On the face of it, this would appear to be a very useful association, where it is possible to predict damage levels according to the trampling pressure. If this were reliable, it would also be possible to reverse the procedure and set maximum trampling levels for a tolerable disturbance. However, the value of the model is measured by the confidence with which the predictions can be accepted. An estimation of confidence limits to be set is given by the standard error of estimates made from the regression line. In this case, SE y on x = 1.72.

To predict a relationship with 95% confidence requires the use of a confidence interval of $\pm$ 3.44 on the DI scale. Thus, for the predicted disturbance by 10 people the index lies in the range 0.82 - 7.7, and for 100 people in the range 3.28 - 10.16. With a confidence interval of 6.88 on a scale that measures from 0 - 12, it is clear that the possibility of error is far too great for any useful conclusions to be drawn. The trend line and confidence limits are shown in Figure 5.12.

The problems in analysis stem largely from the sampling techniques used, but the random variations due to the use of surrogates may also be important. The disturbance index was designed to measure change at one

Figure 5.12 Beacon Fell: Regression of Disturbance Index on Log People

point but the people counts measure pressure over an area, thus the two are not strictly comparable. Use is essentially linear; on the whole people literally follow the beaten track, even when they are free to roam more widely. The only site to show a heavily trampled area is the Summit. The steady decline in the width of the Summit Path (increasing the chance of "missing" it) may account for the lower relationship of pressure and disturbance found on Path B. However, there is also the possibility that the lower total numbers here indicate a threshold level.

It was not possible to investigate the idea of thresholds from the data available. As has been stated, the sampling methods employed mean that a people count of zero does not literally mean no use, but no measured use. If it were possible to set up experimental sites where the level of use could be controlled, then the resulting information may indicate if a measurable threshold of trampling pressure exists.

It has been assumed throughout that the damage index scale was arithmetic. The possible sources of error already incorporated into this index reduced the value of further manipulation. However, it is recognised that weighting the variables or assessing the index on a geometric or logarithmic scale may be appropriate. Just as the effects of numbers seem to be logarithmic, the disturbance index may not be genuinely arithmetic. There may be some subjective justification for transforming the people count data, from the observable differences in effect of 10s, 100s or 1000s of people. A similar case for the disturbance index cannot be made from the evidence at present available.

III Discussion

At the simplest level the Index of Disturbance appears to function adequately; it reflects all forms of disturbance which have upset the balance of the background vegetation. The major logical criticism involves the assessment of the "normal state" of the background vegetation. It is unrealistic to make a comparison with a presumed "natural" vegetation, as all areas of Britain show some divergence from the climatic optimum. When attempting to monitor changes due to a particular type of interference, it follows that the background form should be the vegetation prior to that interference, or in this case, an area not affected by trampling. An obvious problem here is the difficulty of isolating interference. Although trampling is the main form of interference currently affecting the grassland areas of Beacon Fell, it became apparent that other forms of interference were still having an effect. It seems that the vegetation is still re-adjusting after the cessation of grazing pressures and more recent changes due to planting and clearance of trees are of major importance in some areas.

It was originally intended to use the transect survey as a base and monitor change over several seasons. It would then be possible to investigate relative suceptibility and the possibility of colonisation by ruderal species. However, the state of the paths was causing considerable concern and had attracted the attention of the County Ecologist. 'In places the loss of vegetation cover is leading to erosion of the peat soil and the commencement of gulleying. Unless this damage is checked, there is little doubt that the amenity value of the Country Park will be seriously impaired, and restoration may become prohibitively expensive and technically difficult' (Gemmell 1976).

The ecologists commissioned a study which revealed that the damage was due to concentrated trampling pressure, and the lack of recovery resulting from the following factors: soil acidity, shortage of plant nutrients (especially nitrogen, phosphorus and potasium), soil compaction, water-logging in winter and droughting in summer, anaerobic soil conditions and presence of toxic sulphides, and absence of species possessing trampling tolerance. Sample surveys along the ridge path showed that the pH of the soil under the paths was consistently lower than that under the nearby untrampled vegetation. The mean difference was only 0.14, but as pointed out in the survey, when the original pH is very low the difference may be critical to plant growth. Thus it is suggested that once damaged, the low pH and nutrient status of the trampled areas may inhibit the re-establishment of the local vegetation (Gemmell 1976).

Under the direction of the County Ecologist, the Estates Department carried out a series of grass seeding trials using various liming and fertiliser treatments and several grass seed mixtures. With no treatment, it was found that none of the sown seeds became established, although there was some spread from the local _Deschampsia flexuosa_ population. Fertiliser alone gave little improvement; liming alone was followed by some development of the less demanding species and spread of _Deschampsia flexuosa_. The most successful results were obtained when both lime and fertilisers were applied; _Lolium perenne_ and _Phleum pratense_ proved to be unsuitable, but _Poa annua_, _Festuca rubra_ and _Agrostis tenuis_ all became established. Mixtures containing at least one of these three species all achieved at least 50% cover, the three together attaining an almost total cover. However, it is noted that _Poa annua_ suffered by competition from _Agrostis tenuis_.

Poa annua was selected for more extensive trials: it was known to be resistant to trampling since it is observed as a characteristic footpath species; it is capable of almost continuous growth and regeneration from seed throughout the year, thus is able to recover from trampling damage in the winter when other species are dormant. Another advantage is its dwarf, compact form considered to yield an ideal turf for walking. Trials showed that liming was essential for successful establishment; the application of NPK fertiliser greatly improved performance. The initial application of lime as a top dressing was quite successful, due to the shallow rooting depth of Poa annua. However, a satisfactory change in pH was only found in the top 4 cm of the soil; this would inevitably lead to root restriction possibly increasing susceptibility to drought damage in summer. In the main seeding programme cultivation to 15 cms was recommended, to incorporate the limestone application at 20 t/ha and fertiliser at 750 kg/ha (NPK fertiliser, e.g. 17: 17: 17 - N: P_2O_5: K_2O). The recommended seed mixture was Poa annua (60%), Festuca rubra (25%) and Agrostis tenuis (15%) at 200 kg/ha. It was intended to continue applications of fertiliser as necessary to maintain the nutrient balance of the rooting zone.

Though interesting in itself, the operation of this seeding programme prevented further monitoring of the transects as they were located across one of the treated routes. Initial results of the seeding showed a vivid fresh growth resulting from the nutrient flush. It was hoped that once the grass was established, the fertiliser application could be reduced to allow the turf to blend in with the natural community.

The seeding experiment proved quite successful, and by 1978 a favourable report was received:

> 'The treated paths are now covered with a dense mat of annual meadow grass which is withstanding well the heavy wear, providing an excellent walking terrain on areas which were once bare. The bent and fescue have disappeared, suggesting it may be better to sow annual meadow grass on its own, perhaps at a higher seeding rate to speed up turf development' (Gemmell and Crombie 1978, 18)

Observation four years after the original seeding showed a fairly good survival of grass, but it had not blended into the natural community and could be distinguished by colour and species (see Plate 22).

The area study also proved inconclusive. The complications arising from alternative causes of interference and the problems of the sample data precluded statistical analysis that would result in a quantitative expression relating the amount of pressure in the resulting damage. However, it has been shown that the combination of factors measured do give an indication of disturbance, and it is possible to assess the disturbance on an ordinal scale. Two problems need to be overcome before the scale can be applied to the model of vegetation strategies. First, the measure of trampling pressure would need to be more precise so that it relates to exactly the same area as the vegetation study. Second, care must be taken to include areas of one type of disturbance only, the effects of trampling and clearance should be tested separately.

Plate 21 Beacon Fell: Summit Path 1974; note gradual change in colour due to lack of seed heads on Deschampsia flexuosa in trampled area.

Plate 22 Beacon Fell: Summit Path 1981; note bright colour of reseeded path, due to added nutrients and lack of integration of introduced species and background vegetation

The assessment of the Disturbance Index may be of value as a management tool in itself. If applying the technique in a new study, it should be possible to use such a scale to indicate the distribution of disturbance and damage without independent assessment of interference. One application of the technique would be to establish the pattern of the intensity of use of a site, without recourse to the very time-consuming task of observing visitor distribution. It would also be possible to map variation from an ideal background vegetation. This might be useful if there was a desire to manipulate a vegetation community to achieve some desired state of cover.

Chapter Six

THE ASSOCIATION OF SITE AND VISITOR

In the report so far, an account of the total number of visitors to a recreation site in the Forest of Bowland AONB has been presented, with a discussion of seasonal and diurnal fluctuations in visiting and the annual trend. The impact study investigated some of the effects of large numbers of visitors, with particular reference to trampling of moorland vegetation. A desire to identify the people causing the disturbance is understandable, but investigation of visitor characteristics is important in planning, and deserves more than idle curiosity.

If there is to be any attempt to assess recreation activity, provide for specific demand and anticipate developments, then information about visitor characteristics is needed. In Chapter Two the outline of a recreation strategy was presented, which would involve the manipulation of site choice or the movement of people within a site. If such a strategy is to be successful, it is also necessary to understand how visitors perceive opportunities presented to them. This chapter is concerned with a questionnaire survey carried out at Beacon Fell Country Park and the Trough of Bowland. The objective of the survey was to investigate the functioning and interpretation of two contrasing sites in relation to their role in a recreation strategy. An initial appraisal of the basic concepts relating to a recreation strategy (Part I), is followed by an assessment of the characteristics of the visitors at the two sites (Part II), and their interpretation and use of the resources available to them (Parts III and IV). An attempt is made to distinguish recreation types by site description (Part V), and to establish the importance of vegetation in the landscape of an area chosen for recreation (Part VI).

I Introduction

Recreation is big business now, its economic potential being reflected in the stands of glossy "leisure" magazines and the ever-changing fashions in accommodation: this year back-to-nature camps, next year time-shared apartments. Its importance is increasingly being recognised by government, both national and local, with specialist agencies and departments devoted to monitoring, catering for and evaluating the leisure market. Nevertheless, assessment of recreation activities, interpretation of growth trends, analysis of demand curves, and planning for specific functions all come back to factors of individual decision-making. Dower's "fourth wave" is not a unified surge, but thousands of individuals making similar decisions at the same time, often for quite different reasons. "Good" planning results in the unaware traveller "stumbling across" the ideal site; the importance of the feeling of exploration and discovery should not be underrated. However, to exploit the resources fully the site should not only be in the right place, but also provide the "right" facilities. In reality, much recreation provision has rested on the fortuitous coincidence of demand and resource availibility. A full recreation strategy may provide honeypots, sites of specialised function, ideal routeways, quiet areas, and so on, but its fulfilment requires the use of these resources as intended, i.e. that the planners' intentions and the visitors' perception of opportunity should agree. A better understanding of what determines a recreation decision and how visitors interpret the options available to them will help towards this goal.

Much can be achieved by carefully controlled observation, but when it comes to attitudes, there is no choice but to talk to people and allow them to express their own views. It is only through such an approach that it is possible to discover how visitors perceive a site, and whether they see it in the way the planners intended. When a site is busy and the visitors appear to be happy, it may seem an unnecessary indulgence to trouble about interpreted function, but if there is a divergence between intended and actual use, then it will have implications for the whole strategy, perhaps involving several other sites. The decision over what should change - site design, information services, or the plan itself - can only be made in the knowledge of the visitors' perceptions and preferences.

(a) Visitor Characteristics and Site Choice

A great variety of recreation resources may be available within a region, some attracting most countryside visitors while others have a more limited appeal. The operation of a recreation strategy is based on the manipulation of supply and demand to regulate pressure and, to a certain extent, this depends on identifying and providing for different types of visitor. Definition of visitor groups is difficult because perceptions are rarely explicit, groups may not be mutually exclusive and requirements vary from time to time. The ideal site for any one day depends on the time available, the weather conditions, method of transport, companions and mood. Nevertheless, although circumstances may dictate the choice of site for a particular trip, basic preferences may be identified that will underwrite all decisions and help to characterise the visitors' perceptions.

Because of the degree of ambiguity in the definition of visitor types, concentration on extreme examples may help to clarify the variety of reactions. In terms of countryside recreation environments, these extremes may be represented by a wilderness with no facilities for visitors, and a highly developed site with visitor centre providing for every need.

(i) The Wilderness

The use of the term wilderness has aroused some controversy, as it has no specific meaning in the British context. The traditional application of the term to places where wild beasts abound has been superseded in the present dictionary definitions emphasising lack of cultivation or human occupation, some, indeed, giving an area of little life at all (Longman's New Generation Dictionary 1981). A formal definition given in the Wilderness Act in the United States recognises wilderness as 'an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain' (United States Congress 1964, 1). Huxley comments that 'the growth of the wilderness concept has paralleled the increasing industrialisation of man, so that for ever more people remote places are assumed to be wilderness and not simply unknown to them' (Huxley 1974, 361). He offers this as some explanation for the use of the term in remote areas of northern and western Britain, where the more exact requirements of the American definition could not be met.

Thus the concept of wilderness seems to have surprisingly little to do with natural vegetation. The landscape must be lacking in obvious signs of human activity, but much in the way of vegetation modifications will be tolerated. Priddle found that it was absence of people that was the critical factor in determining the concept of wilderness in the Algonquin National Park (Priddle 1978), a point taken up by the recommendation of the designation of "top tier" National Heritage Areas in this country (CRC 1979). Thus the coniferous plantations of the Forestry Commission may compete with managed moorlands or wetland wastes to qualify as wilderness, indeed the screening possible in a woodland makes the first a more likely candidate by this definition alone.

Within the British experience, the moorlands provide one of the more extensive areas of wilderness. The reason for their attraction as a recreation area is not immediately obvious, but the substantial number of visitors attests to their appeal. The preference for the bleak moorlands appears to increase with years of education, but just why we should be "educated into" a love of the moors is not clearly understood (Shoard 1981). There is an argument that it is not the landscape so much as what it represents that is appreciated. 'Moorland devotees generally prefer to feel that their favoured landscapes antedate any human presence. Many of them are well aware that this is not the case, but this knowledge does not diminish their pleasure in the wild, primeval flavour of the moorland landscape' (Lowenthal 1978, 399).

Lowenthal declares that the 'moors are enjoyed less for their beauty than for the sense of space and freedom and isolation they impart' (ibid., 399), suggesting that the beauty of such a landscape depends heavily on interpretation. Charlotte Brontë was early to discover the importance of the character of the observer:

'Unless that light and freshness are innate and self-sustained, the drear prospects of a Yorkshire moor will be found as barren of poetic as of agricultural interest; where the love of wild nature is strong, the locality will perhaps be clung to with the more passionate constancy, because from the hill-lover's self comes half its charm' (Charlotte Brontë 1850: Memoir of Emily Jane Brontë) (Collins 1954, 415).

However irrational the liking, there is a persistent, articulate group of visitors who value moorlands, and an even larger group who prefer to admire the purple hills from the comfort and security of car or coach.* The preference may not even extend to visiting, but become a "wilderness by proxy" enjoyed through the media of books or television. The popularity of such programmes as those about Yorkshire hill farmers and vets must surely reflect in part the emphasis given to their location.

If the wilderness can be represented by the moorlands, then their visitors may suggest a <u>wilderness type</u> of countryside visitor (WT); those with a preference for the wide and open places, who seek peace and quiet and places without obvious development for their recreation. This type of visitor is often the more active, being prepared to walk long distances to achieve a feeling of isolation. The group may include site-specific visitors, e.g. those intent on climbing to the top of Snowdon, but the popularity of a well-known location may well lead the true WT to avoid the beauty spot and seek tranquility elsewhere. Thus, the objective of "open moorland" might be achieved by any number of

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* The presence of a road would undermine the wilderness classification for a purist.

locations, the specific choice resting on the circumstances of a particular trip.

(ii) The Park

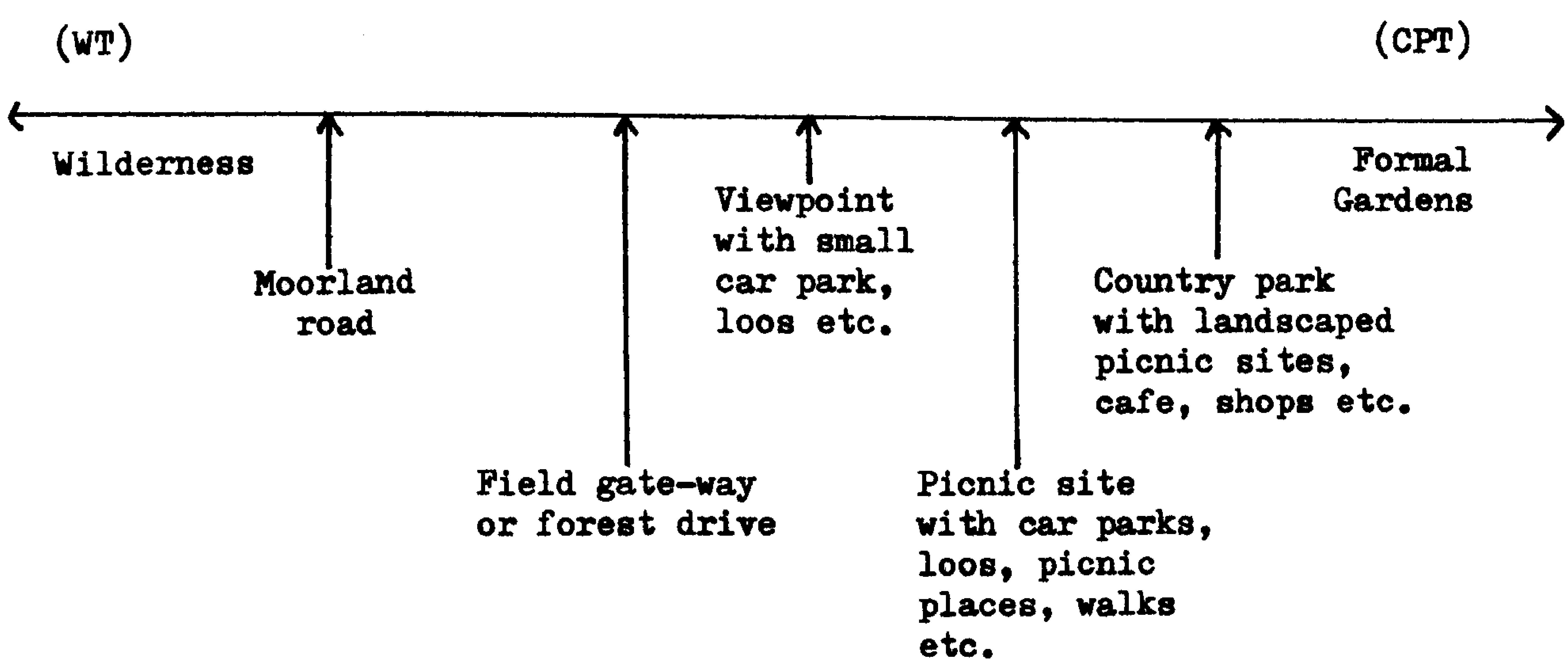
As a contrast there are visitors who require many facilities to enjoy fully a day in the country. This may start with a preference for the security offered by a defined car park or waymarked footpath, but leads to the development of picnic sites, cafés and "visitor centres". For this group, the landscape may be no more than a pretty background for the sort of informal activities that could easily be a part of an afternoon in a town park or garden.

The Country Parks were developed with the intention of providing suitable sites for this type of visitor. The emphasis on accessibility and location stresses the filtering function, particularly directed at the "site-free" visitors with no specific destination in mind. The characteristic features of a Country Park are opportunities for informal recreation in natural surroundings, but as a recent guide pointed out 'in many cases much of the attraction is man-made; there are castles and great houses, but also farms and watermills, a complete slate-working complex, restored canals and a railway station' (Waugh 1981, 7). For the typical <u>Country Park Type</u> (CPT) visitor, the combination of facilities provided, accessibility and location may be more important than the specific features of the landscape.

The direct opposition of wilderness type and country park type is highly artificial, but it may be useful to consider the types as the extremes of a continuum. The majority of countryside visitors could be placed along this continuum, although their exact location on it may vary from time to time with the circumstances of an individual trip. Thus, the general terms of their interpretation of the landscape features may be predictable, but the degree of satisfaction derived from any one visit may vary with expectations, companions, the weather, and so on.

The concept could also be applied to sites, so that these too could be considered to exist along a continuum from the true wilderness to a formal garden (Figure 6.1).

Figure 6.1 Hypothetical Continuum of Countryside Recreation Sites



Applying the concept of wilderness to Britain is fraught with problems, but within the context of the British experience it is possible to identify some areas, such as the central Bowland Fells, that approach the ideal. It is this sense of peace and quiet, in natural surroundings away from human activity, that a recreation strategy may seek to protect among other things. In selecting sites to represent the contrasting elements in the range of resources, it is possible to investigate the factors influencing the choice of site. If the filtering system is operating successfully, it would be expected that the Country Park (Beacon Fell) would attract more visitors towards the CPT end of the scale, than the moorland site (The Trough of Bowland), where visitors may tend towards the WT end of the scale. Investigation of the characteristics, activities and attitudes of the visitors at the two sites may provide an indication of the success of the Country Park in drawing off the site-free.

(b) Visitor Characteristics and Crowd Tolerance

A second problem concerns the question of crowding. If sites are designed to be honey-pots and intended for heavy use, then the full effects of crowding should be foreseen. In Chapter Five the problem of ecological capacity was considered, but perceptual capacity may be more important to the visitor. It is important to be aware of any resistance to crowding, and anticipate possible reactions. As shown in Chapter Four (II (b) (ii) 160) site modifications may mask the effects of crowding, but its importance in influencing decisions must be considered. It may well be that visitors adjust their expectations according to the time of the visit, or modify behaviour in accordance with site conditions, but the attitude to crowding, potential and real, may influence site choice.

In Chapter Five the vulnerability of some natural plant associations was shown; this may be an important consideration in planning. The outline of Country Park policy requires a "country" setting, but the importance of natural vegetation in creating a suitable landscape is hard to assess. As already shown (Chapter Two II (d) (ii) 38) the landscapes of many recreation areas are far from natural in a strict application of the word, although they may be considered to be so by the majority of the visitors. Management to maintain a vulnerable plant community may require very restrictive controls, and may not be practical on a recreation site. A fuller understanding of the general interpretation of "natural" may be very valuable in determining realistic aims.

It would be expected that the wilderness type visitor would show a greater awareness of, and sensitivity to, crowding than the country park type visitor. However, the distinction may be hard to isolate in a site study; WT visitors may well bear in mind possible crowding in selecting their site, avoiding areas likely to be busy. Thus it would be expected that those found in crowded areas will not be adversely affected by the other people present, and may appreciate the company.

Thus, although a distinction between the WT and CPT in their reaction to the number of other visitors present may be expected, a crowd-intolerant group may be hard to identify through on-site reactions.

II Visitor Profiles

The collated answers to the factual questions may be used to build a profile of the visitors of the two sites, detailing their origin, the reason for the trip, activities engaged in, likes and dislikes of the site, and personal characteristics. (A summary of the results of the questionnaire is given in Appendix VI.)

(a) Beacon Fell

Taking the data set as a whole, the average responses show no significant difference between the main survey (Easter 1975) and the pilot study (Summer 1974), thus for most purposes the two are treated together. Where there may be interest in the separate findings, they may be distinguished.

Beacon Fell has a distinctly local catchment, 87% of the visitors coming from within a twenty mile radius, with 40% from within ten miles. No-one had set out from more than fifty miles away, but a few of the holidaymakers lived more than fifty miles away. A survey carried out by Lancashire County Council in 1971, and another by Dutch students on an exchange with the Council in 1973, both show a similar distribution (Table 6.1).

Table 6.1 Beacon Fell: Origin of Visitors by Distance Zones
(% respondents in each category)

Miles	1971	1973	1975
0 - 10	42.9	36.0	42.7
11 - 20	41.3	49.0	45.3
21 +	15.3	14.0	12.0
	n = n.a.	n = 682	n = 349

Source: Forest of Bowland AONB Survey, van Wijngaarden 1973
(NB: distance groups had to be amalgamated to achieve comparability between studies; some variation in the longer distances is lost)

There is slight evidence to support the earlier suggestion that people were travelling further in the early 1970s, although the difference was not statistically significant. There is no available survey from before the date when the area became a Country Park, but this evidence suggests an established catchment that has not changed, in spite of the great increase in the number of visitors (see Traffic Census - Chapter Four I (a)). This may also support the assertion made that the increase is due to the same visitors coming more frequently.

Examination of the distance categories alone masks one of the most interesting factors of the catchment: over 50% of the visitors come from Preston, or the towns of the Fylde, principally Blackpool and Lytham-St Annes (see Figure 6.2). This pattern is also shown in the earlier studies (Table 6.2). For potential visitors travelling east from the Fylde, Beacon Fell is the nearest hill, and also the nearest

Figure 6.2 Beacon Fell: Origin of Visitors by Urban Districts

Table 6.2 Beacon Fell: Origin of Visitors by Urban Districts

	1971 %	1973 %	1975 %
Longridge/Goosnargh	5.7	4.1	3.4
Preston	35.0	27.9	36.4
Garstang	0	2.1	1.4
Blackburn/Accrington	8.1	8.6	4.6
Blackpool/Poulton	21.1	24.5	22.3
Lancaster	0	1.9	2.6
Leyland	2.5	1.5	2.6
Clitheroe	1.2	1.3	0.6
Kirkham	1.6	1.2	1.2
Chorley	1.6	2.2	2.6
Burnley/Colne	1.3	0	2.3
Southport	2.0	1.0	2.9
Liverpool	1.2	3.0	1.4
Bolton/Rochdale	0	1.6	0.9
Manchester	1.6	1.9	3.2
Wigan	0	1.1	1.2

(places consistently less than 1% excluded)

Source: 1971 and 1973 from Lancashire CC 1973 sizeable defined recreation site. The rarity of visitors from the north is not surprising in view of the absence of concentrated urban populations and the range of alternative opportunities available in the north of Bowland and the Lake District, but emphasises the importance of the Country Park to the people of Preston.

The vast majority of the visitors travelled by car. Although the main survey technique was biassed in favour of motorists (see Chapter III part IV), this should not affect the results as only two respondents (1%) were encountered in the interview survey who had not come by car (one a local resident on foot and the other on a motor-bike). Overall, 10% of the visitors reported difficulty in finding somewhere to park; this proportion rises slightly in the Easter (Bank Holiday) survey, when 19% of the visitors parked on the road. Some visitors chose to park in laybys (and passing places), but only 3% were not in car parks in the quieter surveying days of the summer. This is some indication of the physical capacity of the Fell, and the crowding problem at peak times (1,393 cars were recorded on the Easter Sunday).

The importance of the regular clientèle is reflected by the fact that 79% of the visitors had set out with the intention of coming to the Fell, nearly 60% of them having been there at least three times before. If the holidaymakers are removed, only 13% had never been to the site before. In view of this, it is not surprising that the majority reported knowing about the site through "local knowledge" or friends, however 17% had found the site by following road signs, and 7% as a result of formal publicity (information centres, talks, newspapers). These proportions may be significant if there is an intended function of "filtering" Bowland visitors; if the Park really is going to draw in the site-free CPT, then the publicity and roadsigns may need to do a little better. However, this figure may be misleading; it is likely that for the majority the site's presence is absorbed into "local knowledge" only after being discovered with the help of publicity.

Many people gave more than one reason for their trip; the most frequently stated reasons were to have a walk (47%), a picnic (32%), or as part of a general day out (41%). As may be expected, there were more picnickers in summer, and more walkers at Easter. There was a significant difference in the responses to this question due to the greater number of walkers at Easter, and the bilberry pickers in the summer. It is interesting that over half the respondents reported having a picnic while on the site (51% at Easter, 54% in the summer), but obviously for some this was not the main reason for their visit. The question on the use of picnic tables was a little ambiguous, as it did not specify the wooden type of table provided by the authorities, and the question on availability did not probe whether a table was wanted or not. However, in the summer 33% of the picnickers used a table, and of those who did not, 45% reported that there was no table available. This confirms the popularity of the tables, and suggests that more would be used if available (NB: in an open question on facilities, only 2% actually asked for more tables).

The open question on features of the Fell that were liked, produced a varied response, many people mentioned more than one thing, and some difficulty was found in coding, e.g. "freedom" includes "freedom for the kids to run about" (Table 6.3).

Table 6.3 Beacon Fell: Features Liked

n = 527	Number	% of Total Respondents
Scenery/Views	218	41
Walks	75	14
Freedom	64	12
Peaceful/quiet	60	11
Facilities (including the Warden!)	53	10
Forests/woods	40	8
Fresh air	32	6
Uncommercialised	24	5
Easy access	20	4
Well maintained	7	1
Variety	5	+
Information centre	3	+

A slightly higher response rate was achieved in the summer (11% don't know) when the interview technique allowed prompting, but there was no significant difference in the responses given.

The importance given to walking and the view in these two questions underlines the earlier suggestion that most walkers make it to the Summit, and may also indicate a greater popularity for Fell House and the Quarry car park where it is possible to get a view from the car. These responses are as might be expected for a Country Park, with the peacefulness and the facilities gaining equal credit.

The questions relating to crowding were a little ambiguous. Although 56% reported finding the site as they expected, this takes no account of self-adjustment for season. In fact, 36% said they would prefer less people in the main survey (Easter Bank Holiday), compared with 41% in the summer, when it was generally quieter. If the earlier statements about catchment are correct, this would suggest that visitors adjust their expectations for a Bank Holiday, thus being less bothered by the reality of crowds. An alternative possibility is that the adjustment takes place "off-site", and crowd-sensitive people simply do not go on a day they would expect to be busy. However, all the other evidence suggests that the Bank Holiday visitors are not a different group to those coming at other times; the differences in this question cannot be relied on as they fall within the bounds of sampling error.

A pre-coded question was used to investigate the range of activities while on the Fell. As expected, walking (90%), and picnicking (47%), were most frequently reported; while the picnicking figure can be considered reliable, it should be recognised that opinion on what constitutes a "walk" varies dramatically. In spite of poor weather in the summer, and a Bank Holiday survey at Easter, there is a greater number of picnickers in the summer (53%) than at Easter (43%). This suggests that picnicking is a "summer" activity regardless of the weather, and may also relate to the longer trips at that time. The only other activities to be reported frequently are sitting in the car (28%), games (19%) and nature study (17%). It is interesting that nature study was more popular in the summer, and games at Easter, although the proportion who sat in the car was equal on both equations. Mention should be made of the bilberry pickers, 16% of the summer survey.

Analysis of the question regarding desirable additional facilities was a little difficult: 61% gave no codable response, but this includes a large number who gave a very emphatic "NO!" Comparison with a similar question asked in 1973 shows little change (Table 6.4 (a)). The demand for information and refreshments shows a slight increase, as does the demand for litter bins; but the demand for increased car parking and picnic tables seems to be less. The only substantial increase is in the demand for toilets. The 1973 survey noted that the demand for more of facilities already provided (toilets, picnic tables, parking, etc.) seemed to be greater on the busier days, and this is borne out by this study (Table 6.4 (b)). This may be an indication of physical capacity of the site being reached on the busiest days. However, there are few days in the year when the pressure is such that there is a great demand for more of facilities already provided. It is questionable whether the demand on about half a dozen fine summer Sunday afternoons and a few Bank Holidays would warrant the expense of increasing facilities; such changes would only result in car parks and toilets that would remain unused for most of the year.

Three points can be made: most visitors are satisfied with the site as it is, and do not require (or would positively dislike) more facilities; of the facilities required, the majority are in the line of basic sanitation and amenities; demand for facilities increases when the Fell is busy, suggesting that the majority of the visitors use existing facilities which get crowded at peak times. This question is useful in indicating some characteristics of the CPT, particularly the requirement for the basic sanitation ammenities and the expectation of information and refreshment. There is a persistent, though low, demand for particular facilities, such as sporting equipment, surfaced paths, seats,

Table 6.4 Beacon Fell: Facilities Required

(a)

	1974/5 Number	1974/5 % of Total	1973 % of Total
Toilets	78	14.8	8.6
Café	72	13.7	12.4
Information	24	4.6	2.0
Sports Facilities	19	3.6	
Car Parks	11	2.1	1.9
Litter Bins	9	1.7	0.7
Picnic Tables	8	1.5	3.4
Surfaced Paths	8	1.5	0
Telescope (Summit)	7	1.3	0
Seats	5	0.9	0
	n = 527		n = 682

Source: 1973 from Lancashire CC 1973

(b)

	Easter (Bank Holiday) 1975	Summer 1974
Toilets	15.5	13.5
Car Parks	2.6	1.1
Café	14.9	11.2

telescopes and so on, that might be more appropriate for an urban park or coastal promenade. However, the proportion of non-respondents should be kept in mind. With the responses available it was not possible to separate "No - we like it as it is" from "No - you've done too much already", or even "I don't know". Conversations and observations suggest that the first is the most frequent; the majority of visitors do use the existing facilities and these are a great attraction, but many do not wish to see further development.

The rest of the questionnaire deals with factual points of trip type and family characteristics. The majority of visitors stayed between one and four hours (75%), most of the rest making a shorter stop. As stated earlier, the visits in the summer tend to be longer, but the difference is not statistically significant. Slightly more than half (58%) made their only stop at Beacon Fell, and the great majority travelled less than fifty miles in total (75%). Nearly all said they intended to return, rather too many in view of the number of holidaymakers, which suggests a glib answer more than a definite intention. A slight majority of groups included children; a greater proportion of adults (alone, or with other adults) were encountered on weekdays in the pilot study.

Most of the groups were travelling in their own car, only 5% reporting a company car. The respondents were mainly men (72%), but this says more about the women who handed the questionnaire to their husband than it does about group composition! The question about education was a little ambiguous, some respondents interpreting it as "so many years ago" rather than age on completing education. However, approximately 10% went on to higher education, and a further 10% were educated until eighteen. The majority of groups came from families where the head of the household was in employment, with the job breakdown showing a predominance of the managerial and professional categories (Table 6.5)

Table 6.5 Beacon Fell: Socio-economic Groups of Respondents (based on head of household)

<table>
<tr><th></th><th>Beacon Fell Visitors (%)</th><th>North West Region (%)</th></tr>
<tr><td>Managerial/Professional</td><td>25</td><td>15</td></tr>
<tr><td>Non-manual (white collar)</td><td>17</td><td>12</td></tr>
<tr><td>Skilled manual</td><td>25</td><td rowspan="2">41</td></tr>
<tr><td>Semi and unskilled</td><td>28</td></tr>
<tr><td>Other (including retired)</td><td>5</td><td>32</td></tr>
</table>

Source: North West Region from HMSO 1976

(NB: the retired contingent of the visitors may be underrepresented as many accompanied someone in work, so were classified with them)

In summary, it may be said that the most typical Beacon Fell visitors come to the site in groups of adults with children. They come by car, which someone in the household owns, and they live within twenty miles of the site. They set out deliberately to visit the Fell, they have been there several times before, and they will probably not stop anywhere else on the way home. They come for a walk and may have a picnic, especially in the summer; they like the scenery of the Fell, and their impression is not marred by the number of other visitors there. They will walk and picnic, and the children will play games. They may make use of existing facilities but they do not require more, or wish the Fell to be changed in any way. They will stay about two hours, more if they picnic, and will probably return on a similar visit quite soon. The leader of the group is a man aged 25 - 44 years; the head of household is probably working in local industry.

This profile strongly suggests that Beacon Fell has developed a regular, local clientèle. If the site was actively filtering new visitors, a larger proportion of first time visitors who had not set out with the intention of visiting Beacon Fell (i.e. site-free) might be expected. Thus it would seem that the filtering function is supressed at present, although it must be said that if present visitors did not come here, they would probably look for somewhere similar. The short journey length suggests that an alternative site would also be on the fringes of Bowland, but attempts to discover this were not successful due to inadequate response to the question asked.

(b) The Trough of Bowland

The relative remoteness of the Trough road is reflected in the greater distances people have to travel to get there; in this case only 6% came from within ten miles, and the greatest proportion came from within eleven and thirty miles (73%). It is notable that 12% travelled from more than forty miles away. The catchment is rather more evenly spread than that for Beacon Fell, but there is still a dependence on Preston and the Fylde (25%) There are rather more visitors from further away, and the catchment extends into Yorkshire and Cumbria; however there is still a marked gap to the north east (Figure 6.3). Nearly twice as many people were on holiday as at Beacon Fell (15%), and this is reflected in the large number living more than forty miles away. Those reporting excessively long distances were touring.

The total dependence on motor transport is partly a result of the sampling technique (see Chapter Three IV), however the location of the site makes other forms of transport unlikely. In this case, the majority

Figure 6.3 Trough of Bowland: Origin of Visitors by Urban Districts

of the "other" category were, in fact, recorded as "vans". Again, a strongly local clientele is indicated, 73% of the visitors set out with the intention of driving through the Trough, and 80% had been there at least once before, suggesting that some of the holidaymakers were familiar with the location from previous visits. Again, the majority reported finding the site through "local knowledge", although roadsigns were quite frequently mentioned (20%).

The general "day out" was the most frequently given reason for the visit (49%), but many specified a picnic (48%). Those stating pleasure driving were less numerous (19%), although this occurred more often than for Beacon Fell. The main difference was in the number of walkers, there being only 11% here. Those who intend to walk some distance generally stop at Langden, and walk to the castle ruin, as other opportunities are very limited. The difference between the two sites is highly significant (Table 6.6) due mainly to the unexpectedly large number of picnickers at the Trough of Bowland, and the large number of walkers on Beacon Fell. The Trough sample will adequately represent those to be found there at the time of the survey, but may bias in favour of those making a longer stay if the total visitor group is considered; even so, a surprisingly large number reported having a picnic (74%).

Table 6.6 Reason For Journey (Respondents could give more than one reason)

	Beacon Fell		Trough of Bowland	
Drive	90	17%	64	19%
Picnic	170	32%	158	48%
Day out	216	41%	162	49%
Walk	249	47%	38	11%
Dog	53	10%	14	4%

In considering the features liked on the two sites, again significant differences occur. The scenery is still considered to be the main attraction (47%), but in the Trough the stream is very important (27%). The only other factor to be recorded many times was the peacefulness (26%), in spite of the busy road. However, another factor that might be expected in the true wilderness is not frequently encountered, freedom (5%), probably because of the restriction on walking, much of the road verge being fenced or too steep to get onto easily. It is interesting that more people experience "freedom" on Beacon Fell, perhaps reflecting the ability to relax there in the sure knowledge that the site is set aside for recreation and there is no danger of trespass.

People at the Trough seemed no more concerned about crowding than those at Beacon Fell. Slightly more expected the crowds here, maybe reflecting holiday expectations. In terms of activities, there was also a significant difference to Beacon Fell, due mainly to the large number of picnickers (68%), and the smaller number of walkers (48%). Games were popular (31%), as was nature study (15%), but many just sat in the car (22%). The number of walkers is surprising, as only one site provides access to routes of any length, and suggests that most "walks" must be relatively short, along the streams. Those just sitting in the car mainly reflect the pleasure drivers who only make a brief stop.

The only "facilities" available on this section of the road are the tea and ice-cream vans parked at Langden most weekends, thus the demand for basic amenities is not surprising. However, it does reflect the expectations of many of the visitors; if the site continues to be used as a picnic place some toilets would be desirable, especially in view of the fact that the stream feeds a reservoir.

Table 6.7 Facilities Required by Respondents

	Beacon Fell	Trough of Bowland
Toilets	14.8%	35.6%
Car Parks	2.1%	5.4%
Litter Bins	1.7%	5.4%
Picnic Tables	1.5%	5.7%
Cafe	13.7%	3.3%
Sports facilities	3.6%	2.1%
Information	4.6%	1.5%
Seats	0.9%	1.2%

It is clear that those using the Trough road as a picnic site would like the same facilities as are already available at Beacon Fell, and fewer would make no change (53%). The reduced demand for a cafe reflects the fact that tea and ice-creams are available, but the emphasis of the demand for other facilities suggests a significant number of the CPT rather than the more self-reliant WT.

The majority of those contacted stopped for between one and four hours (62%), with 15% stopping longer than this. However, as noted, short stop visitors may be underrepresented. A large proportion of Trough visitors did stop somewhere else in the day (61%). This shows the importance of the road for pleasure drivers making several short stops, but also reflects the lack of facilities, many visitors making a tea and toilets stop on the way home. Again, the vast majority of visitors said they intended to return.

Turning to the socio-economic characteristics of the visitors, it is interesting that there are no significant differences between the two sites. The Trough respondents also tend to be men in the 25 - 64 age group. There is an even larger proportion of managerial and professional workers (30%), and slightly fewer in the skilled working class, but otherwise the breakdown is much the same.

A summary profile for the Trough of Bowland produces a group of adults with children, who have travelled from 11 to 20 miles away, although their round trip may be 50 to 100 miles, probably taking in a stop at a cafe on the way home. They travel in their own car, and set out to visit the Trough that day. They know the area well, and have visited the Trough road several times before. Their visit forms part of a general day out, but they intend to have a picnic in the valley. They are attracted by the scenery, particularly the sections with a stream. They like the peace and quiet; nevertheless they expected it to be quite busy, and the crowds do not bother them. They will walk and picnic while in the valley, and the children will play games. They would like there to be toilets and might use other picnic site facilities if provided. They will stay for two to four hours and intend to return.

Overall the similarity of the two data sets is remarkable, the only significant differences being found in the longer distances travelled to the Trough of Bowland and the balance of walking or picnicking as the main activity. Although more people gave picnicking as the reason for their visit to Beacon Fell in the summer, the similarity between the proportion actually having a picnic while on site in Easter and summer suggests that this is not simply a seasonal variation.

Thus, it would appear that Beacon Fell is successful in attracting walkers, but less so for the more passive recreationists. It is interesting that there is a greater experience of freedom on the highly planned site. There was a greater awareness of crowding on Beacon Fell, but few of the visitors seemed particularly bothered by the numbers. It seems that the Trough of Bowland is fulfilling a similar function to Beacon Fell; it also has a strong regular clientèle and, in spite of the lack of facilities, many visitors use it as a long-stop picnic site. The requests for facilities give further evidence of overlap, the main differences being the greater demand for toilets, litter bins, picnic tables and car parks at the Trough, where there are none of these, and the greater demand for a café on Beacon Fell, where the nearest source of refreshments is off the site.

III Site Function

Site function may be indicated by the association of activities and the intention of visitors. The relationships were tested by cross tabulations using the Chi square Statistic (Table 6.8). In some cases where there were insufficient responses in one category, it was possible to group the categories, e.g. Question Seven - information services and newspapers - were amalgamated to give the single category of publicity. Three composite variables were created from the responses given to the open questions.

(i) Activity Group:

1)	Active	walking (games)
2)	Passive	sitting in or out of the car, picnicking, watching gliders, etc.
3)	Interest	hobby, nature study, bilberry picking

Walking was given priority over all else, with picnicking as second priority. The length of the "walk" was not specified, although 90% of the visitors to Beacon Fell were classified as active by this means, observation showed that some of the walks were very short.

(ii) Features Liked:

1)	Natural	views, woods, quiet, air
2)	Developed, semi-natural	walks, variety, freedom
3)	Developed, artificial	information centre, facilities, well maintained, accessible

The distinction here was based on the association by many people of "freedom" with children's games etc., and "walks" with nature trails and surfaced footpaths

(iii) Additional or New Facilities

1)	Improved access	roads, car parks, etc.
2)	Developed	toilets, sports facilities, cafe, seats, etc.
3)	None	

There is some difficulty in comparing Beacon Fell with the Trough of Bowland as the facilities are complementary, what is provided at one is not available at the other. Thus, the response "none" at Beacon Fell does not necessarily indicate a "wilderness" type who positively dislikes the trappings of mass recreation, but may simply reflect a visit when the existing facilities were seen to be quite adequate.

The relationships indicated in Table 6.8 must be interpreted with care. In some cases the difference is due to a "positive" association, thus people who give pleasure-driving as the main reason for their visit also tended to stop elsewhere on the same day (STOPS x RDRIVE χ^2 9.88 (Beacon Fell), 9.84 (Bowland), both significant at 0.001). In other cases the difference is due to a "negative" association, thus people who had a picnic on site were less likely to stop elsewhere (STOPS x APICNIC χ^2 = 6.89 (Beacon Fell), 13.05 (Bowland), both significant at 0.01) (See Table 6.9)

Table 6.8 Cross Tabulations Showing Significant Relationships for either Beacon Fell or the Trough of Bowland

		Beacon Fell			Trough of Bowland		
Variable 1	Variable 2	χ^2	df	probability less then	χ^2	df	probability less than
VISITS	ORIGIN	69.59	9	0.001	19.85	6	0.01
INFO+	ORIGIN+	89.69	9	0.001	29.63	6	0.001
RDRIVE	ORIGIN+	20.13	4	0.001	not significant		
RWALK	ORIGIN+	12.03	4	0.05	"	"	
VISITS	INFO+	90.51	9	0.001	invalid		
RDRIVE	STAY	62.07	5	0.001	112.98	5	0.001
RPICNIC	STAY	48.26	5	0.001	44.75	5	0.001
RDAYOUT	STAY	43.15	5	0.001	52.72	5	0.001
RWALK	STAY	14.92	5	0.05	12.52	5	0.05
RHOBBY	STAY	13.53	5	0.05	invalid		
AWALK	STAY	24.09	5	0.001	not significant		
APICNIC	STAY	120.22	5	0.001	86.81	5	0.001
AGAMES	STAY	22.23	5	0.001	27.9	5	0.001
ANATSTUD	STAY	16.90	5	0.01	24.35	5	0.001
ASATINCR	STAY	not significant			19.37	5	0.001
STOPS	RDRIVE	9.88	1	0.01	9.84	1	0.01
GROUP	AGAMES	45.11	2	0.001	81.59	2	0.001
STOPS	APICNIC	6.89	1	0.01	13.05	1	0.001
APICNIC	AWALK	5.05	1	0.05	6.02	1	0.05
ANATSTUD	AWALK	not significant			7.2	1	0.01
ASATINCR	AWALK	57.83	1	0.001	not significant		
ASATOUT	AWALK	not significant			6.6	1	0.05
AGAMES	APICNIC	12.85	1	0.001	7.1	1	0.05
ASATINCR	APICNIC	not significant			17.34	1	0.001

ASATOUT	APICNIC	not significant			8.45	1	0.01
ASATINCR	AGAMES	"	"		10.89	1	0.001
LQUIET	LVIEWS	"	"		11.53	1	0.001
LFREEDOM	LVIEWS	8.83	1	0.01	7.29	1	0.01
LFREEDOM	LQUIET	4.03	1	0.05	not significant		
LFREEDOM	LAIR	not significant			3.9	1	0.05
RDRIVE	ACTGP	33.29	3	0.001	not significant		
EDUCAT+	NFACILS	not significant			18.11	4	0.01
EDUCAT+	LIKES	"	"		22.27	4	0.01
ACTGP+	LIKES	15.35	2	0.001	not significant		

\+ Recoded variables:

ORIGIN: Beacon Fell 0 - 10, 11 - 20, 21 - 30, 31 + miles
Trough of Bowland 0 - 20, 21 - 40, 41 + miles

INFO: Roadsigns, Friends, Local knowledge, Publicity
(newspapers, talks, information centres)

EDUCAT: Less than 16, 16 - 18, more than 18 or continuing

ACTGP: Active, Passive (including interest)

NB: PREFIXES R = Reason
A = Activity
L = Likes

Table 6.9 Frequency Distribution for those giving pleasure driving as the main reason for the trip, those stopping elsewhere on the same day, and those having a picnic on site: Trough of Bowland

Observed Frequency (expected under the null hypothesis of no significant relationship between variables)

(i)

		Stops		
		Yes	No	Total
Drive	Yes	50 (39)	14 (25)	64
	No	152 (163)	115 (104)	267
	Total	202	129	331

$\chi^2 = 9.84$ df = 1

(ii)

		Stops		
		Yes	No	Total
Drive	Yes	136 (150)	110 (96)	246
	No	66 (52)	19 (33)	85
	Total	202	129	331

$\chi^2 = 13.05$ df = 1

The association between origin and both the number of previous visits and the source of information is interesting; it shows that new visitors tended to come from within eleven to thirty miles, a typical "half day" distance, and their main source of information was roadsigns, although personal recommendation was also important (see Table 6.10). As might be expected, those who visit the site frequently rely less on roadsigns and more on their own and their friends' memories; they also tend to live closer to the site. No significant association was found between intention to visit and these variables; so isolation of a "site-free" group is not possible. There is some evidence of a group available for filtering in the importance of roadsigns for new visitors, but the existence of such a new group at the Trough of Bowland suggests that a filtering strategy may not be operating successfully. The relatively poor showing of the publicity services suggests room for improvement here,* if there is the desire to manipulate site choice.

Certain activities were found to be frequently associated on both sites, thus the picnic parties tend to engage in many other activities in the course of a relatively long stay (more than two hours). There is a tendency for walkers to make a shorter stop (less than two hours) and they are less likely to record other activities. The pleasure drivers make the shortest stops, and their main "activity" while on the site is sitting in the car.

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* The inclusion of Beacon Fell in the suggested routes of the AA book "No Through Road" probably led to an increase in new visitors to the site in the seasons following publication (1976 and 1977)

Table 6.10 Frequency Distributions for source of information, number of previous visits and origin

(a) Beacon Fell Observed frequencies (expected under null hypothesis of no significant relationship between variables)

	Visits				
INFO	None	1 or 2	3 to 10	10	Total
Roadsigns	29 (20)	19 (17)	29 (30)	11 (22)	88
Friends	62 (39)	42 (30)	55 (60)	16 (43)	175
Local Knowledge	19 (51)	33 (44)	85 (79)	93 (56)	230
Publicity	7 (8)	7 (7)	11 (12)	9 (8)	34
Total	117	101	180	129	527

$\chi^2 = 90.51$ df = 9

	Visits				
ORIGIN	None	1 or 2	3 to 10	10	Total
0 - 10	27 (48)	30 (41)	74 (73)	84 (53)	215
11 - 20	59 (54)	52 (46)	92 (83)	39 (59)	242
21 - 30	21 (11)	14 (9)	7 (16)	6 (12)	48
31 + miles	10 (5)	5 (4)	7 (8)	0 (5)	22
Total	117	101	180	129	527

$\chi^2 = 69.59$ df = 9

Table 6.10

(a) Beacon Fell (continued)

	INFO				
ORIGIN	Roads	Friends	Local Knowledge	Publicity	Total
0 - 10	15 (36)	57 (71)	136 (94)	7 (14)	215
11 - 20	44 (40)	92 (80)	85 (106)	21 (16)	242
21 - 30	20 (8)	18 (16)	7 (21)	3 (3)	48
31 + miles	9 (4)	8 (7)	2 (10)	3 (1)	22
Total	88	175	230	34	527

$\chi^2 = 89.69$ df = 9

(b) Trough of Bowland Observed frequencies (expected under H_o)

	Visits				
INFO	None	1 or 2	3 to 10	10	Total
Roadsigns	29 (14)	12 (12)	19 (22)	6 (19)	66
Friends	28 (20)	18 (16)	22 (31)	21 (31)	94
Local Knowledge	11 (34)	25 (29)	62 (55)	66 (47)	164
Publicity	1 (1)	3 (1)	2 (2)	1 (2)	7
Total	69	58	110	94	331

Chi square test invalid

Table 6.10

(b) Trough of Bowland (continued)

	Visits				
ORIGIN	None	1 or 2	3 to 10	10	Total
0 - 20	29 (35)	27 (29)	51 (56)	61 (48)	168
21 - 40	25 (26)	23 (22)	44 (41)	31 (35)	123
41 + miles	15 (8)	8 (7)	15 (13)	2 (11)	40
Total	69	58	110	94	331

$\chi^2 = 19.85$ df = 6

	INFO				
ORIGIN	Roads	Friends	Local Knowledge	Publicity	Total
0 - 20	22 (34)	39 (48)	105 (83)	2 (4)	168
21 - 40	33 (25)	37 (35)	49 (61)	4 (3)	123
41 + miles	11 (8)	18 (11)	10 (20)	1 (1)	40
Total	66	94	164	7	331

$\chi^2 = 29.63$ df = 6

The relationships of features liked suggests a distinction of those appreciating the scenery and the quiet from those liking "freedom"; this suggests a use of the term freedom to cover the more active pursuits. The relationship of games and group type is not surprising, as this relates to children in the party.

Some differences between the sites can be seen, although in some cases the tests became invalid due to the small numbers occurring in the subsets. The relationship of reason for the trip and origin is not so pronounced at the Trough of Bowland, probably because everyone has to travel further to reach that site. The exclusive walking visits which are a feature of Beacon Fell are not so evident in the Trough, reflecting the smaller range of opportunities here; in the Trough walking is more likely to be combined with other activities in a picnicking visit of some hours. The fewer people experiencing "freedom" here may also in some way reflect the limitations on walking.

The relationship of the composite variables was a little contradictory, possibly reflecting the danger of simplifying discrete categories. On Beacon Fell, the group giving greatest weight to the natural features was the "passive" visitor, while the relationship of education and likes showed a greater proportion of those in the shorter schooling categories listing the natural features on both sites. This may be due to the way the features are grouped, the more active people frequently listing the "walks" among their likes; in both cases those giving no preference were excluded from this test.

It is interesting that the people in the Trough appear to be less sensitive to crowding than those at Beacon Fell, and few saw the tea and ice-cream vans as incongruous. Comparing the two sites on the three composite variables produces the following result:

Activity Group	$\chi^2 = 148.2$	df = 2	Sig. 0.001
Features Liked	$\chi^2 = 22.05$	df = 2	Sig. 0.001
New Facilities Wanted	$\chi^2 = 3.52$	not significant	

Thus the visitors to Beacon Fell are more "active" and more likely to like the "artificial" developments, but in terms of the facilities demanded there appears to be no significant difference between the two sites (the contradiction of toilets v cafe being absorbed in the same category).

Thus the two sites appear to be functioning in a similiar, if complementary way. Beacon Fell has more medium-term walkers in its visitor group, with picnicking as a secondary activity. In the Trough, the principal function appears to be that of picnic site, although it should be remembered that the sampling technique may lead to an underestimate of the secondary function, pleasure driving. There may also be a slight difference with the season of the survey, as walking and pleasure driving operate over a longer season than picnicking. Just as the summer survey on Beacon Fell picked up more picnickers than the main survey at Easter, an Easter survey in the Trough may pick up more pleasure drivers than shown in the main survey in the summer.

Comparing the two sites against what might be considered characteristic of the "typical" wilderness or Country Park produces interesting results (Table 6.11). Beacon Fell has been designed as an informal recreation site, and the varied opportunities for walking contribute greatly to its

Table 6.11 Characteristics of "typical" visitors

	Typical CPT	Beacon Fell (av.)	Trough of Bowland (av.)	Typical WT
ORIGIN	less than 20 miles	less than 20 miles	11 - 30 miles	more than 30 miles
INTEND to visit one site	No - anywhere in locality	Yes - must set out for Beacon Fell	Yes - must set out for Trough of Bowland	Yes - to wilderness area
VISITS	Few to sites with facilities	Many to this site	Many to this site	Many to wilderness
INFO	Publicity, roadsigns	Friends/local knowledge	Friends/local knowledge (roadsigns)	Previous knowledge
REASON	Day out; picnic	Walk (picnic)	Day out; picnic	Walk
LIKES	Facilities; freedom	Scenery, walks; freedom	Scenery, quiet, stream	Scenery, quiet
Activity Group ACTGP	Passive	Active	Passive	Active
Facilities wanted	Developed	None (NB: basic fac. are provided)	Developed	None
Average STAY	half day	half day	full day	full day
Other stops	No	No	Yes	No
GROUP	Family, with young children	Family, with young children	Family, with young children	Adults, with older children

popularity. The Trough of Bowland cannot compete on this function, so it may be said that Beacon Fell is successfully filtering "walkers". However, the comparison suggests that the "typical" visitor found at the Trough of Bowland still shows many characteristics of the CPT, the main variations being the slightly longer trip length and the willingness to do without facilities for the sake of the scenery. In this case, the big scenic draw is the stream, not the most typical feature of a moorland wilderness, but frequently mentioned by the long-stay picnickers. Thus, many of those listing scenic features as their main reason for choosing this site can still be considered to be "site-free", as it is the combination of attractive features offered rather than the specific location that is the draw. A similarly endowed picnic site, with basic facilities, would probably prove more attractive for many of these visitors.

IV Site Description

Having examined the characteristics and activities of the visitors to the two sites, the next question to consider is their interpretation of the resources available. An indication of site perception and interpreted function (i.e. what people think the place is for) may be gained by study of the descriptive terms the visitors employ (see Appendix V (b)). Visitors were asked to give their reactions to the site at the time of contact; it is not possible to exclude the influence of past experience for frequent visitors, and memory, for those completing the questionnaire on returning home. The respondents could check as many words as seemed appropriate, and most used at least ten (20% of the total). The proportion of times each word was checked is given in Appendix VII. Analysis of this information gives an impression of the visitors' interpretation of the sites, an important consideration in designing sites for specific functions.

(a) Total Scores on Check List

The scores give an impression of the image of the site, in both cases related to a visit at a fairly busy time. One problem in this approach is that interpretation may vary with the mood and expectation of the visitors. Once committed to a stop, there may be a tendency to underrepresent faults, perhaps to justify the time spent on the site. A particular problem was found in the reaction to crowding. Few checked "crowded" in spite of obvious congestion in some places; this may reflect an unawareness of or tolerance of crowds, but some visitors seemed to be influenced by not wishing to appear selfish. When questioned, many people indicated some regret over the number of others present, but when answering a direct question, they usually opted for "all right", reluctant to criticise others' right to enjoy the same resources.

Taking the responses as a whole, there is a similar pattern in the choice of words used to describe both sites (Figure 6.4). The most frequently used words in both cases are natural, healthy and pleasant, with such words as boring, forbidding, monotonous, tense, ugly and unpleasant being hardly, if ever, used. The most frequently used words are substantially the same (see Table 6.12), excepting maintained (52.2% at Beacon Fell) and undeveloped (29.6% at the Trough of Bowland).

This would suggest that the general impression given by both sites is very similar. The differences between the scores are interesting, possibly indicating a degree of distinction of the two sites. Due to the problem of sampling, differences of less than 5% cannot be considered significant (see Chapter Three), however many differences greater than this do occur (see Table 6.13).

Thus, Beacon Fell was seen to be significantly more accessible, educational, maintained, organised, safe and tidy than the Trough of Bowland. The latter was found to be more beautiful, quiet and undeveloped. This should not be taken as a direct comparison, as the respondents were not asked to evaluate both sites; the comparison is made on the basis of the other data in the questionnaire, which suggests that the people have a similar background in terms of their socio-economic and recreational characteristics.

Direct comparison of the sites is further complicated by the different resources available, but some interesting relationships are indicated. Thus, the coniferous plantations of Beacon Fell are seen to be almost as natural as the moorland of the Trough, and slightly more open. The Trough has the edge on beauty, and is found to be

Figure 6.4 Responses to Check List

Table 6.12 Words used by more than 20% of respondents to describe each site

Beacon Fell		Trough of Bowland	
Healthy	82.5%	Natural	89.1%
Natural	81.6%	Pleasant	73.4%
Pleasant	78.2%	Healthy	71.9%
Accessible	75.0%	Beautiful	69.8%
Tidy	61.9%	Peaceful	65.0%
Peaceful	57.5%	Accessible	58.6%
Open	55.6%	Unspoilt	57.4%
Relaxed	54.3%	Relaxed	56.2%
Safe	52.2%	Open	52.6%
Beautiful	51.8%	Inviting	44.1%
Unspoilt	50.5%	Quiet	41.4%
Educational	43.8%	Pretty	40.5%
Friendly	41.9%	Tidy	37.2%
Inviting	40.6%	Safe	28.4%
Quiet	29.8%	Friendly	25.7%
Pretty	24.3%		
Stimulating	23.0%		

Table 6.13 Site Description: distinction of sites using words where the difference was more than 5%

(a) Beacon Fell scoring more than Trough of Bowland:

	Beacon Fell	Trough of Bowland	Difference
Maintained	52.2%	7.9%	44.3%
Tidy	61.9%	37.2%	24.7%
Safe	52.2%	28.4%	23.8%
Educational	43.8%	24.5%	19.3%
Organised	18.0%	0.3%	17.7%
Accessible	75.0%	58.6%	16.4%
Friendly	41.9%	25.7%	16.2%
Developed	8.5%	0	8.5%
Exposed	19.7%	12.4%	7.3%

(b) Trough of Bowland scoring more than Beacon Fell:

	Beacon Fell	Trough of Bowland	Difference
Undeveloped	9.5%	29.6%	20.1%
Beautiful	51.8%	69.8%	18.0%
Pretty	24.3%	40.5%	16.2%
Quiet	29.8%	41.4%	11.6%
Remote	9.5%	18.4%	8.9%
Natural	81.6%	89.1%	7.5%
Peaceful	57.5%	65.0%	7.5%
Unspoilt	50.5%	57.4%	6.9%
Lonely	3.2%	10.0%	6.8%
Big	11.4%	16.6%	5.2%

more peaceful in spite of the busy road. Both sites were found to be very healthy, although this probably represents the idea of getting out of the house, rather than the fact of getting out of the car. The "friendliness" of Beacon Fell may be due to the more intimate enclosure of the car parks and picnic sites, but the welcome by the Warden was particularly mentioned by many regular visitors.

(b) Word Association

The initial breakdown using the total score gives the pattern of associations (Figure 6.5). The diagonal through the diagram shows the similarity of scores for concepts such as beauty and naturalness. However, this is taking the total score for each site, and does not relate the descriptions to individuals.

A further analysis was made to seek common word groupings, i.e. words that were frequently used together by the same respondent. The division was made by an association analysis technique based on the highest chi square of all possible pairs of words. For both sites three words showed a strong positive association: natural, healthy and pleasant. Thus, many people linked these three concepts when describing the sites. Other links varied slightly with site (see Figure 6.6).

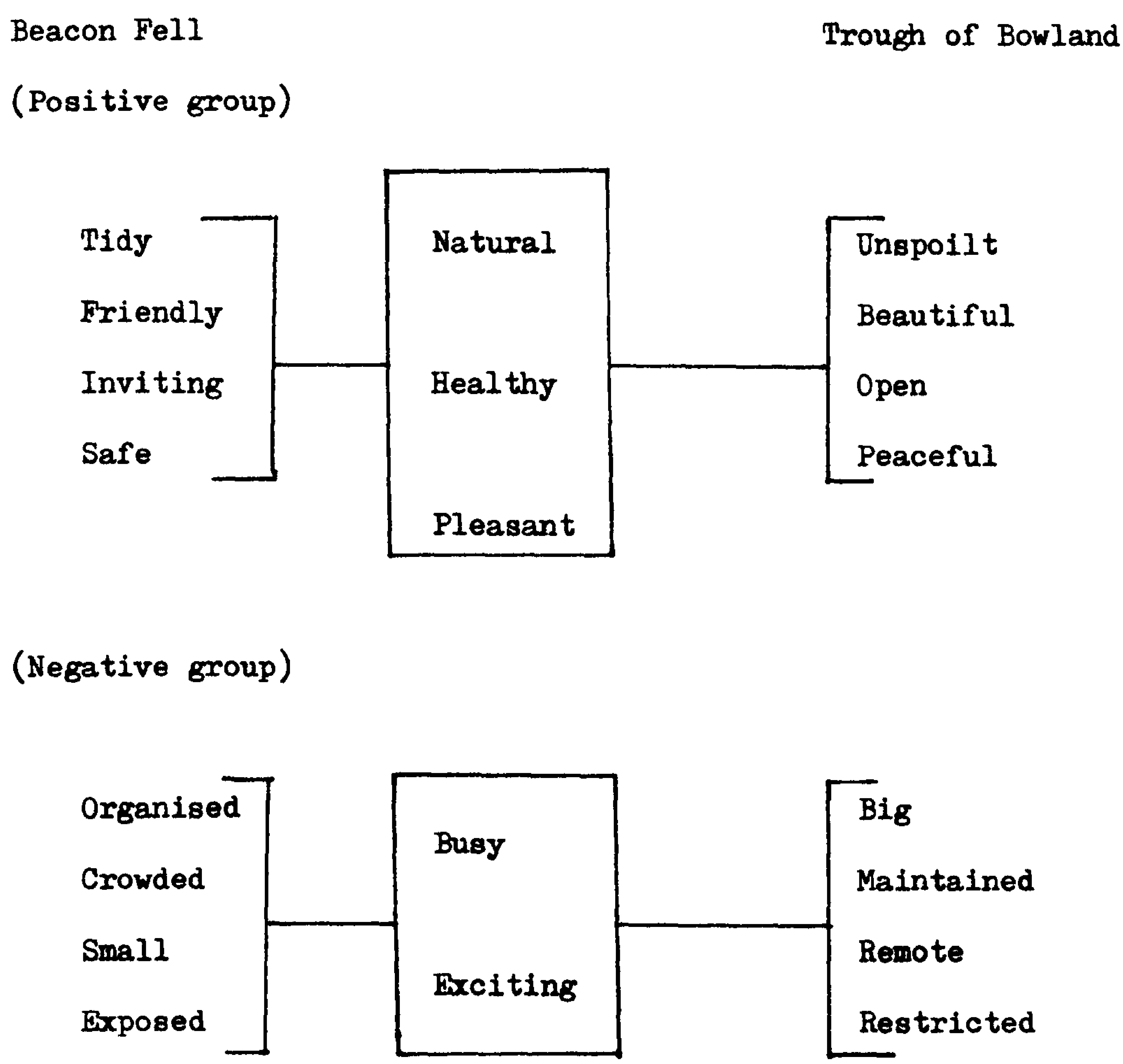
Secondary groupings showed some differences for site. At Beacon Fell, the concepts of tidy, friendly, inviting and safe showed strong associations; whereas at the Trough of Bowland unspoilt, beautiful, open and peaceful were linked. A "negative" grouping was also found, with words used by the more critical visitors. Further groupings were less useful, as they were made up of words that were rarely used.

Figure 6.5 Word Associations by Total Scores (% of Time Used)

Beacon Fell

Trough of Bowland	10%	10-29.9%	30-49.9%	50-69.9%	70% +
10%	words scoring less than 10% excluded	crowded organised	maintained		
10 - 29.9%	lonely striking	big, busy, exciting, exposed, remote, stimulating undeveloped varied	educational friendly safe		
30 - 49.9%		pretty quiet	beautiful inviting	tidy	
50 - 69.9%			relaxed unspoilt	open peaceful	accessible
70%+					healthy natural pleasant

Figure 6.6 Word Associations



Two factors will influence the choice of descriptive words: the characteristics of the site, and the characteristics of the visitor. The breakdown is interesting, suggesting that the immediate impact of the two sites is similar, but that the detail (shown in the secondary groupings) is different. The "positive" and "negative" groups may reflect different groups of visitors, one seeing Beacon Fell as natural, inviting and safe, the other seeing it as busy, crowded and organised. This may be an indication of the visitor types hypothesised, but it was not possible to test this division further using the score on individual words, as the number of respondents using the negative combinations was insufficient to form a viable sample.

(c) Natural and Attractive Features

An attempt was made to overcome the problem of the use of individual words by assessing the performance of the two sites on a standardised scale of attractiveness for informal recreation and for naturalness. The check list was given to an independent sample of subjects*, who were asked to group the words into categories:

(i) Attractiveness (1) Features attractive for an informal recreation site

(2) Features considered unattractive for an informal recreation site

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* The sample was made up of ten people who said that their "ideal" countryside site would be completely untouched (WT), and ten who said they would look for a place offering at least basic facilities (toilets and off the road parking) (CPT).

(ii) Naturalness (1) Features characteristic of natural landscape
(2) Features considered unnatural.

The responses were amalgamated to give four groups of words that were placed into the same category by at least 85% of the sample (see Table 6.14). A composite score was computed for each site by taking the mean response (total %) on each construct from the questionnaire results.

	Beacon Fell	Trough of Bowland
Natural	33.8%	40.3%
Not natural	10.2%	4.4%
Attractive	37.6%	41.8%
Unattractive	2.9%	2.8%

It is not surprising that both sites score higher on the attractive features than the less attractive, as they are both prime countryside recreation sites, and the scoring was based on the reaction of people who had opted to spend some time there. The two sites show a similar range of results, and the only significant difference is on the natural scale, where a Wilcoxon Matched-Pairs test showed a significant difference between the scores for the 18 key words ($T = 27$). Thus, measured against an ideal, the Trough of Bowland was considered to be significantly more natural than Beacon Fell; however both sites show a mean score of less than 50 (potential maximum 100).

Table 6.14 Words consistently categorised by at least 85% of a test group n = 20

Attractive Features	Unattractive Features	Natural Features	Unnatural Features
Accessible	Artificial	Beautiful	Artificial
Beautiful	Boring	Challenging	Busy
Empty	Busy	Empty	Commercialised
Exciting	Commercialised	Exposed	Crowded
Friendly	Crowded	Healthy	Developed
Healthy	Dangerous	Lonely	Enclosed
Inviting	Forbidding	Natural	Maintained
Natural	Hostile	Open	Noisy
Open	Monotonous	Peaceful	Organised
Peaceful	Noisy	Pleasant	Restricted
Pleasant	Restricted	Pretty	Spoilt
Pretty	Spoilt	Quiet	
Quiet	Tense	Relaxed	
Relaxed	Ugly	Remote	
Safe	Unpleasant	Stimulating	
Stimulating		Striking	
Striking		Undeveloped	
Undeveloped		Unspoilt	
Unspoilt			
Unusual			
Varied			

Maximum scores:

ATTA = 21	DETRA = 15	NATIE = 18	NOTNAT = 11

V Definition of Visitor Types

It has been suggested that countryside visitors might be classified along a scale with extremes that may be termed the Country Park Type (CPT), and the Wilderness Type (WT). A clear-cut distinction between the two would be artificial, as expectations and reactions vary with mood and circumstances. However, some consistency within a range of responses might be expected for individual visitors. Much hierarchical planning, and particularly the idea of filtering, has an element of divisionist thinking in it, so it is worth examining the evidence for definition of visitors by types.

There are two possible ways of approaching the problem. One would involve in-depth interviews with a group of people to establish the precepts determining site choice. The sample would have to be large to cover all possible variations, producing sufficient respondents in the various categories. The main problem with this approach is that it deals with stereotyped behaviour, not necessarily reflecting the reality. It is possible that many who declare the desire for a "wilderness-type" experience, in fact would happily accept a park because of the restrictions of particular circumstances.

A second approach is to consider the visitors who actually use different sites, under the general hypothesis that those found in a Country Park will be predominantly CPT, and those found in the more open areas will approach the WT. A major difficulty here concerns the choice of sample site. Although a Country Park is precisely defined by designation, the examples vary in character. Beacon Fell is close to the original description with the ideal countryside setting, many more recent examples show many features of urban parks. Wilderness is a concept not normally applied to Britain, but in this context may be used for the open, expansive moorlands. In this survey, the Trough of Bowland was taken to represent the wilderness end of the scale, but although the scenery of the central section is worthy of the title, the developments along the road and multiple function complicate the analysis.

(a) Recreation Group by Indicator Variables (Likes and New Facilities)

An initial attempt was made to identify recreation groups by their activity and the features of the site particularly liked. A new variable was defined:

Recreation Group	1)	WILD	LIKES = 1, NFACILS = 3
	2)	MID	(not 1 or 3)
	3)	PARK	LIKES = 3, NFACILS 1 or 2

The following breakdown was produced:

		Beacon Fell	Trough of Bowland
Recreation Group	1)	61 (17.5%)	69 (20.8%)
	2)	266 (76.2%)	250 (75.5%)
	3)	22 (6.3%)	12 (3.6%)

It can be seen that there is a slight bias in the expected direction, with more "wild" at Bowland and more "park" at Beacon Fell, but the differences are not significant. Attempts to relate the division to measures of crowding and activity produced no significant result. It may be that the function of the two sites is so closely related that it is unrealistic to try to define recreation groups in this way; this variable is certainly not sufficiently refined to pick up the differences that do exist. Thus an alternative approach was tested, using the site descriptions.

The constructs of attractiveness and naturalness were derived to indicate the characteristics of the two sites, but they may also be used to assess individual respondents. It would be expected that someone tending towards the WT end of the scale may have a more critical judgment of the unnatural and detracting features of a landscape; they may see surfaced footpaths and coniferous plantations as unnatural features, or tea vans as signs of commercialisation, thus yielding a higher score on the scales measuring unattractive or unnatural features. On the other hand, those tending towards the CPT may be more easily impressed by natural features and appreciate some developments, thus scoring higher on the scales measuring attractive and natural features. If this hypothesis is valid, then an evaluation for each respondent may be used to classify them along the scale.

(b) Discriminant Analysis of Visitor Groups

Under the hypothesis that Beacon Fell and the Trough of Bowland do represent distinctly different types of recreation site, a discriminant analysis was carried out to separate the total set of respondents on the basis of their interpretations of the sites. 'The mathematical objective of discriminant analysis is to weight and linearly combine the discriminating variables in some fashion so that the groups are forced to be as statistically distinct as possible' (Nie 1975, 435). If it could be arranged that one group were entirely WT and the other CPT, then the technique could be used to derive discriminant functions with which to classify unknown cases. In this example, the distinction was supposed to exist along the site division, and then the data analysed by these groups. The distribution of the respondents along the scale of the discriminant function should give an indication of the hypothesised relationship.

The statistical breakdown of the analysis is given in Table 6.15, and shows that the variable measuring unnatural features is the most important in sorting out the sites. A "correct" classification of 71.03% of the cases was achieved, leaving 28.97% (or 197 respondents) misclassified. It can be seen that classification was a little more successful in the case of the Trough of Bowland than for Beacon Fell. The breakdown becomes clearer when the plot of the scores is examined (Figure 6.7), where the extent of the central overlap can be seen. This technique classifies on the rule of highest probability, and produces a very clear dividing-line. The plot for the misclassified group shows a normal distribution around this cut-off, emphasising the continuous nature of the change. Thus, the strict division may be more apparent than real for the borderline cases.

Returning to the hypothesised differences in site description by the different groups of visitors, the scale of the discriminant functions may be interpreted as an indication of the range of the WT - CPT continuum. The Trough of Bowland does not represent true wilderness, but only an approach to it (Figure 6.1), thus the WT location would lie at an incalculable distance to the left of the range shown. Beacon Fell provides a satisfactory recreation experience for many groups demanding country settings; the persistent, if small, demand for greater development suggests that it does not meet with all the requirements of the CPT extreme, so the CPT location would lie to the right of the scale shown.

Table 6.15 Results of Discriminant Analysis

Variables:

Mean scores:		Beacon Fell	Trough of Bowland	Total
Attractive features	ATTA	7.9026	8.7674	8.3235
Unattractive features	DETRA	0.4298	0.4199	0.4250
Natural features	NATIE	6.0831	7.2598	6.6559
Not natural features	NOTNAT	1.1175	0.4834	0.8088
Standard deviations:				
Attractive features	ATTA	4.0841	4.4908	4.3074
Unattractive features	DETRA	0.9122	0.9089	0.9099
Natural features	NATIE	3.1978	3.6654	3.4810
Not natural features	NOTNAT	1.2226	0.9827	1.1559

Discriminant Function:

Eigen value: 0.303 Relative % = 100%

Canonical correlation: 0.482 Wilks' Lambda = 0.767

Chi-square 179.061 df = 3 Significant = 0.000

Standardised Discriminant Function Coefficients:

Unattractive features	DETRA	- 1.22697	(ATTA not included at this stage)
Natural features	NATIE	- 0.40107	
Not natural features	NOTNAT	1.53451	

Centroids of groups:

Group 1	Beacon Fell	0.46921
Group 2	Trough of Bowland	- 0.49481

Table 6.15 Results of Discriminant Analysis (continued)

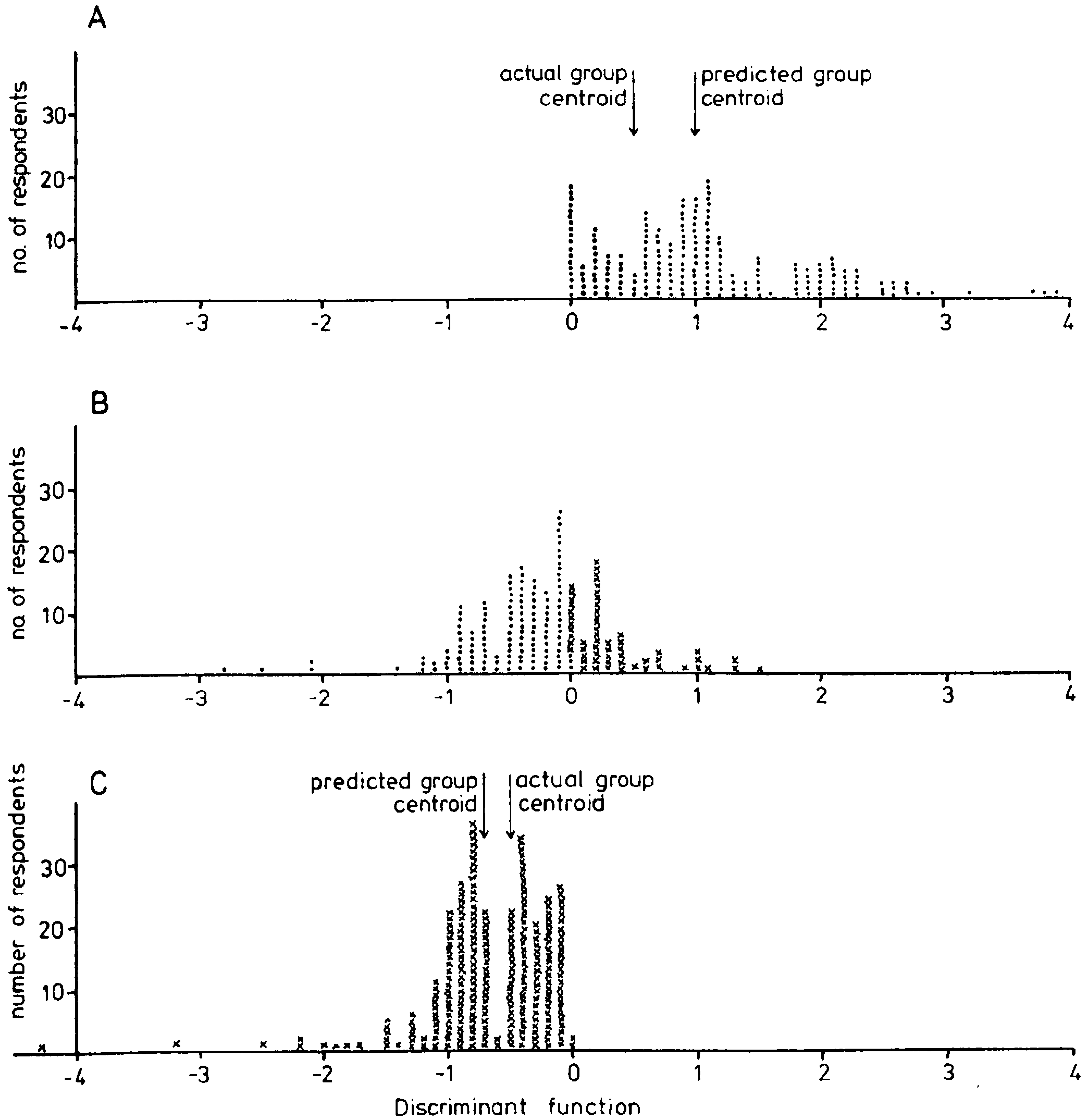
Predicted Results

Actual Group	Number of cases	Predicted Group Membership Group 1	Group 2
1) Beacon Fell	349	211 (60.5%)	138 (39.5%)
2) Trough of Bowland	331	59 (17.8%)	272 (82.2%)

Per cent of "grouped" cases correctly classified: 71.03%

Figure 6.7

DISTRIBUTION OF RESPONDETS BY DISCRIMINANT FUNCTION



A Group I (Beacon Fell) - classified as I

B Undefined Group

C Group II (Trough of Bowland) - classified as II

• Beacon Fell

× Trough of Bowland

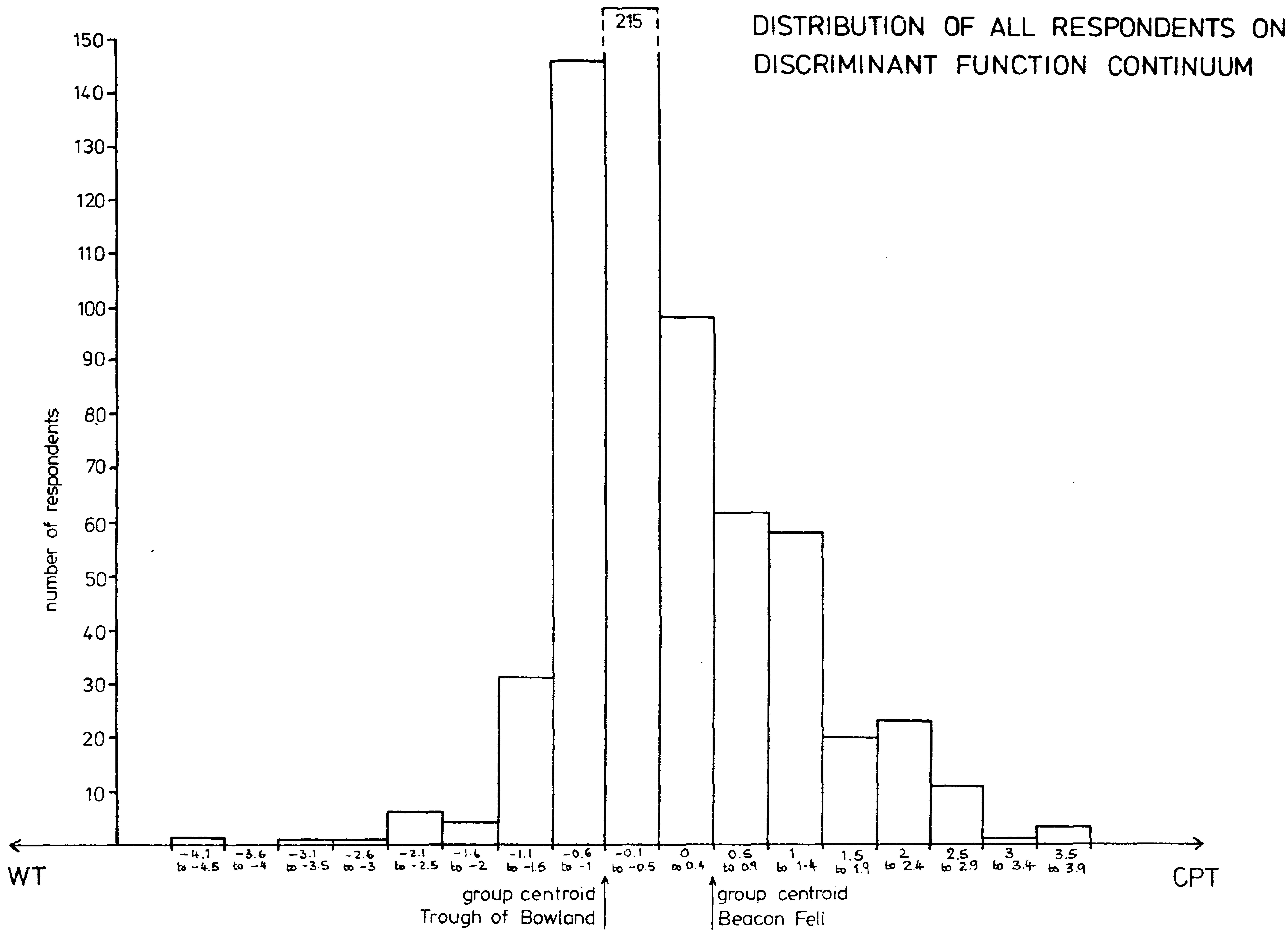
The resulting distribution (Figure 6.8) shows a large central grouping, not surprising in view of the earlier findings indicating an overlap function for the two sites. Thus, the scale depicted probably represents a central section of the WT - CPT continuum, showing that the majority of visitors to these two sites represent neither extreme. The proximity of the group centroids is due to the dampening effect of the opposing contingents.

The definition of a recreation type is not an end in itself, but as an indication of site interpretation and function it may be adopted as a planning tool. Applied to the population as a whole, it may give an indication of the demand for different types of site. It is probably easier (if more expensive) to provide for the CPT; the addition of basic facilities will convert most reasonably attractive and accessible country places into suitable recreation sites. Providing for the WT is far more difficult, as it is the absence of obvious development and people in a beautiful natural setting that is the attraction. In this case, "provision" may concentrate on the attempt to preserve the quiet and natural appearance. If a large number of visitors to such a place are found to be of the CPT, then it may be necessary to consider the site's future. Three approaches may be suggested:

(i) Do nothing - and hope that a build-up of visitors will not swamp the site and cause damage;

(ii) Provide for the CPT, especially if they are the majority, and balance their increased enjoyment against possible scenic damage and the reduced satisfaction of the WT;

Figure 6.8


215
DISTRIBUTION OF ALL RESPONDENTS ON DISCRIMINANT FUNCTION CONTINUUM
number of respondents
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
WT
CPT
-4.1 to -4.5
-3.6 to -4
-3.1 to -3.5
-2.6 to -3
-2.1 to -2.5
-1.6 to -2
-1.1 to -1.5
-0.6 to -1
-0.1 to -0.5
0 to 0.4
0.5 to 0.9
1 to 1.4
1.5 to 1.9
2 to 2.4
2.5 to 2.9
3 to 3.4
3.5 to 3.9
group centroid Trough of Bowland
group centroid Beacon Fell

(iii) Try to encourage the CPT to go elsewhere by providing a suitable filter site, thus preserving the original place for quiet enjoyment.

The first option is the most likely, as it involves no expensive action, but it may result in disappointment for both WT and CPT and environmental damage. The choice of action may well depend on the larger recreation strategy, the quality of the environment and the demands of compatibility.

VI The Importance of Landscape in the Recreation Experience

In the last two sections an analysis of site description has been made, and then used in an attempt to identify groups of visitors. It might be thought that a natural landscape is an essential feature of a countryside recreation trip, but it is clear that it is the perception of the landscape that is the vital factor. Thus a countryside recreation trip may take place wherever the people concerned think they are in the country; some visitors will be quite satisfied in surroundings that are not obviously man-made, others may be more demanding, seeking out a natural wilderness.

The importance of landscape may be judged from two points of view. If there is to be an attempt to provide recreation sites for varied uses, then it is necessary to anticipate the visitors reactions whether the need is to provide a natural-looking but high density site to act as a filter for the wilderness, or to control development to maintain the desired image of an existing site. Attention to landscape may also be important in the development of multiple-use sites, or where there is a need to reconcile recreation use with environmental conservation.

The importance of preserving rare habitats or particularly beautiful landscapes has already been discussed (Chapter Two), but the value to be placed on the countryside as a whole is hard to assess. A dissenting group of The Countryside Review Committee argued against the proposed National Heritage Areas on the grounds that 'in practice it is the settings, rather than the gems, which are at risk' (CRC 1979, par. 213).

In this they agree with an argument put forward by Appleton, that landscape forms a backcloth to human activity (Appleton 1975).

The value of landscape may be hard to assess, but it is no less real for that: 'unspoilt landscapes and the wildlife associated with them are part of our national heritage, of equal importance with the great achievements in the arts, because of the pleasure they give so many people' (Duffey 1967). All countryside recreation is resource-based to the extent that the countryside itself is an important element of the experience; the value of fine landscapes may be partly indicated by the distances people are prepared to travel to reach them.

There have been many attempts to evaluate landscape objectively, some of them related to planning problems. In the particular case of planning for countryside recreation it would be useful to establish the basis on which the public evaluates their chosen location. Appleton argues that vegetation might be considered to be the most important single element in the landscape, 'certainly in the planning of a contrived landscape its manipulation can yield the most conspicuous results' (Appleton 1975, 11). Thus, the reaction of visitors to the vegetation, whether conscious or not, may be of great importance to the success of a recreation site.

The British landscape is composed of a great variety of communities, many owing their existence wholly or in part to man's activities. For recreation, the natural status of a community is rarely an issue; however, the existence of suitable communities for various activities may influence site choice. The average day trip to the countryside may include a scenic drive (a variety of landscapes with the emphasis on views with contrasting elements of human activity), a picnic (a grassy area, backed by trees, and preferably with water in sight), active games if children are in the party (a large area of relatively flat ground, preferably short grass), nature study or short walk (variety of woodland and scrub within a short distance, not too enclosed and preferably with fruit or flowers to pick). The place of the informal day trip and picnic in the British recreation tradition may well be partly a consequence of the ample provision of these requirements in many parts of the country.

The importance of natural communities for recreation is debatable. Most visitors have fairly simple requirements: trees, usually deciduous and not too many; grass, short turf rather than tussock; interesting bushes to give colour and texture, fruit and flowers, but not so many or so prickly as to inhibit movement (Fairbrother 1970). The specific plants or suitability to the environment are apparently rarely considered. This is at once a great asset to management and a great threat to the remaining semi-natural areas. Most visitors do not recognise natural vegetation or rare plants, and why should they, if the background is suitably pretty? However, they will pick rare orchids as readily as bluebells, and probably not distinguish the two.

In contrasting the variables of attractiveness and naturalness it can be seen that the two concepts overlap to a considerable degree (Table 6.16). This would suggest that there is a need (perhaps sub-conscious) for a site for countryside recreation to at least <u>look</u> natural. However, it is apparent that opinion over what looks natural varies considerably. As already shown, 81.6% of all respondents at Beacon Fell considered the site to be "natural", in spite of the dominant landscape feature being coniferous plantations, cut through with footpaths and picnic sites. This would suggest that the majority of these visitors

Table 6.16 Words used to describe attractive features for a recreation site and features of the natural landscape (see p 288)

Attractors	both	Natural
Accessible	Beautiful	Challenging
Exciting	Empty	Exposed
Friendly	Healthy	Lonely
Inviting	Natural	Remote
Safe	Open	
Unusual	Peaceful	
Varied	Pleasant	
	Pretty	
	Quiet	
	Relaxed	
	Stimulating	
	Striking	
	Undeveloped	
	Unspoilt	

at least do not distinguish between different types of landscape element, so that most things green and growing are considered to be natural. This is a very important consideration for the landscape architect. The perceptual capacity of a site can be dramtically increased by the use of trees or "natural" barriers (e.g. the walls at the Sheepfolds picnic site), and screening car parks may help preserve the image of wilderness where sites may be viewed from a distance.

Further descriptions of Beacon Fell show 61.9% regarding the site as "tidy" and 52.2% seeing it as "maintained", both concepts showing a considerable overlap with "natural". Indeed, 37.2% regarded the Trough of Bowland as "tidy", perhaps because the low-growing moorland vegetation looks well "mown" from a distance.

These descriptions are important to landscape design for recreation, and show that it is possible to carry out considerable management operations and still produce a site that meets the requirements of a "natural" setting for many visitors. There are many examples which demonstrate the ready acceptance of landscape change; objections usually come at the planning stage, or in the disruptive operational phase. 'Places which are fortunate enough to have been desecrated by both the forester and the water engineer, such as Thirlmere, Lake Vyrnwy and the Elan Valley, top the list of attractions in the tourist offices' (Appleton 1975, 4). Nevertheless, as Appleton observes, the changes may be accompanied by an alteration in the recreation resource, the lone rambler being replaced by coach-loads of tourists.

As shown in Chapter Five, difficulties arise when natural and semi-natural communities come under trampling pressure. Ultimately, changes will be caused in the vegetation that may alter the whole ecological balance of the habitat. The recognition of damage to natural ecosystems may lead to a call for conservation, perhaps to the extent of excluding visitors. A realistic management plan is needed, that takes account of the value of the habitat, the demand for recreation space, possible compatibility, and so on.

In relating these observations to recreation planning in the countryside, it may be necessary to reassess the concept of nature. The AONBs display a wide range of landscapes, many not "natural" to a purist. Perhaps it is the terminology that is at fault; these are certainly valued landscapes, and their natural status is not really at issue. However, the planning status may be very important in determining practical management.

It has been argued that the preservation of isolated bits of nature by excluding people is of limited value to the population as a whole. Such sites may be vital if a species is threatened, or to allow ecological studies, but a habitat that may only be viewed from a distance over a fence can add little to the experience or satisfaction of the casual visitor. There is a danger that the strict ecologist's approach may risk overlooking the bulk of the "natural" scenery today by dismissing it as artificial. It could be argued that the landscape is a natural response to the continued pattern of management. Perhaps those who admire the natural beauty of a coniferous plantation are more attuned to the modern landscape, as opposed to a purist looking for a survival of the "wildwood". Plantations may bear little relation to the vegetation of five thousand years ago, but they are a most impressive and locally extensive example of the living vegetation today. Protection of the natural heritage needs to include the relevant modern communities, just as industrial and architectural archaeology seeks to preserve fine examples of the working past.

Realistic management and planning objectives should include a rational approach to conservation. It has been shown that multiple use may not always be possible; recreation use is not compatible with the strictest requirements of habitat preservation, and some recreation activities may compete with each other. However, careful management of sites should allow the protection of particularly vulnerable ecosystems, perhaps at the cost of a less valued system elsewhere. Beacon Fell is a good example of a high density recreation site; some damage is inevitable, but in this case the recreation use comes first and a certain amount of change in the vegetation must be accepted. In view of the nature of the background community, excessive concern over vegetation damage would be misplaced. The priority here is to produce a hardwearing surface, "natural" (i.e. growing) if possible, but otherwise artificial. The evidence suggests that such manipulations are readily accepted, indeed welcomed, by the majority of visitors, the range of woodland walks, picnic places and "surprise" views adding to their enjoyment of a natural landscape.

Chapter Seven

CONCLUSIONS

I Summary of Findings

The thesis discusses the functioning of two recreation sites in the Forest of Bowland AONB. The traffic census data for Beacon Fell indicates the trend in participation in informal countryside recreation throughout the decade. The strength of the correlation with the weather conditions is remarkable, but other social and economic factors may also influence the length and frequency of trips. The evidence from the surveys in 1974 and 1975 supports the suggestion of an increased trip frequency with better than average weather, rather than an increase in the total number of participants. Evidence relating car ownership to socio-economic conditions suggests that the increase in the proportion of the population active in this sector of recreation has levelled off, and unless there are background changes influencing the general mobility pattern, further substantial changes are unlikely.

The information on seasonal and diurnal visiting patterns demonstrates the uneven nature of the demand. Countryside recreation is a markedly seasonal activity, probably being more akin to tourism than other forms of recreation in this respect. However, the most exaggerated feature of this pattern is the very high dependence on Sundays and Bank Holidays. This produces a dilemma for the planners. Provision of adequate facilities for the large number of visitors who may come on a fine summer Sunday would result in great over-capacity for the rest of the year. Peak days may occur on as few as six to ten days in the year. One solution to this problem has been tried in some parks, with overflow parking on grass for the peak days, but this may lead to overreaching the physical capacity of other parts of the site. An alternative possible solution would be an adaptation of the "extended season" encouraged at some coastal resorts. In this case, it is not the season that needs to be extended, but the week, or even the weekend. If some of the potential Sunday visitors could be encouraged to make their trips on Saturday, much of the excess could be evened out.

The observation of pedestrian flow around Beacon Fell drew attention to certain sites that were experiencing a disproportionate share of the trampling pressure. Although it was not possible to produce a reliable quantitative expression relating vegetation damage and trampling, the relationship clearly exists. Examination of the different types of disturbance demonstrated the linear nature of trampling pressures, apart from limited sites such as the Summit, where people spread more widely. This observation suggests a possible planning tool, the location of route foci and barriers (preferably in the form of un-inviting but natural looking vegetation) which may be used to regulate pressure on a site, controlling the distribution of visitors to protect vulnerable areas.

The management of paths and picnic places will depend partly on the anticipated pressure and partly on the ecological characteristics. Where heavy pressure is expected on soft ground or steep slopes, some form of all-weather surface to a footpath may be necessary, since mud or a very rough surface rapidly leads to braiding and path widening. Experiments at Beacon Fell have shown that grass seeding is a practical solution in some cases, but the resulting path may not blend in with the background community, thus reducing the landscape difference between surfaced and reseeded paths.

The characteristics of the visitor groups at both sites showed a remarkable degree of correspondence, confirming the impression from observations that many visitors viewed the two places in a similar way. The main function of Beacon Fell was as a site for walking, emphasising the attractiveness of a site providing varied scenery. The continued development of the management plan has concentrated on this function, opening up the "closed" plantations and laying out a variety of new footpaths. Walking opportunities are limited at the Trough of Bowland, and the main site function here is picnicking, with a surprising proportion of summer visitors staying for a full day.

Beacon Fell has been successful in attracting large numbers of visitors, particularly those out for a short walk, but it is questionable how successful it is in terms of filtering picnickers from central Bowland. The presence of so many long-stay picnickers in the Trough of Bowland and the increase in long-term parking observed between 1973 and 1975, is evidence of the demand for picnic places. If there is to be any attempt to preserve the peace and quiet of the landscape in the central areas then additional filtering sites may be necessary, but their location and nature would have to be carefully planned. Developments in the immediate area may only increase pressure, especially if accompanied by advertising. The origin of the visitors and the evidence for through-journeys could be usefully employed in seeking an appropriate relief site. The activities of the CPT group in the Trough would suggest concentration on picnicking facilities for a new site, within a setting that provides the basic features of the Trough scenery, particularly the stream.

The evidence from these two surveys suggests that it may be possible to distinguish the different types of visitor by their interpretations of the site; in this example, the overlap function is emphasised by the lack of clear division. The concept of the WT - CPT continuum may be applicable in planning future sites. If it is intended to reduce the pressure on one site, then locating the target visitors along the scale may indicate the type of site to provide to attract them elsewhere. If it is intended to alter or reinforce one aspect of the functioning of a site, then the range of the visitors along the scale may indicate which groups are underrepresented. In the example of the Trough of Bowland, the range along the scale indicates an overlap function with a "Country Park Type" site, and the presence of a CPT group available for filtering. The range for Beacon Fell indicates the success of the site in creating attractive walking scenery, but also shows that its function for the true CPT may be a little muted.

One remarkable feature of the CPT is their crowd-tolerance. Many of the visitors to both sites not only were not bothered by the crowds, but expected the sites to be busy. This is a great advantage in planning a site for high density use; just as the recreational use of a region may be planned on an hierarchy of sites, so the internal use of a site may be managed in terms of zones of varying density. In the difficult game of balancing supply and demand, the planners have two trump cards to play: certain developments are seen as a definite advantage by many visitors (particularly toilets and off-the-road parking), and most visitors are not practiced in observation of the countryside, and will happily interpret "green" or "growing" as "natural". The presence of the trees is a great asset to Beacon Fell, as they absorb much of the noise and visual impact of so many people. The evidence from the Beacon Fell picnicking survey suggests how the landscape elements and "key attractions" may be manipulated to increase site capacity.

In both the reaction to crowding and interpretation of the landscape, the vegetation seems to be very important. For some it is the specific attraction (e.g. the bilberry pickers on Beacon Fell), for others it is the backdrop vital to create the right context for a countryside trip. However, it is clear that for the majority of visitors, the status of the vegetation (i.e. whether natural or not) is unimportant. The possibility of manipulating landscape features may be an important practical application of these findings; the interpretation of and reaction to the landscape by the visitors will determine, to a large extent, whether multiple use is possible or not.

II Implications for Bowland

In Chapter Two, the importance of attention to basic concepts concerning site requirements, compatibility, location and capacity in planning the development of new recreation resources was stressed. Within the confines of the sites studied, it would appear that Beacon Fell meets with most requirements, although in this case there has been no attempt to combine recreation with other land use. The Trough of Bowland demonstrates some of the problems of conflicting land uses. In theory, there is a good case to be made for reinforcing the filtering strategy to relieve the peak pressure here, preferably by relocating some of the long-term picnickers. In practice, the recreation strategy has been overtaken by the demands of the recession. Although the current structure plan does allow for development of new sites where there is a proven need, emphasis on the urban fringe means that additional facilities are unlikely to be provided near the Trough.

The Beacon Fell Traffic Census is a valuable source of information; in spite of the unfortunate amount of estimation necessary in the last two years, it provides a unique picture of recreation use in a limited area. If this data is to be used to its greatest potential, prompt maintenance of equipment would be well worth-while. The vulnerability of the counter cables to vandalism is unfortunate, and adoption of a more robust mechanism may be advisable (e.g. the pressure-sensitive plates being tested by Nottingham County Council). Such equipment is expensive, but the data provided by consistent, reliable counts is invaluable to research and could contribute greatly to planning and management. The addition of similar counts from other sites would increase the value of extrapolations and predicted relationships. The evidence from this survey provides some justification for not increasing resources, as the growth of the early 1970s has not been maintained throughout the decade. However, it should be remembered that site counts (i.e. monitoring consumption) may be a poor surrogate for demand. A full picture of participation could only be gained by following the site-counts with a home-based survey to monitor demand.

The existence of a regular clientele at both sites suggests that they will continue to experience periodic pressure, subject to the constraints on total participation mentioned previously. It is clear that the visitors contacted were not unduly disturbed by crowding, and were apparently unaware of possible damage to the sites. It is possible that a survey in the peak year of 1976 might have picked up more discontent, but since that time, the drop in overall visiting means that, if anything, the conditions will have improved. Demand for additional facilities is only significant at limited peak periods, thus in view of the current restraints on spending, and more pressing demands in other areas of the county, expansion of resources here would be hard to justify. However, in adopting the "do nothing" strategy, it is necessary to accept that there will be some loss in the potential satisfaction to be derived from sites such as the Trough of Bowland. In this case, user satisfaction could be increased in a qualitative way for a few (by excluding the tea vans and long-stay parking), or in a quantitative way for many (by improving facilities). The acceptance of the status quo is inevitably a compromise, and allows that some loss of satisfaction and physical erosion must be tolerated.

Beacon Fell is a valuable high density site. The vegetation here can absorb a considerable amount of pressure and still adapt to maintain a cover. The sequence of wet years in the late 1970s has given difficulty with mud and some paths are suffering excessive churning. However, the vegetation here is not sufficiently unusual for the addition of species to be regretable, and on the drier areas, where the peat is not too deep, reseeding has been successful. Thus, in the case of Beacon Fell, further maintenance should be undertaken when necessary to allow the high density use to continue. Present projects include extending the Summit paving, paving the steeper sections of the surfaced path from Fell House to the Summit, and ditching the wetter areas. Wood-chip paths through the trees have been successful, but some attention to the higher firebreaks and paths approaching the Quarry is necessary. It is clear that the majority of visitors would see such maintenance as a positive advantage, and not as an interference with the natural vegetation.

At Beacon Fell a management objective exists to convert the coniferous plantations into 'predominantly deciduous woodland of mixed indigenous species appropriate to their situation as quickly and as economically as possible' (Allport 1977, 2). Although such an objective may be ecologically sound and advantageous in terms of wildlife conservation, the evidence suggests that its achievement would not greatly change the image of the site, which is already considered to be natural by the majority of the visitors.

The development of recreation sites should be seen in the context of a regional strategy, with due regard to the possible impact on the landscape. Indiscriminate development of resources may be very damaging to the region as a whole. The forceful marketing approach adopted by the

English Tourist Board has prompted the suggestion of development of any potential resource. A report commissioned by the Board picked out the Trough of Bowland as an area that could be developed, recommending that 'nature trails ... should be prepared ... and that picnic areas and improved signposting for walkers should be provided ... and traffic management schemes should be provided incorporating additional car parking facilities and signposting' (P.A. Management Consultants Limited 1975, 8). It is likely such provision would 'increase the enjoyment that tourists get from the area' but it is doubtful whether it would indeed 'help enhance the area's beauty' (ibid., 8). No site should be developed in isolation, and with regard to one visiting group alone, but as part of an integrated scheme balancing protection and development for the whole region.

III Research Implications

(a) Applications of this Study

The initial aims of this study included assembling a body of information that was sufficiently detailed to allow wider application. The detail of the traffic census certainly encourages extrapolation, but the experience of one site can only give an indication of what may be happening elsewhere. A wider range of studies would be valuable, particularly if it were possible to find comparable information concerning similar sites in different parts of the country. Unfortunately, few authorities have seen the value of monitoring their sites consistently, and the reduction in money and staff available now is likely to result in a cutback in this type of work. It may be possible to construct a predictive model of participation, based on a long run of attendance data, but this would almost inevitably have to assume the continuation of the present trends, unaffected by social or economic change. Such modelling is fraught with dangers, but if the consistent monitoring is not continued, it may become the only way of estimating visitor patterns.

The observations on use of site, particularly those relating to picnicking, provide a useful basis on which to build site design. It is clear that site capacity may be influenced by layout, especially in the use of key attractions and route foci. The range of activities will be influenced by the resources available, but the adoption of landscaping units (bushes, trees, pond, etc.) would greatly increase the perceptual capacity of sites at present offering large open areas for picnicking. The assessment of crowding is very subjective, but given the great crowd tolerance of the majority of visitors to the Country Park type sites, management of fixed features such as car parks, may allow for extreme peak pressure.

The undemanding interpretation of nature adopted by many of the visitors to these countryside sites could prove a great asset in planning. The wealth of existing resources already demonstrates a great variety of landscape design experience. The landscaping should be effectively carried out at all scales, from blending in the smaller site facilities, to concern for the view of the site from afar. Most recreation sites do display the concern of their managers for protecting the landscape, the flexible perception of "nature" expressed by many visitors should allow more scope where necessary for large plans.

(b) Future Research

The pattern of visiting at individual sites seems fairly consistent; in future studies it should be possible to produce a reasonable estimate of weekly and seasonal fluctuations from limited sample counts. The continuation of the annual monitoring would be most valuable, especially if the relationship to the controlling variables could be more clearly defined. The most important need at this stage is to get data for a wider range of sites, so that the trends can be established, or regional divergence discovered.

The difficulties of the abortive Countryside Commission annual counts stemmed largely from the reliance on only four summer Sundays, when the background pattern of use for the trend sites had not been established. As shown, even with a verifiable pattern, it may be dangerous to interpolate from so few records. Problems also occurred due to the effects of averaging results between many sites; it may be more valuable to achieve a complete and reliable count from fewer sites.

The attempt to produce a quantitative expression relating vegetation disturbance and trampling was frustrated mainly by the difficulty of correlating an area count with a point index. If the technique could be refined, and the people counts more closely located, then it may be possible to develop the concept and apply it to the question of vegetation strategies in recreation areas. Identification of such strategies would assist in landscape design, by providing an objective means of evaluating the suitability of the vegetation of an area for potential use. The use of the index could be refined further if the nature of the measure could be independently assessed, particularly by the application of tests to assess the importance of logarithmic or arithmetic evaluation.

The WT - CPT continuum could be applied to both the study of sites and that of their visitors. However, some independent assessment of the characteristics of the WT and CPT would be advisable. The Trough of Bowland shows many features that are not appropriate in the context of the true wilderness, and in some ways Beacon Fell is not typical of existing Country Parks. Two approaches are possible: the use of more "extreme" examples would help to clarify the division between the groups, alternatively an off-site study may be attempted to evaluate preference in controlled situations. In the first case, the danger of a circular argument still exists: if the sites are chosen to represent the extremes (by some preconceived ideas of the researcher) their visitors cannot then be used to confirm the existence of the trend. In the second case, all the problems of large, home-based surveys would be experienced, with the added difficulty of separating unrealistic hopes from real intentions. The experience of those attempting to find objective ways of evaluating landscape counsels caution in this approach. It would seem that the site survey still has the greatest potential: after all, it is our reaction to the landscape in which we find ourselves that will determine the satisfaction derived from an individual recreation trip.

APPENDICES

Appendix I

PLANTS MENTIONED IN THE TEXT

Botanical names and common names as given by Clapham, Tutin and Warburg, Flora of the British Isles, 3rd ed. 1981

Agrostis tenuis	Common bent grass
Anthoxanthum odoratum	Sweet vernal-grass
Asperula cycanchica	Squinancy wort
Calluna vulgaris	Heather; ling
Carex nigra	Common sedge
Cynosurus cristatus	Crested dog's tail
Deschampsia flexuosa	Wavy hair-grass
Dryopteris sp.	Fern
Empetrum nigrum	Crowberry
Epilobium angustifolium	Rosebay willow-herb
Erica tetralix	Cross-leaved heath, bog heather
Eriophorum vaginatum	Cotton-grass; hare's tail
Festuca rubra	Creeping fescue
Galium saxatile	Heath bedstraw
Hedera helix	Ivy
Juncus effusus	Soft rush
J. squarrosus	Heath rush
Larix decidua	European larch
Lolium perenne	Rye-grass
Molinia caerulea	Purple moor-grass

Nardus stricta	Mat grass
Phleum pratense	Timothy
Picea sitchensis	Sitka spruce
Pinus sylvestris	Scots pine
Plantago major	Rat's-tail plantain
Poa annua	Annual meadow grass
Polygala vulgaris	Common milk wort
Primula vulgaris	Primrose
Pteridium aquilinium	Bracken
Rubus fruticosus	Blackberry; bramble
Rumex acetosa	Sorrel
Sphagnum	Bog moss
Taraxacum officinale	Common dandelion
Thymus drucei	Wild thyme
Trifolium repens	White clover; Dutch clover
Urtica dioica	Stinging nettle
Vaccinium myrtillus	Bilberry; whortleberry
V. oxycoccus	Cranberry
Viola riviniana	Common viola

Appendix II

RESULTS OF VEGETATION SURVEY

Summit		Height	Bare Ground	Floristic cover	DI	People
A	1	3	0	1	4	edge*
	3	1	0	1	2	edge
	5	2	0	1	3	edge
	7	1	0	2	3	edge
	9	1	0	1	2	edge
	11	1	0	1	2	edge
	13	1	0	1	2	edge
	15	1	0	1	2	edge
	17	2	1	1	3	edge
C	1	2	0	1	3	edge
	3	2	0	1	3	0
	5	3	0	1	4	3
	7	3	0	1	4	8
	9	1	0	1	2	0
	11	2	0	1	3	0
	13	2	0	1	3	0
	15	1	0	1	2	0
	17	1	0	1	2	edge
E	1	2	0	1	3	edge
	3	2	0	1	3	1
	5	2	0	2	4	12
	7	1	1	1	3	106
	9	1	0	1	2	9
	11	2	0	1	3	9
	13	1	0	1	2	10
	15	2	1	1	4	43
	17	2	0	1	3	edge
G	1	2	0	1	3	edge
	3	4	0	2	6	7
	5	4	1	1	6	59
	7	3	1	1	5	246

		Height	Bare Ground	Floris-tic cover	DI	People	
Summit							
G	9	4	1	1	6	71	
	11	4	1	3	8	43	
	13	3	0	3	6	14	
	15	4	4	1	9	21	
	17	2	0	1	3	edge	
I	1	3	0	1	4	edge	
	3	3	0	3	6	17	
	5	4	1	1	6	92	
	7	4	3	1	8	131	
	9	4	4	3	11	867	
	11	3	2	3	8	43	
	13	2	1	3	6	14	
	15	2	0	1	3	4	
K	1	3	0	3	6	edge	
	3	3	0	3	6	38	clearance
	5	3	1	3	7	75	clearance
	7	4	1	2	7	156	
	9	4	0	3	7	103	
	11	2	0	1	3	8	
	13	3	0	1	4	8	
M	3	4	0	4	8	0	clearance
	5	3	2	3	8	25	clearance
	7	3	3	1	7	90	clearance
	9	2	1	2	5	68	
	11	3	1	1	5	18	
O	3	4	0	4	8	10	clearance
	5	3	3	3	9	16	clearance
	7	3	0	3	6	33	clearance
	9	3	3	3	9	84	
Path A							
A	1	1	0	2	3	edge	
	3	1	0	2	3	edge	
	5	1	0	2	3	edge	
	7	1	0	1	2	edge	
	9	1	0	1	2	edge	

		Height	Bare Ground	Floristic Cover	DI	People
A	11	1	0	1	2	edge
	13	1	0	1	2	edge
	15	1	0	1	2	edge
	17	1	0	1	2	edge
C	1	1	0	1	2	edge
	3	1	0	1	2	0
	5	1	0	2	3	0
	7	1	0	1	2	4
	9	1	0	1	2	4
	11	1	0	1	2	1
	13	1	0	1	2	8
	15	1	0	1	2	1
	17	1	0	1	2	edge
E	1	1	0	1	2	edge
	3	1	0	1	2	0
	5	2	0	1	3	0
	7	1	0	1	2	1
	9	1	0	1	2	0
	11	4	1	1	6	2
	13	3	1	1	5	17
	15	1	0	1	2	3
	17	1	0	1	2	edge
G	1	1	0	1	2	edge
	3	1	0	1	2	1
	5	2	0	1	3	0
	7	1	0	1	2	3
	9	3	0	1	4	5
	11	3	1	1	5	8
	13	1	0	1	2	3
	15	3	0	1	4	2
	17	1	0	1	2	edge
I	1	1	2	2	5	edge
	3	1	1	2	4	18
	5	1	2	2	5	22
	7	3	2	1	6	51
	9	4	0	3	7	65
	11	2	2	3	7	48

		Height	Bare Ground	Floristic Cover	DI	People	
I	13	4	4	3	11	25	
	15	3	2	3	8	95	
	17	1	0	3	4	edge	
K	7	3	0	3	6	8	clearance
	9	4	0	3	7	34	clearance
	11	3	1	4	8	0	clearance
	13	4	0	4	8	3	clearance
	15	3	0	4	7	24	clearance
	17	3	1	4	8	edge	clearance
M	11	3	0	4	7	0	clearance
	13	3	2	4	9	24	clearance
	15	1	1	4	6	0	clearance
	17	3	0	4	7	edge	clearance
O	13	1	0	4	5	0	clearance
	15	2	0	4	6	2	clearance
Path B							
D	5	1	1	3	5	50	
F	5	1	1	1	3	35	
H	5	1	2	1	4	22	
	7	1	1	1	3	8	
J	5	1	2	1	4	8	
	7	1	0	1	2	6	
L	5	3	2	1	6	32	
	7	2	0	1	3	2	
	9	2	0	1	3	8	
N	5	4	4	1	9	15	
	7	1	0	1	2	0	
	9	2	0	1	3	3	
	11	1	0	1	2	3	
P	5	1	1	1	3	8	
	7	2	1	1	4	0	
	9	1	0	1	2	3	
	11	1	0	1	2	0	
	13	1	0	1	2	edge	
R	5	1	0	1	2	21	
	7	1	0	1	2	4	
	9	1	0	1	2	1	
	11	1	0	1	2	1	

		Height	Bare Ground	Floristic Cover	DI	People
R	13	1	0	1	2	edge
T	5	4	0	1	5	edge
	7	1	0	1	2	edge
	9	1	0	1	2	edge
	11	2	0	2	4	edge
	13	2	0	1	3	edge

* in "edge" quadrats the corresponding people count was for an area less than 10 x 10 m, thus not strictly comparable

Appendix III (a)

"EASTER" DATES OF PEOPLE SURVEY

Date	Hour of set	10	11	12	13	14	15	16	17	18	19
Date	2.4	*				*					
	3.4	*		*		*		*			
	6.4 Sat	*	*	*	*	*	*	*	*		
	7.4 Sun	*	*	*		*	*	*	*	*	
	8.4		*	*		*	*	*			
	12.4		*	*	*	*	*	*			
	13.4 Sat								*	*	
	14.4 Sun		*	*		*	*	*	*	*	
	15.4 BH	*	*	*	*	*	*			*	*
	17.4	*	*		*	*	*	*			
	18.4		*		*		*				
	18.5 Sat		*		*	*	*				
	19.5 Sun	*	*				*	*	*		
	25.5 Sat			*			*	*			
	26.5 Sun		*		*			*			
	27.5 BH				*	*		*	*		
	29.5					*	*	*	*		
	31.5		*	*	*	*	*	*	*		
	1.6 Sat		*		*	*					
	2.6 Sun		*	*		*	*	*			

Total: 100

Appendix III (b)

"SUMMER" PEOPLE COUNTS

Hour of set	10	11	12	13	14	15	16	17	18	19
Date 30.6 Sun		*	*		*	*	*			
2.7		*	*	*						
6.7 Sat			*		*	*	*	*		
7.7 Sun			*	*		*	*			
9.7					*					
13.7 Sat			*	*		*				
14.7 Sun					*	*	*	*	*	
20.7 Sat			*		*	*	*			
21.7 Sun		*	*		*	*	*			
27.7 Sat		*	*			*	*			
28.7 Sun						*	*			
30.7						*	*			
1.8			*			*	*			
3.8 Sat			*	*	*	*	*	*	*	*
4.8 Sun		*	*			*	*	*		
6.8		*		*	*	*				
10.8 Sat						*				
11.8 Sun		*	*		*	*				
17.8 Sat			*		*	*	*	*		
18.8 Sun		*	*			*	*	*		
20.8			*		*	*	*			
24.8 Sun			*			*				
25.8 BH					*					

Total: 85

Appendix IV

TRAFFIC CENSUS - WEEKLY COUNTS

BEACON FELL 1971 Number of cars

Week:	Week ending:	Sunday	Week	Month	
January					
1 - 4				2850	
February					
5 - 8				4102	
March					
9	6/3		800		
10	13/3	320	832		
11	20/3	178	904		
12	27/3	455	1444	3980	
April					
13	3/4	464	1204		
14	10/4	1336	2072		EASTER 4 days = 4491 (9/10/11/12)
15	17/4	1424	4046		
16	24/4	766	2482		
17	1/5	770	2001	11805	
May					
18	8/5	"	"		
19	15/5	924	2400		
20	22/5	998	2591		
21	29/5	444	1153	9263	BANK HOLIDAY 3 days = 2513
June					
22	5/6	1118	3687		
23	12/6	1061	1855		
24	19/6	793	1959		
25	26/6	828	2150	8533	

Week:	Week ending:	Sunday	Week	Month	
July					
26	3/7	813	2110		
27	10/7	940	2442		
28	17/7	1391	3612		
29	24/7	969	2516		
30	31/7	"	"	13196	
August					
31	7/8	"	"		
32	14/8	"	"		
33	21/8	1013	2630		
34	28/8	789	2049	10164	
September					
35	4/9	453	2652		
36	11/9	955	2481		
37	18/9	721	1872		
38	25/9	528	1372	7924	
October					
39	2/10	484	1256		
40	9/10	532	1383		
41	16/10	355	922		
42	23/10	627	1628		
43	30/10	626	1627	6816	
November					
44	6/11	191	497		
45	13/11	405	1051		
46	20/11	270	701		
47	27/11	357	926	3175	
December					
48	4/12	283	734		
49	11/12	357	927		
50	18/12	205	532		
51	25/12	254	659	3913	CHRISTMAS DAY 187
52	1/1	63	1061		NEW YEARS DAY 143
			TOTAL FOR YEAR	85721	

BEACON FELL 1972

Week:	Week ending:	Sunday	Week	Month	
January					
1	8/1	225	584		
2	15/1	185	480		
3	22/1	279	724		
4	29/1	383	994	2782	
February					
5	5/2	223	579		
6	12/2	457	1187		
7	19/2	"	"		
8	26/2	"	"	4140	
March					
9	4/3	"	"		
10	11/3	682	1772		
11	18/3	919	2387		
12	25/3	580	1506	7860	EASTER 4 days = 2492
April					
13	1/4	438	1138		
14	8/4	536	3359		
15	15/4	702	1823		
16	22/4	295	766		
17	29/4	626	1310	7911	
May					
18	6/5	523	1265		
19	13/5	439	1565		
20	20/5	849	2186		
21	27/5	650	1737	7846	
June					
22	3/6	548	3308		SPRING BANK HOLIDAY 3 days = 2042
23	10/6	707	1681		
24	17/6	938	1774		
25	24/6	683	1774	7335	

Week:	Week ending:	Sunday	Week	Month	
July					
26	1/7	415	2183		
27	8/7	840	2183		
28	15/7	1154	2998		
29	22/7	1154	2997		
30	29/7	1116	4052	14779	
August					
31	3/8	781	2257		
32	12/8	505	1711		
33	19/8	1625	3336		
34	26/8	876	2894	10861	
September					AUGUST BANK HOLIDAY 3 days = 1794
35	2/9	817	3023		
36	9/9	923	2275		
37	16/9	753	1651		
38	23/9	755	2056		
39	30/9	535	1553	9114	
October					
40	7/10	711	1692		
41	14/10	836	1570		
42	21/10	822	1293		
43	28/10	498	1293	6101	
November					
44	4/11	253	871		
45	11/11	252	653		
46	18/11	95	573		
47	25/11	182	845	3045	
December					
48	2/12	356	719		
49	9/12	196	545		
50	16/12	286	724		
51	23/12	371	840		
52	30/12	187	1205	3830	
		TOTAL FOR YEAR		85605	

BEACON FELL 1973 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	7/1	172	385	992		
2	14/1	208	300	545		
3	21/1	244	354	598		
4	28/1	273	390	634	2769	
February						
5	4/2	645	751	1021		
6	11/2	519	653	1036		
7	18/2	580	974	1424		
8	25/2	550	981	1439	4920	
March						
9	4/3	345	497	1242		
10	11/3	1457	1880	2679		
11	18/3	921	1272	1774		
12	25/3	608	836	1807	8327	
April						
13	1/4	636	771	1596		
14	8/4	1008	1220	1820		
15	15/4	825	1270	2016		
16	22/4	973	1410	3336		EASTER
17	29/4	1453	2071	4530	12473	4 days = 3427
May						
18	6/5	932	1127	2040		
19	13/5	701	968	1736		
20	20/5	1107	1735	3136		
21	27/5	662	1116	2318	9688	SPRING BANK HOLIDAY 3 days = 1574
June						
22	3/6	584	712	1911		
23	10/6	438	700	1477		
24	17/6	960	1513	2457		
25	24/6	601	1172	1752		
26	1/7	1129	1668	2693	8703	

Week:	Week ending:	Sunday	Weekend	Week	Month	
July						
27	8/7	1322	1883	3315		
28	15/7	403	661	1766		
29	22/7	848	1107	2037		
30	29/7	1235	1974	4037	12284	
August						
31	5/8	872	1102	3132		
32	12/8	1341	1827	2938		
33	19/8	612	1158	3038		
34	26/8	1228	1711	3105	12881	AUGUST BANK HOLIDAY 3 days = 2379
September						
35	2/9	598	933	2326		
36	9/9	1105	1607	2612		
37	16/9	732	971	2042		
38	23/9	856	1018	1770		
39	30/9	606	728	1222	9304	
October						
40	7/10	704	1003	1559		
41	14/10	225	421	855		
42	21/10	795	858	1276		
43	28/10	595	873	1440	5130	
November						
44	4/11	288	375	953		
45	11/11	358	442	748		
46	18/11	173	286	562		
47	25/11	152	235	508	2771	
December						
48	2/12	150	200	400		
49	9/12	151	222	384		
50	16/12	150	200	406		
51	23/12	150	250	500		
52	30/12	416	485	1188	2878	
				TOTAL FOR YEAR	92128	

Weekend and holiday evening counts 6 pm to 9 am

Date	Saturday	Sunday	Total	
28/29.7	299	232	531	
4/5.8	74	154	228	
11/12.8	175	278	453	
18/19.8	247	90	337	
25/26.8	156	310	466	BANK HOLIDAY MONDAY = 128 TOTAL = 590
1/2.9	100	46	146	
8/9.9	213	191	404	
15/16.9	66	113	179	
22/23.9	69	154	223	
29/30.9	62	68	130	
6/7.10	34	44	78	
13/14.10	44	33	77	
20/21.10	22	25	47	
27/28.10	35	34	69	

BEACON FELL 1974 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	6/1	226	329	876		
2	13/1	229	321	732		
3	20/1	260	385	589		
4	27/1	318	420	725	2922	
February						
5	3/2	294	420	770		
6	10/2	353	494	889		
7	17/2	572	642	981		
8	24/2	380	543	988	3628	
March						
9	3/3	987	1455	2052		
10	10/3	292	419	886		
11	17/3	590	813	1255		
12	24/3	320	514	1156		
13	31/3	1414	2066	3013	8362	
April						
14	7/4	1339	1875	3375		
15	14/4	1728	2150	3932		EASTER
16	21/4	818	1150	4110		4 days = 4493
17	28/4	530	970	1856	13273	
May						
18	5/5	969	1184	1857		
19	12/5	614	884	1607		
20	19/5	1211	1657	2530		
21	26/5	1032	1480	2143	10587	
June						
22	2/6	815	1100	3550		WHITSUN 2 days = 1100
23	9/6	532	899	1707		
24	16/6	719	1106	2019		
25	23/6	728	1202	2446		
26	30/6	895	1402	2625	9897	

Week:	Week ending:	Sunday	Weekend	Week	Month	
July						
27	7/7	704	1068	1846		
28	14/7	1011	1573	2694		
29	21/7	979	1243	2637		
30	28/7	681	1016	2483	9660	
August						
31	4/8	1174	1835	3329		
32	11/8	1243	1517	3585		
33	18/8	1018	1618	3204		
34	25/8	591	923	1661	13869	
35	1/9	874	1142	2964		
September						
36	8/9	437	525	1113		
37	15/9	558	1187	2069		
38	22/9	384	709	1705		
39	29/9	770	989	1603	7364	
October						
40	6/10	291	637	1292		
41	13/10	507	860	1487		
42	20/10	362	524	945		
43	27/10	274	389	1075	4799	
November						
44	3/11	397	510	1199		
45	10/11	397	515	820		
46	17/11	659	860	1222		
47	24/11	145	241	534		
48	31/11	272	439	928	4431	
December						
49	8/12	276	386	768		
50	15/12		524	953		
51	22/12		525	954		CHRISTMAS
52	29/12	435	624	929	4311	4 days = 573
			TOTAL FOR YEAR		93103	

BEACON FELL 1975 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	5/1	500	716	1301		
2	12/1	351	501	1383		
3	19/1	393	565	976		
4	26/1	310	396	743	4779	
February						
5	2/2	1066	1193	1569		
6	9/2	560	801	1456		
7	16/2	394	801	1457		
8	23/2	758	1044	1817	6453	
March						
9	2/3	549	729	1259		
10	9/3	821	1159	1572		
11	16/3	665	922	1300		
12	23/3	716	886	1595		EASTER
13	30/3	1393	1780	3285	9281	4 days = 3600
April						
14	6/4	749	1098	2779		
15	13/4	424	683	1485		
16	20/4	444	637	1249		
17	27/4	1365	1836	2664	7377	
May						
18	4/5	1125	1607	2239		
19	11/5	1297	2131	3210		
20	18/5	1424	2079	2957		
21	25/5	1464	2044	3798		
22	1/6	987	1408	4966	16183	
June						
23	8/6	1154	1775	2608		
24	15/6	933	1521	2787		
25	22/6	1061	1525	2388		
26	29/6	1396	1880	3024	11794	

Week:	Week ending:	Sunday	Weekend	Week	Month
July					
27	6/7	1345	1996	3672	
28	13/7	1285	1737	3050	
29	20/7	835	1290	3027	
30	27/7	1206	1535	3076	12825
August					
31	3/8	940	1704	4255	
32	10/8	1108	1494	3178	
33	17/8	922	1164	2783	
34	24/8	1116	1604	2866	
35	31/8	1401	1814	4788	17870
September					
36	7/9	1112	1730	3337	
37	14/9	764	1096	1798	
38	21/9	1438	1973	2368	
39	28/9	666	952	1853	10591
October					
40	5/10	613	875	1590	
41	12/10	924	1329	1591	
42	19/10	728	1032	1638	
43	26/10	942	1456	2359	8640
November					
44	2/11	759	868	2330	
45	9/11	480	791	1297	
46	16/11	296	311	860	
47	23/11	242	521	1023	
48	30/11	374	638	1061	5064
December					
49	7/12	375	513	923	
50	14/12	397	567	1151	
51	21/12	303	433	663	
52	28/12	628	947	1751	4488
			TOTAL FOR YEAR		115345

BEACON FELL 1976 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	4/1	148	314	571		
2	11/1	262	481	865		
3	18/1	360	667	1078		
4	25/1	735	1050	1483		
5	1/2	752	877	1253	5250	
February						
6	8/2	758	1008	1440		
7	15/2	455	932	1597		
8	22/2	765	1039	1729		
9	29/2	789	1127	1957	6723	
March						
10	7/3	658	926	1684		
11	14/3	454	656	1071		
12	21/3	964	1377	1970		
13	28/3	767	1141	2075	6800	
April						
14	4/4	961	1219	1917		
15	11/4	647	1229	2175		EASTER
16	18/4	1651	2000	4108		4 days = 5443
17	25/4	1229	1718	5652		
18	2/5	870	1000	2168	16020	
May						
19	9/5	1133	1866	2672		
20	16/5	691	937	1836		
21	23/5	1141	1557	2391		BANK HOLIDAY
22	30/5	599	1036	1878	8777	2 days = 1721
June						
23	6/6	1274	1618	3602		
24	13/6	995	1340	2512		
25	20/6	1444	1802	2544		
26	27/6	1213	1801	2890	11548	

Week:	Week ending:	Sunday	Weekend	Week	Month
July					
27	4/7	1083	1663	3445	
28	11/7	1571	2298	4190	
29	18/7	1332	2144	3872	
30	25/7	1280	1927	4824	
31	1/8	547	1269	4606	20937
August					
32	8/8	1375	2012	4148	
33	15/8	1488	2244	4608	
34	22/8	1320	1886	3429	
35	29/8	2170	3099	4427	16612
September					
36	5/9	1540	2200	4000	
37	12/9	1155	1650	3000	
38	19/9	1138	1626	2958	
39	26/9	947	1123	2042	12000
October					
40	3/10	432	580	1247	
41	10/10	1112	1271	1716	
42	17/10	640	971	1567	
43	24/10	471	673	1178	
44	31/10	695	926	1684	7392
November					
45	7/11	378	540	1029	
46	14/11	382	572	817	
47	21/11	355	574	988	
48	28/11	496	803	1179	4013
December					
49	5/12	441	630	962	
50	12/12	203	290	527	
51	19/12	200	429	780	
52	26/12	565	807	1467	
53	2/1/77	948	1110	2832	6568
			TOTAL FOR YEAR		122640

BEACON FELL 1977 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	9/1	381	502	1236		
2	12/1	674	826	1157		
3	19/1	260	551	804		
4	26/1	880	1257	1564	4761	
February						
5	6/2	553	746	1356		
6	13/2	559	776	1226		
7	20/2	223	385	833		
8	27/2	1295	1874	2740	6155	
March						
9	6/3	604	930	1572		
10	13/3	798	1140	1678		
11	20/3	446	637	1158		
12	27/3	505	626	1138		
13	3/4	403	587	1129	6675	
April						
14	10/4	792	1291	2873		EASTER 4 days = 3770
15	17/4	819	1170	3773		
16	24/4	615	973	1769		
17	31/4	831	1168	1746	10161	
May						
18	8/5	655	890	1501		
19	15/5	718	1114	1979		
20	22/5	1491	1821	3127		
21	29/5	927	1533	2707	9314	
June						
22	5/6	1190	1575	3057		BANK HOLIDAY 3 days = 4118
23	12/6	792	1041	2941		
24	19/6	849	1299	2182		
25	26/6	974	1363	2913		
26	3/7	1204	1686	2507	13600	

1977

Week:	Week ending:	Sunday	Weekend	Week	Month	
July						
27	10/7	1100	1819	3540		
28	17/7	422	1043	2729		
29	24/7	1020	1272	2545		
30	31/7	1411	1924	4446	13260	
August						
31	7/8	1447	2289	4277		
32	14/8	902	1289	4191		
33	21/8	1121	2299	4358		BANK HOLIDAY
34	28/8	1813	2285	4341	17167	3 days = 3111
September						
35	4/9	492	1078	3105		
36	11/9	1316	1429	2954		
37	18/9	1676	1989	3151		
38	25/9	822	1197	2041		
39	2/10	467	667	1406	12657	
October						
40	9/10	573	991	1802		
41	16/10	1155	1657	2579		
42	23/10	933	1424	2224		
43	30/10	658	940	1709	8314	
November						
44	6/11	593	695	1264		
45	13/11	336	415	1252		
46	20/11	772	886	1243		
47	27/11	482	675	1077	4836	
December						
48	4/12	208	462	962		
49	11/12	260	418	760		
50	18/12	446	637	1159		
51	25/12	446	637	1159		
52	1/1/78	390	490	891	4931	
			TOTAL FOR YEAR		111831	

BEACON FELL 1978 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	8/1	344	502	1698		
2	15/1	373	533	970		
3	22/1	322	421	765		
4	29/1	330	472	858	4291	
February						
5	5/2	421	493	896		
6	12/2	868	1240	1675		
7	19/2	595	850	1214		
8	26/2	595	850	1214	4999	
March						
9	5/3	1113	1462	2658		
10	12/3	602	922	1423		
11	19/3	156	366	808		EASTER
12	26/3	719	924	2075		4 days = 2606
13	2/4	1095	1564	2844	9808	
April						
14	9/4	708	1048	1905		
15	16/4	717	1224	1742		
16	23/4	1013	1215	1914		
17	30/4	443	939	1494	7055	
May						
18	7/5	870	1290	2751		
19	12/5	718	914	1773		
20	19/5	1257	1883	3067		BANK HOLIDAY
21	26/5	1373	640	1279	8870	1 day = 1075
June						
22	4/6	786	1256	3094		
23	11/6	769	1190	2227		
24	18/6	688	1204	2262		
25	25/6	344	578	1579		
26	2/7	746	951	1908	11070	

Week:	Week ending:	Sunday	Weekend	Week	Month
July					
27	9/7	1063	1241	2256	
28	16/7	798	1257	2890	
29	23/7	683	984	2343	
30	30/7	476	1028	2843	10332
August					
31	6/8	380	939	2035	
32	13/8	838	1148	2603	
33	20/8	1169	1632	2967	
34	27/8	1086	1691	3639	
35	3/9	829	1283	3170	14414
September					
36	10/9	419	665	1544	
37	17/9	1068	1389	2399	
38	24/9	1004	1434	2607	
39	1/10	926	1266	2301	8851
October					
40	8/10	1070	1543	2177	
41	15/10	275	555	1411	
42	22/10	629	784	1363	
43	29/10	468	865	1255	6206
November					
44	5/11	439	626	1333	
45	12/11	242	415	1090	
46	19/11	162	247	583	
47	26/11	774	1116	1430	
48	3/12	245	348	664	5100
December					
49	10/12	336	480	716	
50	17/12			600	
51	24/12			600	
52	31/12			600	2516
			TOTAL FOR YEAR		93512

BEACON FELL 1979 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	7/1					
2	14/1					
3	21/1			Locks frozen		
4	28/1					
5	4/2				2981 *	
February						
6	11/2	353	424	770		
7	18/2	256	378	603		
8	25/2	900	1216	1761		
9	4/3	769	918	1399	4533	
March						
10	11/3	388	517	827		
11	18/3	248	354	644		
12	25/3	358	541	951		
13	1/4	618	831	1124	3546	
April						
14	8/4	167	422	933		
15	15/4	673	1943	3183		EASTER
16	22/4	552	812	3784		4 days = 3799
17	29/4	282	900	1357	9257	
May						
18	6/5	653	898	1405		
19	13/5	1091	1418	2558		
20	20/5	574	1123	1903		
21	27/5	478	617	1228		
22	3/6	385	550	2104	9198	
June						
23	10/6	739	1107	3081		
24	17/6	985	1449	2149	8604 *	

Week:	Week ending:	Sunday	Weekend	Week	Month
September					
38	23/9	816	1396	2538	
39	30/9	590	1211	2242	8093 *
October					
40	7/10	784	1060	1741	
41	14/10	676	853	1883	
42	21/10	1179	1555	2242	
43	28/10	243	789	1384	7250
November					
44	4/11	321	603	1436	
45	11/11	169	275	620	
46	18/11	252	320	806	
47	25/11	130	328	606	
48	2/12	292	417	891	4359
December					
49	9/12			654	
50	16/12			654	
51	23/12			653	
52	30/12			653	2615

NB: Months when no readings were taken	July	11075 *
	August	12122 *

BEACON FELL 1980 Number of cars

Week:	Week ending:	Sunday	Weekend	Week	Month	
January						
1	6/1	450	643	1169		
2	13/1	499	636	939		
3	20/1	620	770	1043		
4	27/1	443	716	1003		
5	3/2	210	300	628	4782	
February						
6	10/2	785	1019	1344		
7	17/2	793	1138	1866		
8	24/2	546	956	1589		
9	2/3	865	1358	1922	6721	
March						
10	9/3	1257	1444	2020		
11	16/3	592	750	1276		
12	23/3	352	728	1270		
13	30/3	861	1063	1601	6167	
April						
14	6/4	1104	1513	3253		EASTER 4 days = 3734
15	13/4	787	1265	3456		
16	20/4	749	1064	1894		
17	27/4	1204	1720	2587	11190	
May						
18	4/5	1359	1764	2459		
19	11/5	913	1499	3564		
20	18/5	Fell roads closed because				
21	25/5	of fire risk (estimate				
		for trend made on assump-				
22	1/6	tion of continued visiting)			10200 *	estimate month
June						
23	8/6	911	1167	2063		
24	15/6	364	520	1214		
25	22/6	816	1356	2454		
26	29/6	952	1216	2255	7986	

Week:	Week ending:	Sunday	Weekend	Week	Month	
July						
27	6/7	963	1248	2084		
28	13/7	893	1174	2337		
29	20/7	669	891	2137		
30	27/7	793	1122	3361	9919	
August						
31	3/8	828	1461	3321		
32	10/8	872	1192	2396		
33	17/8	960	1539	2338		
34	24/8	1398	2111	3558		
35	31/8	1078	1367	4189	15802	
September						
36	7/9			2777		
37	14/9	613	751	1365		
38	21/9	901	1178	2107		
39	28/9	963	1423	2548	8797	
October						
40	5/10			2435		
41	12/10	630	900	2322		
42	19/10	1087	1553	2793		
43	26/10	624	1090	2330	9880	
November						
44	2/11	131	178	502		
45	9/11	93	192	346		
46	16/11	440	540	1870		
47	23/11					
48	30/11				4241	* estimate month
December						
49	7/12					
50	14/12					
51	21/12					
52	28/12				3737	* estimate month
				TOTAL FOR YEAR	99418	

Appendix V (a) (i)

PILOT STUDY: ON SITE INTERVIEW

Beacon Fell Recreation Survey I

1. Where have you come from today?

2. What was your main form of transport to Beacon Fell?

Car

Bicycle

Motorbike

Coach

Foot

Other   Please specify ....

2 (a)   Did you have any trouble finding somewhere to park your car?

Yes

No

2 (b)   Is it parked in a designated Car Park?

Yes

No

3. Here is a list of some of the reasons why people come to Beacon Fell. (SHOW CARD 1)   Which are the most important reasons in your case?

Short stop on drive

Picnic

Day out

Walk

Exercise dog

Sport/hobby

Anything else?   Specify ....

3 (a) Did you have any trouble finding somewhere to picnic?

Yes

No

3 (b) Did you use a picnic table?

Yes

No

3 (c) Was a table available?

Yes

No

4. Have you been to Beacon Fell before?

Yes

No

4 (a) When was your last trip?

This week

Last week

Within the last month

Within the last year

Longer ago

5. Did you set out with the intention of coming to Beacon Fell?

Yes

No

5 (a) When did you decide to come here?

During your journey

Not until seeing the Fell, or the signposts

6. Is there anything that you particularly like about the Fell?

7. Is there anything that you particularly dislike, or think could be improved?

8. Did you expect there to be more or less people here at this time, or is it about as you expected?

   expected more

   expected less

   as expected

   don't know

9. Would you prefer there to be more or less people here, or is it all right as it is?

   prefer more

   prefer less

   all right

   not bothered either way

10. Here is a list of words which could be used to describe Beacon Fell. Would you please indicate the degree to which you would use each set of headings.

BEACON FELL

	Very	Quite	Slightly	Neutral	Slightly	Quite	Very	
Accessible	1	2	3	4	5	6	7	Remote
Friendly	1	2	3	4	5	6	7	Hostile
Artificial	1	2	3	4	5	6	7	Natural
Relaxed	1	2	3	4	5	6	7	Tense
Open	1	2	3	4	5	6	7	Restricted
Maintained	1	2	3	4	5	6	7	Rundown
Noisy	1	2	3	4	5	6	7	Quiet
Exciting	1	2	3	4	5	6	7	Boring
Crowded	1	2	3	4	5	6	7	Empty
Dangerous	1	2	3	4	5	6	7	Safe

11. Are you likely to come back here again?

    Yes

    No

    Don't know

12. Have you been to the information centre at Carwags?

    Yes

    No

    (If no, explain what and where it is)

READ OUT The second part of this survey is a questionnaire for you to fill in when your trip is completed. (GIVE ENVELOPE - MARK SERIAL NUMBER ON OUTSIDE) There may be a short follow-up interview to check a random sample of the results. Please could you give me your address so that you can be contacted again if necessary.

(NAME IS NOT NECESSARY BUT WOULD HELP IF THEY ARE PREPARED TO GIVE IT)

OBSERVATION ONLY:

Number in group:

	M	F	(spokesman)
< 15			
15 - 24			
25 - 44			
45 - 64			
65+			

Appendix V (a) (ii)

PILOT STUDY: POSTAL QUESTIONNAIRE

Beacon Fell Recreation Survey II

The following questions concern your visit to Beacon Fell Country Park, when you were interviewed.

1. How long did you stay on Beacon Fell?

    less than ½ an hour

    ½ - 1 hour

    1 - 2 hours

    2 - 4 hours

    4 - 6 hours

    more than 6 hours

2. Did you stop anywhere else on that day?

    Yes

    No

    2 (a) Where else did you stop?

3. How far, approximately, was the total length of your journey on that day?

    Less than 10 miles

    10 - 24 miles

    25 - 50 miles

    50 - 100 miles

    more than 100 miles

4. How many times have you been to Beacon Fell (including the visit when you were interviewed)?

    Once (i.e. first visit)

    Twice

    3 - 10 times

    More than 10 times

5. Still thinking of the visit when you were interviewed, please indicate the things that you, and the people with you, did while on Beacon Fell.

    Walked

    Picnic

    Played games

    Nature study

    Sat in car

    Anything else?

    5 (a) Did you walk along any part of the marked Nature Trail?

        Yes

        No

        Don't know

6. Is there anything that you would like to have done but were not able to?

    Yes   Please give details below

    No

7. Did any of the other people on the Fell affect your visit in any way?

    Yes   Please give details

    No

8. Are there any additional facilities that you would like to see on the Fell?

9. How did you find out about Beacon Fell?

    Newspapers

    Roadsigns

    Friends/Relatives

    Local knowledge

    Any other means   Please give details

10. Are you likely to return to Beacon Fell?

    Yes

    No

    10 (a) Are you likely to return at a similar time of day and week, to when you were interviewed?

        Yes, at a similar time

        No, at a different time of day or week

        Don't know

    10 (b) Is there any particular reason why you will not return?

11. If you travelled by car, do you or does someone in your household own the car?

    Yes

    No

    11 (a) Who does own the car?

        Friends

        Relatives

        Hired

        Other   Please specify

12. Would you now read the following list quickly and indicate the words that you would use to describe Beacon Fell.

1. Accessible
2. Artifical
3. Beautiful
4. Big
5. Boring
6. Busy
7. Challenging
8. Commercialised
9. Crowded
10. Dangerous
11. Developed
12. Disorganised
13. Educational
14. Empty
15. Enclosed
16. Exciting
17. Exposed
18. Forbidding
19. Friendly
20. Healthy
21. Hostile
22. Inviting
23. Lonely
24. Maintained
25. Monotonous
26. Natural
27. Noisy
28. Organised
29. Open
30. Passive
31. Peaceful
32. Pleasant
33. Pretty
34. Quiet
35. Relaxed
36. Remote
37. Restricted
38. Safe
39. Small
40. Spoilt
41. Stimulating
42. Striking
43. Tense
44. Tidy
45. Ugly
46. Undeveloped
47. Unpleasant
48. Unspoilt
49. Unusual
50. Varied

13. What is your favourite type of place for a day out?

Finally, I would like some information about you and your family. This will be treated in strict confidence, and it is <u>not</u> necessary to give your name. It will not be possible to isolate individuals from the collected results.

14. Please indicate your age group

Under 14

15 - 24

25 - 44

45 - 64

65+

Male

Female

15. When did you finish full-time education?

Continuing

14 or under

15 years but under 16

16 years but under 17

17 years but under 18

18 years or over

16. Is the <u>head of household</u> in employment?

Yes

No

Retired

16 (a) What is (was) the job called?

16 (b) What industry/trade/profession does (did) he/she work in?

16 (c) Is (was) the employment full-time (31 hours/week or more) or part-time (8 - 30 hours/week)?

Full-time

Part-time

Thank you for your help. Please return this form as soon as possible in the envelope provided

Appendix V (b)

POSTAL QUESTIONNAIRE

Beacon Fell Recreation Survey 1975

The following questions relate to the day and place where you were given this form. Please answer every question. All answers will be treated in strict confidence.

1. Where had you set out from on that day?

    Street

    Town

    County

2. Where do you live (if different from Question 1)?

    Street

    Town

    County

3. What was your main form of transport to the site?

    Car

    Coach

    Foot

    Other   Please specify ....

    3 (a) Did you have any trouble finding somewhere to park your car?

        Yes/No

    3 (b) Did you park in a marked Car Park?

        Yes/No

4. Did you set out with the intention of going to the place where you were given this form?

    Yes/No

4 (a) When did you decide to go there?

During your journey

Not until seeing the site, or signs to it

5. Have you been there before?

Yes/No

5 (a) How many times have you been there?

Once or twice

3 - 10 times

$>$ 10 times

5 (b) When was your last trip?

This week

Last week

Within the last month

Within the last year

Longer ago

6. How did you find out about the site?

Newspapers

Chance driving, roadsigns

Friends or relatives

Local knowledge

Anything else? ....

7. What were the most important reasons for your visit?

Short stop on drive

Picnic

Day out

Walk

Exercise dog

Sport/Hobby

Anything else? ....

8. Did you have a picnic there?

Yes/No

8 (a) Did you picnic in or near your car?

Yes

No

Did not travel by car

8 (b) Did you use a picnic table?

Yes/No

8 (b) Was a table available?

Yes/No

9. Was there anything that you particularly liked about the place?

10. At the time of your visit did you expect there to be more or less people there, or was it about as you expected?

Expected more

Expected less

As expected

Don't know

11. Would you have preferred there to be more or less there, or was it all right as it was?

Prefer more

Prefer less

All right

Not bothered either way

12. What did you and the people with you do while on the site?

Walked

Picnicked

Played games

Nature study

Sat in car

Anything else? ....

13. Are there any other facilities that you would like on the site?

14. How long did you stay at that place?

    $<$ ½ hour

    ½ - 1 hour

    1 - 2 hours

    2 - 4 hours

    4 - 6 hours

    $>$ 6 hours

15. Did you stop anywhere else on that day?

    Yes/No

    15 (a) Where else did you stop?

16. How long was the <u>total</u> length of your journey?

    $<$ 10 miles

    10 - 24 miles

    25 - 50 miles

    50 - 100 miles

    $>$ 100 miles

17. Are you likely to return to the site

    Yes/No

    17 (a) At a similar time?

    At a different time of day or week?

    Undecided

    17 (b) Any particular reason why not?

18. How many other people were with you on that day?

    (Please indicate number in each <u>age</u> group)

    None

    0 - 15 years

    16 - 25 years

    26 - 64 years

    65+

19. If you travelled by car, do you or does someone in your household own the car?

    Yes/No

    19 (a) Who does own the car?

        Friends

        Relatives

        Hired

        Company car

        other

20. Please would you indicate <u>your</u> age group and sex.

    under 14

    15 - 24

    25 - 44

    45 - 64

    over 65

21. Male/Female

22. At what <u>age</u> did you finish full-time education?

    Continuing

    Under 14

    14 but not 15

    15 but not 16

    16 but not 17

    17 but not 18

    Over 18

23. Is the <u>head of your household</u> in employment?

    Yes (including part-time)

    No

    Retired

24. What is (was) the job called?

25. What industry/trade/profession does (did) he/she work in?

Thank you for your help

On the next page you will find a list of words that could be used to describe the place where you were given this form. Would you read the list quickly and indicate the words that you would use to describe it.

1. Accessible
2. Artificial
3. Beautiful
4. Big
5. Boring
6. Busy
7. Challenging
8. Commercialised
9. Crowded
10. Dangerous
11. Developed
12. Disorganised
13. Educational
14. Empty
15. Enclosed
16. Exciting
17. Exposed
18. Forbidding
19. Friendly
20. Healthy
21. Hostile
22. Inviting
23. Lonely
24. Maintained
25. Monotonous
26. Natural
27. Noisy
28. Organised
29. Open
30. Passive
31. Peaceful
32. Pleasant
33. Pretty
34. Quiet
35. Relaxed
36. Remote
37. Restricted
38. Safe
39. Small
40. Spoilt
41. Stimulating
42. Striking
43. Tense
44. Tidy
45. Ugly
46. Undeveloped
47. Unpleasant
48. Unspoilt
49. Unusual
50. Varied

Appendix VI

SUMMARY OF QUESTIONNAIRE RESULTS

		Beacon Fell					Trough of Bowland	
	Pilot		Main		Together			
	F	%	F	%	F	%	F	%
1. Origin 0 - 10	66	37.1	149	42.7	215	40.8	20	6.0
11 - 20	84	42.2	158	45.3	242	45.9	148	44.7
21 - 30	21	11.8	27	7.7	48	9.1	93	28.1
31 - 40	7	3.9	13	3.7	20	3.8	30	9.1
41+	0	0	2	0.6	2	0.4	40	12.1
2. Home 0 - 10	59	33.1	134	38.4	193	36.6	10	3.0
11 - 20	77	43.3	148	42.4	225	42.7	127	38.4
21 - 30	22	12.4	27	7.7	49	9.3	84	25.4
30 - 40	8	4.5	14	4.0	22	4.2	30	9.1
41+	12	6.7	26	7.5	38	7.2	80	24.1
3. Holiday Yes	15	8.4	31	8.9	46	8.7	51	15.4
No	163	91.6	318	91.1	481	91.3	280	84.6
4. Transport Car	176	98.9	348	99.7	524	99.4	318	96.1
Motorbike	1	0.6	1	0.3	2	0.4	1	0.3
Foot	1	0.6	0	0	1	0.2	0	0
Other	0	0	0	0	0	0	12	3.6
5. Intent Yes	143	81.5	271	77.7	414	78.9	240	72.5
No	33	18.5	78	22.3	111	21.1	91	27.5
6. Visits None	38	21.3	79	22.6	117	22.2	69	20.8
1/2	29	16.3	72	20.6	101	19.2	58	17.5
3 - 10	59	33.1	121	34.7	180	34.2	110	33.2
10+	52	29.2	77	22.1	129	24.5	94	28.4
7. Info Newsp.	6	3.4	21	6.0	27	5.1	3	0.9
Roadsigns	37	20.8	51	14.6	88	16.7	66	19.9
Friends	58	32.6	117	33.5	175	33.2	94	28.4
Local know.	74	41.6	156	44.7	230	43.6	164	49.4
Formal talks	2	1.1	1	0.3	3	0.6	0	0
Info centre	1	0.6	3	0.9	4	0.8	4	1.2

	Beacon Fell						Trough of Bowland	
	Pilot		Main		Together			
	F	%	F	%	F	%	F	%
8. Reason(s)								
Drive	35	19.7	55	15.8	90	17.1	64	19.3
Picnic	67	37.6	103	29.5	170	32.3	158	47.7
Day out	85	47.8	131	37.5	216	41.0	162	48.9
Walk	80	44.9	169	48.4	249	47.2	38	11.5
Dog	12	6.7	41	11.7	53	10.1	14	4.2
Hobby	3	1.7	9	2.6	12	2.3	5	1.5
Bilberry	5	2.8	0	0	5	0.9	1	0.3
9. Picnic Yes	96	53.9	179	51.3	275	52.2	246	74.3
No	82	46.1	170	48.7	252	47.8	85	25.7
10. Likes Views	63	35.4	155	44.4	218	41.4	154	46.5
Woods	18	10.1	22	6.3	40	7.6	15	4.5
Quiet	24	13.5	36	10.3	60	11.4	86	26.0
Air	10	5.6	22	6.3	32	6.1	7	2.1
Freedom	19	10.7	45	12.9	64	12.1	17	5.1
Don't know	21	11.8	48	13.8	69	13.1	47	14.2
Access	7	3.9	13	3.7	20	3.8	7	2.1
Variety	1	0.6	4	1.1	5	0.9	0	0
Walks	21	11.8	54	15.5	75	14.2	9	2.7
Info centre	0	0	3	0.9	3	0.6	0	0
Facilities	13	7.3	40	11.5	53	10.1	9	2.7
Uncommercialised	4	2.2	20	5.7	24	4.6	26	7.9
Well maintained	3	1.7	4	1.1	7	1.3	6	1.8
Stream	0	0	0	0	0	0	90	27.2
11. Expect more	45	25.3	31	8.9	76	14.4	55	16.6
less	43	24.2	94	26.9	137	26.0	33	10.0
as expected	82	46.1	212	60.7	294	55.8	227	68.6
don't know	8	4.5	12	3.4	20	3.8	16	4.8
12. Prefer more	5	2.8	4	1.1	9	1.7	0	0
less	73	41.0	126	36.1	199	37.8	125	37.8
all right	82	46.1	176	50.4	258	49.0	178	53.8
not bothered	18	10.1	43	12.3	61	11.6	28	8.5

	Beacon Fell						Trough of Bowland	
	Pilot		Main		Together			
	F	%	F	%	F	%	F	%
13. Activity walk	159	89.3	314	90.0	249	89.8	158	47.7
picnic	96	53.9	151	43.3	247	46.9	224	67.7
Games	25	14.0	76	21.8	101	19.2	102	30.8
Nature study	40	22.5	51	14.6	91	17.3	48	14.5
Sat in car	49	27.5	96	27.5	145	27.5	71	21.5
Gliders	4	2.2	1	0.3	5	0.9	0	0
Sat out	3	1.7	0	0	3	0.6	27	8.2
Pick bilb.	29	16.3	0	0	29	5.5	0	0
Hobby	3	1.7	3	0.9	6	1.1	1	0.3
14. Facilities								
Toilets	24	13.5	54	15.5	78	14.8	118	35.6
Car parks	2	1.1	9	2.6	11	2.1	18	5.4
Sports fac.	6	3.4	13	3.7	19	3.6	7	2.1
Cafe	20	11.2	52	14.9	72	13.7	11	3.3
Litter bins	4	2.2	5	1.4	9	1.7	18	5.4
None	113	63.5	208	59.6	321	60.9	175	52.9
Info	12	6.7	12	3.4	24	4.6	5	1.5
Picnic site	4	2.2	4	1.1	8	1.5	19	5.7
Telescope	3	1.7	4	1.1	7	1.3	0	0
Seats	3	1.7	2	0.6	5	0.9	4	1.2
Surf. path	2	1.1	6	1.7	8	1.5	1	0.3
Road imps.	0	0	0	0	0	0	2	0.6
Open land	0	0	0	0	0	0	2	0.6
15. Stay $< \frac{1}{2}$ hr	2	1.1	13	3.7	15	2.8	19	5.7
$\frac{1}{2}$ - 1 hr	20	11.2	47	13.5	67	12.7	57	17.2
1 - 2 hrs	61	34.3	138	39.5	199	37.8	79	23.9
2 - 4 hrs	71	39.9	122	35.0	193	36.6	126	38.1
4 - 6 hrs	20	11.2	21	6.0	41	7.8	37	11.2
$>$ 6 hrs	4	2.2	8	2.3	12	2.3	13	3.9
16. Stops Yes	78	43.8	145	41.5	223	42.3	202	61.0
No	100	56.2	204	58.5	304	57.7	129	39.0

		Beacon Fell						Trough of Bowland	
		Pilot		Main		Together			
		F	%	F	%	F	%	F	%
17. Distance	< 10 m	11	6.2	28	8.0	39	7.4	4	1.2
	11 - 24 m	48	27.0	103	29.5	151	28.7	24	7.3
	25 - 50 m	78	43.8	147	42.1	225	42.7	108	32.6
	51 - 100 m	38	21.3	57	16.3	95	18.0	141	42.6
	> 100 m	3	1.7	14	4.0	17	3.2	54	16.3
18. Returns	Yes	175	98.3	340	97.4	515	97.7	307	92.7
	No	3	1.7	9	2.6	12	2.3	24	7.3
19. Group	Alone	8	4.5	2	0.6	10	1.9	5	1.5
	Adults	85	47.8	134	38.4	219	41.6	143	43.2
	+ children	77	43.3	212	60.7	289	54.8	183	55.3
	No info	8	4.5	1	0.3	9	1.7	0	0
20. Car ownership	Self	163	91.6	308	88.3	471	89.4	288	87.0
	Friends	6	3.4	11	3.2	17	3.2	6	1.8
	Relatives	4	2.2	5	1.4	9	1.7	3	0.9
	Company	3	1.7	23	6.6	26	4.9	22	6.6
	N/A	2	1.1	1	0.3	3	0.5	12	3.6
	Hired	0	0	1	0.3	1	0.2	0	0
21. Age	< 14	1	0.6	5	1.4	6	1.1	7	2.1
	15 - 24	10	5.6	50	14.3	60	11.4	40	12.1
	25 - 44	87	48.9	178	51.0	265	50.3	157	47.4
	45 - 64	59	33.1	106	30.4	165	31.3	113	34.1
	> 65	21	11.8	10	2.9	31	5.9	14	4.2
22. Sex	Male	131	73.6	249	71.3	380	72.1	221	66.8
	Female	47	26.4	100	28.7	147	27.9	110	33.2

	Beacon Fell						Trough of Bowland	
	Pilot		Main		Together			
	F	%	F	%	F	%	F	%
24. Education Continuing	4	2.2	22	6.3	26	4.9	20	6.0
14	52	29.2	6	1.7	58	11.0	9	2.7
14 - 15	46	25.8	71	20.3	117	22.2	80	26.9
15 - 16	30	16.9	113	32.4	143	27.1	76	23.0
16 - 17	10	5.6	61	17.5	71	13.5	58	17.5
17 - 18	36	20.2	21	6.0	57	10.8	23	6.9
18	0	0	55	15.8	55	10.4	56	16.9
25. Employed H/H Yes	151	84.8	322	92.3	473	89.8	288	87.0
No	1	0.6	4	1.1	5	0.9	10	3.0
26. Job H/H Professional	37	20.8	92	26.4	129	24.5	99	29.9
Clerical	23	12.9	64	18.3	87	16.5	57	17.2
Skilled	40	22.5	92	26.4	132	25.0	67	20.2
Semi/un.	64	36.0	83	23.8	147	27.9	85	25.7
Other	8	4.5	5	1.4	13	2.5	9	2.7
No info	6	3.4	13	3.7	19	3.6	14	4.2

Computed variables (%)		Beacon Fell (together)	Trough of Bowland
ACTGP	Active	91	48
	Passive	8	47
	Interest	1	5
LIKES	Natural	45	49
	Developed, semi-natural	34	43
	Developed, artificial	21	8
	(Gave no response	23	14)
NFACILS	Improved access	3	2
	Developed, artificial	37	45
	None	60	53

Beacon Fell				Trough of Bowland	
Pilot Survey		Main Survey	Together		
Total F 178		349	527	331	
9 days - August 1974		Approx. 10% of visitors over Easter Sunday and Monday 1975		9/10/17 August '75 Approx. 4%, 5% and 8% of visitors each day	
Interviews		Postal reply		Postal reply	
14/7	35	30/3 168		9/8	94
4/8	28	31/3 181		10/8	153
6/8	4			17/8	84
10/8	28				
11/8	43				
24/8	10				
25/8	3 BH				
26/8	8				
		Traffic census holiday weekend = 4493 (4 days)		Estimate traffic busy day = 2000+ (NB: Many don't stop, therefore sample of stoppers much higher)	

Appendix VII

RESPONSES TO CHECK LIST

Per cent of respondents checking each word

	Beacon Fell			Trough of Bowland
	Pilot	Main	All	
Access	78.7	71.3	75.0	58.6
Artificial	2.3	2.3	2.3	0
Beautiful	56.3	47.3	51.8	69.8
Big	11.6	11.2	11.4	16.6
Boring	0.2	0.6	0.4	0.6
Busy	16.3	18.3	17.3	16.3
Challenging	6.8	5.4	6.1	6.0
Commercialised	0.3	0.9	0.6	2.4
Crowded	8.4	10.6	9.5	8.5
Dangerous	1.0	0.6	0.8	2.4
Developed	9.8	7.2	8.5	0
Disorganised	1.1	1.1	1.1	3.0
Educational	50.9	36.7	43.8	24.5
Empty	0.9	0.3	0.6	2.4
Enclosed	4.4	3.2	3.8	2.1
Exciting	14.8	10.6	12.7	13.6
Exposed	15.8	20.6	19.7	12.4
Forbidding	0.1	0.3	0.2	0.6
Friendly	50.3	33.5	41.9	25.7
Healthy	85.9	79.1	82.5	71.9
Hostile	0.2	0.6	0.4	0.3
Inviting	45.1	36.1	40.6	44.1
Lonely	3.5	2.9	3.2	10.0
Maintained	59.1	45.3	52.2	7.9
Monotonous	0.6	0.6	0.6	0
Natural	83.3	79.9	81.6	89.1
Noisy	2.6	3.4	3.0	3.3
Organised	19.7	16.3	18.0	0.3
Open	59.1	52.1	55.6	52.6
Passive	3.7	4.3	4.0	5.4
Peaceful	62.6	52.4	57.5	65.0
Pleasant	80.8	75.6	78.2	73.4
Pretty	27.4	21.2	24.3	40.5

	Beacon Fell			Trough of Bowland
	Pilot	Main	All	
Quiet	34.4	25.2	29.8	41.4
Relaxed	61.6	47.0	54.3	56.2
Remote	9.0	10.0	9.5	18.4
Restricted	1.7	1.7	1.7	4.8
Safe	58.8	45.6	52.2	28.4
Small	6.4	8.0	7.2	4.8
Spoilt	0.8	2.6	1.7	2.7
Stimulating	25.7	20.3	23.0	19.0
Striking	13.1	9.3	11.2	10.9
Tense	0.1	0.3	0.2	0
Tidy	63.9	59.9	61.9	37.2
Ugly	0	0	0	0
Undeveloped	8.1	10.9	9.5	29.6
Unpleasant	0.1	0.3	0.2	0
Unspoilt	52.9	48.1	50.5	57.4
Unusual	8.3	6.9	7.6	8.5
Varied	20.7	16.9	18.8	18.7
	n = 178	n = 349	n = 527	n = 331

BIBLIOGRAPHY

Allport, W.G. (1977) Beacon Fell Country Park: Information on Development, Management and Costs Lancashire County Council

Appleton, J. (1975) The Experience of Landscape Wiley

Bates, G.H. (1935) 'The vegetation of footpaths, sidewalks, cart-tracks and gateways' J.Ecol. 23 470-89

Bayfield, N.G. (1980) 'Replacement of vegetation on disturbed ground near ski-lifts in the Cairngorm Mountains, Scotland' J.Biogeog. 7.3 249-60

Bayfield, N.G. (1971) 'Some effects of walking and skiing on the vegetation at Cairngorm', in Duffey, E. and Watt A.S. (Eds) The Scientific Management of Plant and Animal Communities for Conservation Blackwell

Bayfield, N.G. and Moyes, S.M. (1972) 'Simple automatic people counters for gates and stiles' Recreation News Supplement 6 18-21

Bayfield, N.G. and Pickrell, B.G. (1971) 'The construction and use of a photoflux people counter' Recreation News Supplement 5 9-12

Beazley, E. (1969) Designed for Recreation Faber and Faber

Boyle, K. (1930) Plagued by the Nightingale Virago (1981)

Brontë, C. (1850) Memoir of Emily Jane Brontë Collins (1954)

Brotherton, I. et alia (1977) Tarn Hows: an approach to the management of a popular beauty spot Countryside Commission CCP 106

Brown, I. et alia (1976) Countryside Recreation Site Survey Vol.1 Clwyd County Council, Planning Department

Burden, R.F. and Randerson, P.F. (1972) 'Quantitative studies on the effects of human trampling on vegetation as an aid to the management of semi-natural areas' J.App.Ecol. 9 439-57

Burton, R. (1974) The Recreation Carrying Capacity of the Countryside Keele University OCC. Paper No.11

Burton, T.L. (1967) Windsor Great Park: a recreation study Study in Rural Land Use No.8 Department of Economics, Wye College, University of London

Cairns, J. (Ed) (1980) The Recovery Process in Damaged Ecosystems Ann Arbor Science

Chappell, H.G. et alia (1971) 'The effects of trampling on a chalk grassland ecosystem' J.App.Ecol. 8 869-82

Clapham, A.R., Tutin T.G. and Warburg, E.F. (1962) Flora of the British Isles Cambridge U.P.

Coates, U.A. (1970) Beacon Fell Country Park Lancashire County Council, Planning Department

Coker, A.M. and P.D. (1972 a) 'Pressure sensitive counters' Recreation News Supplement 7 14-17

Coker, A.M. and P.D. (1972 b) 'A simple method of time-lapse photography for use in recreation studies' Recreation News Supplement 8 9-13

Coppock, J.T. and Duffield, B.S. (1975) Recreation in the Countryside: a spatial analysis MacMillan

Countryside Commission (1979) Digest of Countryside Recreation Statistics CCP 86 CC

Countryside Commission (1980) Grassland Establishment in Countryside Recreation Areas Handbook No.13 CC

Countryside Commission (1971) The Pennine Way Survey CCP 63 CC

Countryside Recreation Research Advisory Group (1970) Countryside Recreation Glossary CC

Countryside Review Committee (1979) Conservation in the Countryside Topic Paper 4 HMSO

Davidson, J. (1970 a) Outdoor Recreation Surveys: the design and use of questionnaires for site surveys CCP 31 Countryside Commission

Davidson, J. (1970 b) Outdoor Recreation Information: suggested standard classifications for use in questionnaire surveys CCP 32 CC

Dower, M. (1965) 'The Fourth Wave' Architects' J. 141 123-90

Duffell, J.R. (1975) 'Countryside recreation trip origins: use of the registration number technique' Traffic Engineering and Control Jan 31-7

Duffey, E. et alia (1974) Grassland Ecology and Wildlife Management Chapman and Hall

Duffey, E. (Ed) (1967) The Biotic Effects of Public Pressure Monk's Wood Experimental Station Symposium No.3

Edington, J.M. and M.A. (1977) Ecology and Environmental Planning Chapman and Hall

Edwards, R.Y. (1967) 'The impact of recreation use on the landscape in the mountains of western Canada' IUCN 124-6

Fairbrother, N. (1970) New Lives, New Landscapes Architectural Press

Fines, J.M. (1968) 'Landscape evaluation: a research project in East Sussex' Reg.Studies 2 41-55

Fitton, A.M.H. (1978) 'The reality - for whom are we actually providing?' Countryside For All CRRAG Conference Report

Gemmell, R.P. (1976) Path Seeding Trials on Beacon Fell Lancs. C.C.

Gemmell, R.P. and Crombie, S.A. (1978) 'Beacon Fell's recovering from the patter of many feet' Surveyor 3 Aug 17-8

Gilg, A.W. (1978) Countryside Planning: The first three decades 1945-76 Methuen

Goldsmith, F.B. (1974) 'The ecological effects of visitors in the countryside', in Warren, A. and Goldsmith, F.B. (Eds) Conservation in Practice 217-32 Wiley

Goudie, A. (1981) The Human Impact: Man's Role in Environmental Change Blackwell

Green, B. (1981) Countryside Conservation Allen and Unwin

Greig-Smith, P. (1964) Quantitative Plant Ecology 2nd ed Butterworth

Grime, J.P. (1979) Plant Strategies and Vegetation Processes Wiley

Halls, B.R. and Folland, C.J. (1970) The Soils of Lancashire Soil Survey of Great Britain Bulletin No.5 Agricultural Research Council Harpenden

Harrison, C.M. (1979) 'Ecosystems and communities: pattern and process', in Gregory, K.J. and Walling, D.E. (Eds) Man and Environmental Processes Dawson Westview Press

Harrison, C.M. (1971) 'Recent approaches to the description and analysis of vegetation' Trans.of the I.B.G. 52 113-27

Higgs, A.J. (1981) 'Island biogeography theory and nature reserve design' J.Biogeog. 8 No.2 117-24

House, J.W. (Ed) (1971) The U.K. Space: resources, environment and the future Weidenfeld and Nicolson 2nd ed

HMSO Government Paper The Countryside Act 1968

HMSO Government Paper The Countryside Bill 1978

HMSO Government Paper The National Parks and Access to the Countryside Act 1949

HMSO Government Paper The Wildlife and Countryside Bill 1980

HMSO (1980) Social Trends Central Statistics Office

Huxley, J. (1974) 'Wilderness', in Warren, A. and Goldsmith, F.B. Conservation in Practice Wiley

Lancashire County Council (1981) Central and North Lancashire Structure Plan: Explanatory Memorandum Lancs. C.C.

La Page, W.F. (1962) 'Recreation and the forest site' J.Forestry 60 319-21

Liddle, M.J. (1975) 'A selective review of ecological effects of human trampling on natural ecosystems' Biol.Consv. 7 17-36

Lloyd, R.J. (1970) Countryside Recreation: the ecological implications Lindsey County Council

Lowenthal, D. (1968) 'The American Scene' Geog.Rev. 58 61-88

Lowenthal, D. (1978) 'Finding valued landscapes', in Progress in Geography 11 374-418 Arnold

Lucas, R.C. (1964) 'Wilderness perception and use: the example of the Boundary Waters Canoe Area' Natural Resources J. 3 394-411

McIntosh, R.P. (1980) 'The relationship between succession and the recovery process in ecosystems', in Cairns, J. (Ed) The Recovery Process in Damaged Ecosystems Ann Arbor Science

Mercer, D.C. (1979) 'Outdoor recreation: contemporary research and policy issues', in Progress in Resource Management and Environmental Planning Vol.1 Ed O'Riordan, T. and D'Arge, R.C. Wiley

Miles, C.W.N. and Seabrooke, W. (1977) Recreational Land Management Span

Ministry of Land and Natural Resources (1966) Leisure in the Countryside: England and Wales Cmnd 2928 HMSO

Morris, H. et alia (1977) Routes for People: an experiment in rural transport planning CCP 108 Countryside Commission

Nature Conservancy Council (1977) Nature Conservation Review: Selection of Biological Sites of National Importance for Nature Conservation in Britain Camb.U.P.

Nie, N.H. et alia (1975) Statistical Package for the Social Sciences McGraw-Hill New York 2nd ed

O'Connor, F.B. (1974) 'The Ecological basis for conservation', in Warren, A. and Goldsmith, F.B. (Eds) Conservation in Practice 87-98 Wiley

Odum, E.P. (1971) Ecology Holt

P.A. Management Consultants Limited (1975) Tourism in the North West English Tourist Board

Patmore, J.A. (1970) Land and Leisure David and Charles

Patmore, J.A. and Rodgers, H.B. (1972) Leisure in the North West North West Sports Council

Pearsall, W.H. (1968) Mountains and Moorlands Collins 2nd ed Revised Pennington, W.

Perring, F.H. (1967) 'Changes in chalk grassland caused by galloping', in Duffey, E. (Ed) The Biotic Effects of Public Pressure on the Environment Symposium No.3 Monk's Wood Experimental Station

Phillips, J., Yalden, D. and Tallis, J. (Eds) (1981) Peak District Moorland Erosion Study: Phase 1 Report Peak Park Joint Planning Board

Priddle, G. (1978) Queue here for the wilderness Open University D204/01F

Readers' Digest/AA (1975) No Through Road Drive Publications Limited

Schofield, J.M. (1967) 'Human impact on the fauna, flora and natural features of Gibraltar Point', in Duffey, E. (Ed) The Biotic Effect of Public Pressure on the Environment Symposium No.3 Monk's Wood Experimental Station

Settergren, C.D. and Cole, D.M. (1970) 'Recreation Effect on soil and vegetation in the Missouri Ozarks' J.Forestry 68 231-3

Settle, J.G. (1977) Leisure in the North West: a tool for forecasting Sports Council Study No.11

Sherwood Forest Study Group (1974) The Sherwood Forest Study Nottingham County Council

Shoard, M. (1980) The Theft of the Countryside Temple Smith

Simmonds, I.G. (1980) 'Biogeography', in Brown, E. (Ed) Geography: Yesterday and Tomorrow 146-66 Oxford U.P.

Speight, M.C.D. (1973) Outdoor Recreation and its Ecological Effects Discussion Paper in Conservation No.4 University College London

Stoakes, R. (1979) 'Participation in Informal Countryside Recreation', in Digest of Countryside Recreation Statistics CCP 86 Countryside Commission

Streeter, D.T. (1971) 'The effects of public pressure on the vegetation of the chalk downlands at Box Hill, Surrey', in Duffey, E. and Watt, A.S. The Scientific Management of Plant and Animal Communities for Conservation 11th Symp.Brit.Ecol.Soc. Blackwell

Tansley, A.G. (1939) The British Islands and Their Vegetation Camb. U.P.

Trudgill, S.T. (1977) Soil and Vegetation Systems Oxford U.P.

United States Congress (1964) The Wilderness Act Public Law 88-577 88th Congress S.4.

van der Maarel, E. (1971) 'Plant species diversity in relation to management', in Duffey, E. and Watt, A.S. (Eds) The Scientific Management of Plant and Animal Communities for Conservation Blackwell

van Wijngaarden, M., de Vink, A. and Stuyt, G. (1973) Forest of Bowland AONB: Recreation Survey 1973 Lancashire County Council

Wall, G. (1972) 'Socio-economic variations in pleasure-trip patterns: the case of Hull car-owners' Trans.I.B.G. 57

Waugh, M. (1981) The Shell Book of Country Parks David and Charles

Wells, T.C.E. (1971) 'A comparison of the effects of sheep grazing and mechanical cutting on the structure and botanical composition of chalk grassland', in Duffey, E. and Watt, A.S. (Eds) The Scientific Management of Plant and Animal Communities for Conservation 11th Symp. Brit.Ecol.Soc. Blackwell

Westhoff, V. (1967) 'The dynamic structure of plant communities in relation to objects of conservation', in Duffey, E. (Ed) The Biotic Effects of Public Pressure on the Environment Symp. No.3 Monk's Wood Experimental Station

Westhoff, V. (1967) 'The ecological impact of pedestrial, equestrial and vehicular traffic on vegetation' IUCN 218-24

White, J. and Dunn, M. (1974) Recreational Use of the Countryside: a case study in the West Midlands Centre for Urban and Regional Studies Research Memorandum No.33 University of Birmingham

Williams, W.T. and Lambert, J.M. (1959) 'Multivariate methods in plant ecology: I Association - analysis in plant communities' J.Ecol. 47 83-101