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The complex relationship between landscape and recreation

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Abstract

The relation between landscape and recreation is very complex. There are various, interrelated approaches to analyze this relation, such as land evaluation, impact analysis, spatial behaviour analysis, and assessment of the scenic quality of the landscape or landscape evaluation. In many of these approaches airphoto interpretation can be a useful tool.

Introduction

Man uses the land in many ways. Recreation as a form of land use is of increasing importance in many parts of the world. Man's relation with the landscape through recreation is special and is less prone to strictly economical or utilitarian considerations.

'Landscape', in a holistic sense, is synonymous with 'land', as well as with 'environment' (Zonneveld **1979;** Vink **1982).** In addition, there is 'visual landscape' or 'scenery' (Zonneveld **1979;** Bartkowski **1985).** The various landscape types and elements may have different suitabilities and/or attractiveness for recreation.

Based on the concepts of Pearson **(1961)** and Clawson and Knetsch (1966), recreation is defined as "refreshment of body or mind by activities, or a planned inactivity, undertaken because one wants to do it, without any moral, economical, social or other pressure' (Van der Zee **1971, 1986** and **1987).** This definition of recreation comprises a large variety of activities and implies that recreation includes a large number of activities that take place in or near home, and have no relation whatsoever with rural or natural landscapes. But some recreational activities exclusively occur in rural or natural areas. Thus, a key concept in the study of the relations between 'recreation' and 'landscape' is that of 'recreational resources'.

Recreational resources

People travel from their home base because they want a type of recreation that cannot be provided there. The direction of their travel is determined by 'recreational resources'. Some want a mere change of surroundings, so any place away from home will do. Others want sunny and sandy beaches to lie on, mountains to climb, lakes to sail on, or snow to ski on, but this does not make all beaches, mountains or lakes into recreational resources.

Landscape features are resources only when man identifies them and uses them as such. They may have no original relation to recreation (Van der Zee **1986, 1987).** Recreational facilities can be considered as 'derived' from these resources. It

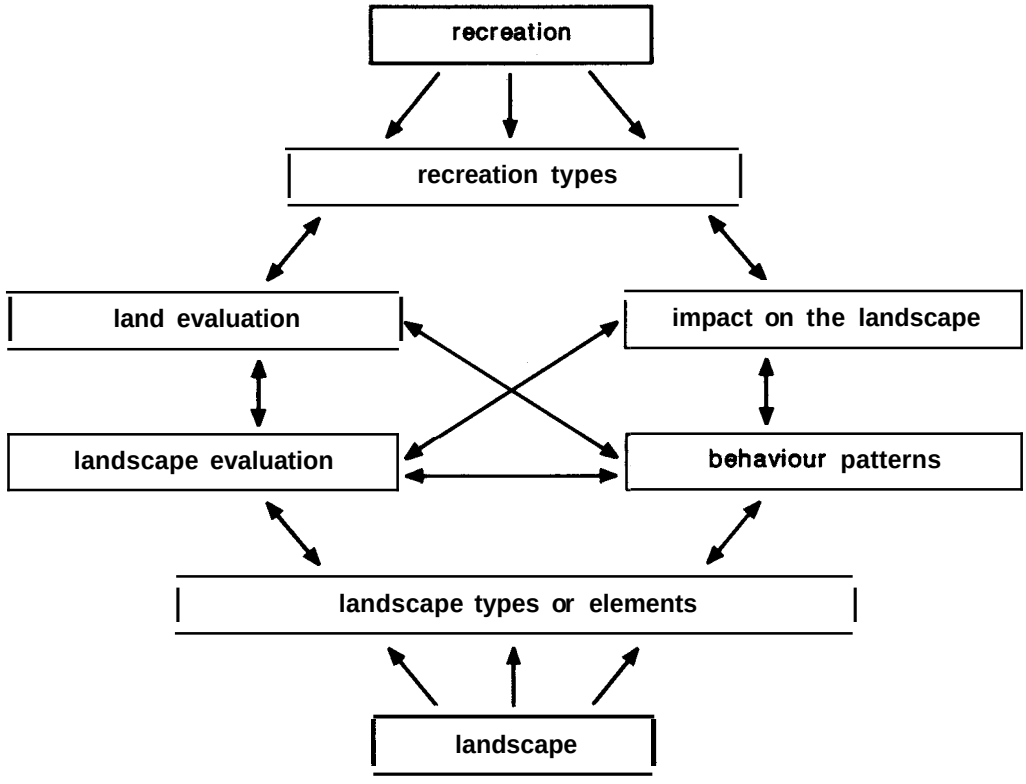

Fig. 1. **The complex relations between landscape and recreation.**

is important to note that the difference between original resources and derived facilities is not that between natural and man-made factors, because man-made objects may be found among the resources, for example, monuments, reservoirs, picturesque towns or villages.

With respect to their spatial distribution recreation areas can be classified into three main types: 'user-oriented', 'resource-based' and 'intermediate' (Clawson and Knetsch **1966;** Patmore **1972).** User-oriented areas are characterized by facilities that are important more for their location and ready accessibility than for their inherent quality. The dominant characteristic of resource-based areas is their outstanding physical resources, irrespective of their location. Intermediate areas lie between these extremes, both geographically and in terms of use.

Recreation in most of the rural landscape will be resource-based, and 'it is in the resource-based land that the most serious conflicts arise between those who seek to enjoy the resource and those concerned, with varying motives, for its preservation' (Patmore **1972).** Several approaches for understanding the relations between recreation activities and landscape types are needed to achieve an optimal combination of both recreation and preservation of nature and landscape.

Relations between landscape and recreation

Creating and maintaining recreational facilities and providing goods and services to recreationists may have a positive impact on the economy of a region. Therefore, it may be rewarding to analyze the rural landscapes for their recreational potential, suitability and attractiveness; that is, to apply 'landscape evaluation' to recreation. The presence of recreational facilities and activities may have a negative impact on the environment, sometimes to such an extent that the quality and quantity of the recreational resources is endangered. Therefore, it is

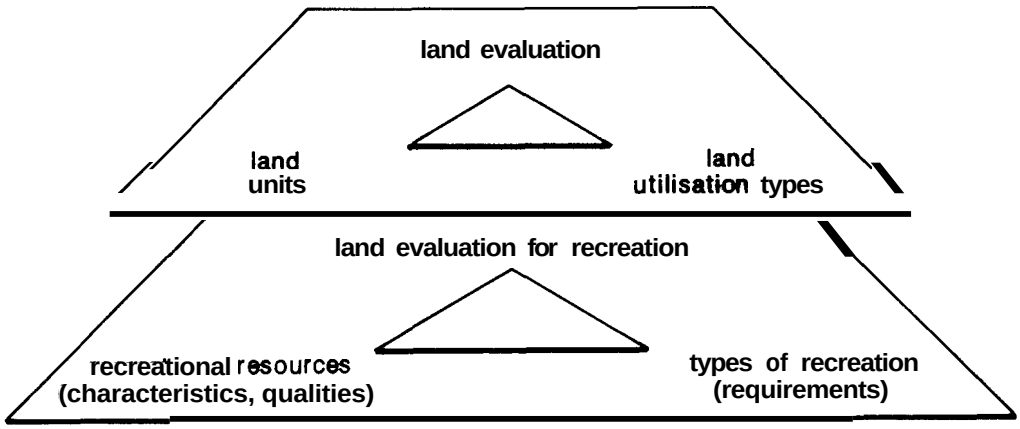

Fig. 2. Land evaluation for recreation.

necessary to analyze the behaviour of recreationists and their impact on the environment. The analysis of the relation between recreation and landscape can be carried out by landscape evaluation, impact analysis, and behaviour pattern analysis.

Land evaluation for recreation

Land evaluation is a method or procedure in which the characteristics of Land Units (LU's), displayed on maps, are evaluated for requirements of specific land uses or 'Land Utilisation Types' (LUT's) (Van der Zee 1986, based on FAO 1977). Land evaluation requires the collection and inventory of many basic data associated with land, water and human development, and therefore, can be a good approach for a better understanding of the relations between landscape and recreation.

When recreation is considered as a major kind of land use in the same way as forestry or irrigated agriculture the land units can be interpreted for their recreational resources. Land utilisation types used in this context are individual types of recreation, such as boating, swimming, hiking, riding, etc., each with its own land requirements that have to be specified.

Identification of relevant recreation types

One of the first steps in the evaluation procedure is to identify the relevant LUT's for recreational use. This might be accomplished by establishing peoples preference for and participation in recreation by looking at membership of associations or clubs (Cosgrove and Jackson 1972; Patmore 1972 and 1983) by interviews, or by surveys. Use of club membership has two objections. First, membership does not necessarily give a realistic measure of the rate of active participation. Second, it covers only the realm of formal recreation activities and excludes informal recreation. Moreover, such data hardly reveal anything about land quality requirements for recreation.

Interviewing people requires a representative sample of sufficient size, a standardized and tested questionnaire, and numerous skilled interviewers. This approach is difficult to organize and is expensive. The development of a good questionnaire is far from easy. While it is difficult enough to get reliable answers from people of the same culture and language, as was experienced in the study of Van der Zee (1971) in the Netherlands, it becomes almost impossible when working in a different cultural setting and having to rely on interpreters for the interviewing.

The 'method of potentialities' suggested by Defert (1954) may be a solution. If the recreational use is not known, at least the capacity of the available facilities can be established and mapped. In most cases this means an inventory and the mapping of the 'physical framework' (Defert 1954), or the physical infrastructure of recreation (Van der Zee 1986). An inventory of recreational facilities, classi-

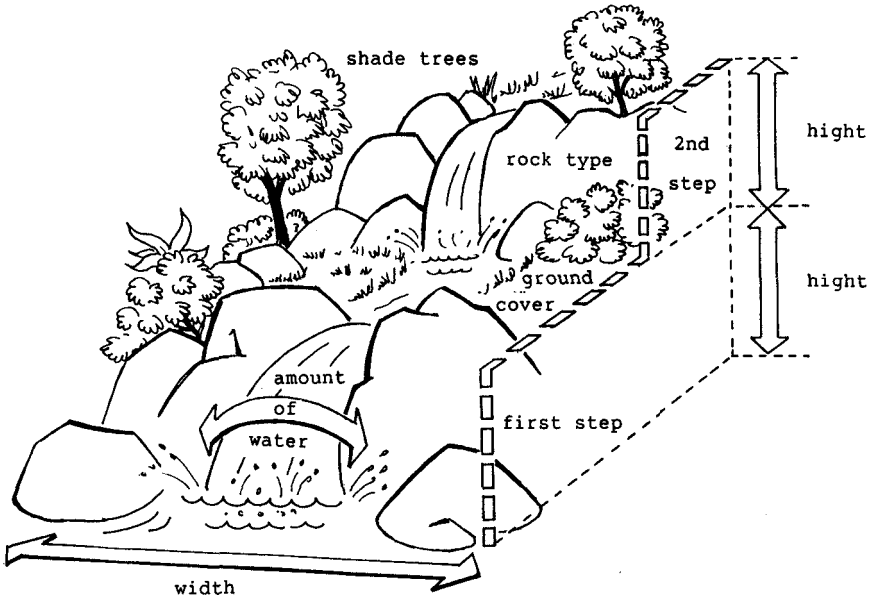

Fig. 3. Parameters **to** compare waterfall sites.

fied according to type and capacity, also gives an indication of which recreation types are in demand. Latent demand and possible future developments are not revealed, but that would be difficult with the other methods too. In addition, there are types of recreational use that do not need special facilities and, therefore, can not be caught in such an infrastructure map.

A map of facilities does not tell anything about actual use, which may be larger or smaller than the capacity (Defert 1954). Surveys can give an indication of the extent to which the facilities are used and thus give a weight factor to each recreation type. An inventory of recreational facilities might be accomplished by quick overall reconnaissance or airphoto interpretation (see MacConnel and Stoll 1969; Van der Zee 1982, 1986 and 1988c).

The identification and inventory of recreational resources

The next step is to establish the land qualities necessary for the recreation uses. These requirements may be obvious for uses such as boating and swimming where water is essential. Yet a map of water bodies and water courses does not necessarily give a good picture of the potential for water sports. A forest setting is attractive for many activities, but a map of forest areas is not identical to a map of forest recreational resources.

First, the physical characteristics of the resource should be described. Agricultural LUT's are mainly described in terms of soil and terrain. These qualities, easily quantifiable and similar for different LUT's, have given rise to standardized procedures. For recreational LUT's, such types of parameters can seldom be used exclusively. An example is the parameters developed to analyze waterfall sites in Northern Thailand (Van der Zee 1988a and 1988b) (Fig. **3),** after a reconnaissance inventory had revealed that such sites were highly favoured for recreation (Van der Zee 1988c). The physical requirements for each type of recreation may differ.

Next the spatial patterns of these physical resources must be established. Once this has been done, landscape elements matching the required parameters can be inventoried for areas where no recreational use is observed. This can indicate the availability of potential sites that may be developed. Comparison of actual recreational resources with such potential resources may reveal those factors which determine use or non-use. From the attempt to assess the importance of each of the

resource qualities for a number of waterfall sites in northern Thailand, it became clear that these qualities are very difficult to quantify and calculate their proportional influences. However, high use did correspond with ease of accessibility, except when the site quality (determined by physical characteristics as well as scenic quality) was low. Greater accessibility can compensate for a somewhat lower site quality but cannot bring high use to the lowest quality sites (Van der Zee 1988a and 1988b). Also, certain types of landscape elements on their own may have insufficient attraction for recreation, but in combination with other elements can be a valuable recreational resource.

When it is possible to analyze the land use patterns of the past (for example, by interpreting older sets of airphotos), we can determine which parts of the area were first occupied by recreational uses and which parts were incorporated in later phases. Also, we can determine the character of the area before recreational development took place. Such a study may indicate which types of resources have (or had) the highest preference (Van der Zee 1982, 1986 and 1988c).

When the recreational resources have been identified and inventoried, the suitability of the resources for various recreational activities can be assessed. In this assessment three aspects are distinguished.

1. The 'physical suitability' determines whether an activity is possible. For example, for swimming or boating a certain minimum extent and depth of water is a basic requirement. The assessment of the physical suitability is the subject of land evaluation in the strict sense.
2. The 'scenic quality' can make one site more attractive than another, even though the physical suitability is the same. For many people a swimming pool located in a city block is less attractive than the same pool would be in a forest setting. The assessment of the scenic quality has the greatest degree of subjectivity of the three and often is not included in land evaluation for non-recreational LUT's. However, for recreation land evaluation it cannot be neglected.
3. Not the least important is 'accessibility'. A site can be the most physically suitable and have the nicest scenic setting, but if people cannot reach it, they will go to less suitable, less attractive but more accessible sites. Still, for certain forms of recreation the accessibility factor may be less critical, because the journey may be an integral part of the recreation experience.

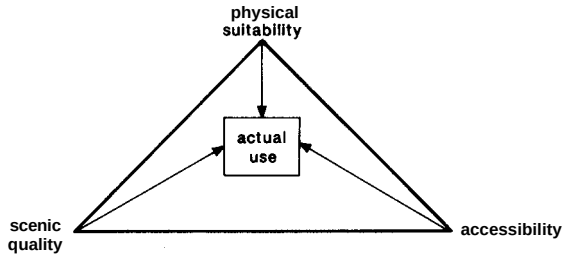

Fig. 4. **Three aspects in the suitability assessment for recreation.**

Which of these aspects is most important in determining the actual use pattern and potential suitability will vary from one situation to another, and will depend on the type of recreation and landscape.

Main approaches to land evaluation for recreation

There are different approaches and different levels of detail (reconnaissance, semidetailed and detailed) in land evaluation for recreation. (Van der Zee 1986). One starting point may be an increasing demand for recreation that is exerting pressure on the available resources. After identification of the major demands, properly defining them as recreational LUT's and analyzing their requirements, an inventory is made of the land units, landscape elements or resources that are suitable for these LUT's. Actual use then is compared with the potential use. This gives an indication of the possibilities for further development. These can lead to the development of unexploited resources or to measures for achieving an optimal use of the present resources. This is called the 'recreation approach'.

Another starting point can be the idea that a recreational resource is available and that development of it might attract recreationists (tourists) from elsewhere, who will spend money to obtain goods and services and thus have a positive influence on the economy of the region. After a first exploratory definition of the resource, the potential

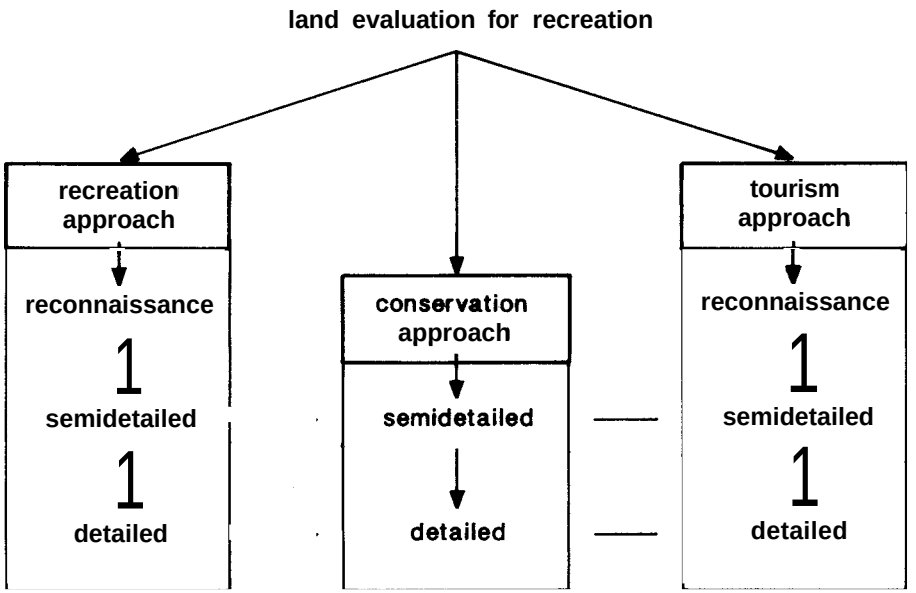

Fig. *5.* Three approaches to land evaluation for recreation.

demand should be identified. That means answering the following questions. For what type of recreational LUT's would this resource be suitable, where are the demands for this LUT, and what alternative competing supplies are available? In other words, what is the chance that development of the resource will attract sufficient numbers of tourists to make the investment worthwhile? Only after this question has been answered positively should further studies be undertaken to determine where best to develop facilities. This is called the 'tourism approach'.

Sometimes recreationists are attracted by resources that also have high value for nature and/or landscape conservation and that may be damaged by too high a recreational pressure. In this case, actual use and potential use are compared and possible future developments identified. These future developments can be anticipated and guided or deflected by knowledge about factors influencing spatial behaviour. Thus, with proper management, the main conservation aim may be achieved without banning recreation completely. This is called the 'conservation approach'. **A** variation of this approach is to identify recreational LUT's which could be tolerated in parts of the area without interferring with the major aim of conservation. This is the 'permissive approach'. Only in the conservation approach will a semi-detailed or detailed analysis be required directly from the start.

Of course, other approaches are possible, and it is clear that 'land evaluation for recreation' can not be a single uniform procedure applying a standard recipe. Each approach and recreation type requires a tailormade procedure, and different landscapes or land units will match their demands.

Analysis of the impact of recreation on the landscape

The impact of recreation

Like every human activity outdoor recreation influences the natural environment and can be as destructive as any industry. This certainly is not only a 'luxury' problem of the rich western countries, but the impact of recreation on the landscape in developing countries will become more obvious as standards of living rise (Robinson **1972).** Therefore, when assessing the suitability of land units for a type of recreation, attention must be paid to the impact that this recreation will have on those land units.

The type and strength of impact depends on both

the activity and type of landscape. The impacts from recreation have been classified into several categories.

Impact by physical facilities

The most direct and clear impact on the landscape is caused by the physical facilities for recreation, which may be either permanent, semi-permanent or temporary. The aspect of a landscape can change drastically if it is occupied by summer cottages, caravans, camping sites, or a large parking place (Van der Zee **1982).**

All these facilities occupy space, even though the direct claim on space is often modest (Patmore **1983).** However, the impact of physical facilities may be indirect. Service facilities, such as shops, bars, restaurants, hotels, and pensions, prefer a location in a village, adding to the total number of structures. Villages with a recreational function have the tendency to expand (Van der Zee 1983), but the areas taken over by this expansion often do not have the highest natural values.

Not all facilities, however, cling to existing settlements. Sometimes complete new recreational settlements are created, and sometimes facilities are dispersed over the countryside. This dispersal often is at the cost of areas with high natural and landscape value, the very qualities that attracted recreation.

It is not only the recreational residence and related facilities that create an impact on the landscape, but transportation network, providing internal and external accessibility to the recreation areas, can put a heavy claim on the environment too. Also, facilities created directly for the recreational activities may occupy considerable space and severely influence the landscape. For example, in Austria, between **1964** and **1975,** more than **10,000** ha of forest were cut for ski trails (Lansink **1983).**

Sometimes changes are planned and occur in a rather short time, but often the development of physical facilities is a gradual process that is hard to recognize. In such cases, the interpretation of sequential aerial photographs may make the process clear and reveal its pattern. This not only helps in identifying the recreational resources in more detail but also to find ways to control the process.

Impact on vegetation

The impact of recreation is not restricted to the space it directly occupies with physical facilities. That a natural landscape is without any 'official' land use designation does not imply that it is not used at all and is uninfluenced by man. Whenever recreationists visit the natural landscape, they walk in it, sit in it, play in it, and throw litter around. In short, they display behaviour that normally is not destructive in intention but is damaging in effect, because the resulting changes in vegetation cause degradation of the plant communities and even soil erosion (Van der Zee **1983).** People can do as much damage to young vegetation as a bulldozer (Clawson and Knetsch **1966).**

The vegetation may be influenced in several ways by recreation. Littering may turn oligo- or meso-trophic environments eutrophic and change the species composition. Recreationists may pick flowers, take fruit or parts of the vegetation, or even dig out complete plants. If this is done frequently and continuously, some species will disappear. Planting exotic vegetation may also influence the vegetation (Raad voor Milieu en Natuur Onderzoek **1985).** Excessive withdrawal from the groundwater layers to meet peaks in water consumption caused by recreational visits may result in lowering of the groundwater level to such an extent that the vegetation is seriously influenced.

But, the effects of recreation are most pronounced when the feet of recreationists create a network of tracks and paths and areas of bare soil. This is the ultimate stage of a process that starts with a change in the vegetation composition and a general degeneration of the vegetation. Of course, some soils and vegetation types are more vulnerable than others. In some types of recreation people are more inclined to leave the paved roads and paths than in others. Because this 'recreational erosion' is a gradual process, often its extent can be judged only by comparing sequences of aerial photographs. Changes in vegetation composition are hard to identify, but the increase in length of the worn path-

network and the increase in area of bare soil easily can be measured and expressed quantitatively (Van Ittersum and Kwakernaak 1977; Van der Zee 1983). The patterns revealed by such an inventory may give a further indication about the relation between recreation types and landscape elements and the spatial behaviour of the recreationists.

Impact on animals

The impact of recreation on animals occurs indirectly through reducing the extent of habitat by the construction of physical facilities, or by changing the character of habitat through impact on the vegetation or water quality. Direct impact comes by taking or killing fauna. Also the mere presence of recreationists is a direct impact. People, boats, vehicles, and planes create noise, vibrations and visual disturbance (Raad van Milieu en Natuur Onderzoek 1985). Larger mammals, birds of prey, small singing birds and birds that nest on the ground are especially susceptible (Goderie 1986). Even in the most isolated areas animals may be disturbed by a noisy schoolclass, an enthusiastic botanist, photographer or bird-watcher. When disturbances are frequent and continuous, the result may be the disappearance of species or a reduction of total animal life.

Recreation not only leads to a decline in animal numbers, but it can change the species composition of an area. For example, fish and pheasants are stocked for recreational purposes, and scavenging species are attracted to areas where there is litter accumulation, as in car parks and around campsites. Direct feeding of animals may lead to local overpopulation of pigeons, squirrels or ducks. Although the impact of recreation on animals is not as easy to determine and inventory as that on vegetation, it certainly should not be neglected.

Recreation causes many impacts and thus influences the recreation resources. Understanding the causes and consequences of these impacts is necessary if the conservation of these resources is desirable. In addition, the patterns of impact can reveal the spatial behaviour pattern of users, and this can be useful information in the land evaluation procedure.

Analysis of the spatial behaviour of recreationists

The need for knowledge on spatial behaviour

Recreation can occur everywhere but tends to be highly localized. An inventory of recreational facilities can give an impression of the spatial distribution of recreational land use, that is the result of the physical suitability, accessibility and scenic quality of the landscape. It has been observed that within a single recreation area as much as 95% of the total use occurs on as little as 5% of the area (Clawson and Knetsch 1966). Overcrowding of such popular sites raises the problem of how access and development can be managed for long-term conservation (Cosgrove and Jackson 1972). It also means that, even though there will always be some disturbance in the most isolated areas, the largest part of the area can be managed with minor measures only.

In order to plan for management of recreational resources, detailed information on the spatial behaviour of recreationists within a landscape element is required. Where do people walk and sit in the forest, at the beach or the lakeshore? What parts of the lake are more frequented by boats and what parts are hardly visited? Such information can help in specifying the physical requirements of a recreation type and in determining how the different aspects of suitability are interrelated.

The structure of space and choice of place

The spatial behaviour of recreationists depends on how the landscape is structured and perceived. Three types of space can be distinguished: space through which one moves, spaces which one occupies for a period and spaces which one only sees. Many relations exist between these three types of space. What can be seen of the surrounding space depends on the routes along which one moves. These routes are determined by the location of the starting point, the target point and the connections between them. The method of movement also influences the way one sees and what can be seen. Moving through an area on foot, bicycle, horse back or in a motorcar determines the speed and

the eye height above ground level (De Jonge **1965).**

Visitors to a recreation area can be grouped into two main categories: 'stationary recreationists', those that settle predominantly close to entrances and roads, and 'mobile recreationists', those that move through the area. For the first category, social togetherness often is an important recreation motive, whereas the mobile visitors have more interest in the landscape and nature (De Jonge **1968).** But both categories of visitors require a clear impression of the spatial structure of the area, otherwise, visitors may get lost or feel uncomfortable (De Jonge **1965).**

The spatial pattern of recreation is characterized by intensively used nodes with linear linkage by roads, bridle tracks and paths (Patmore **1972).** The lack of linkage of one concentration point to another may limit the recreational possibilities of an area. The concept of 'connectivity' that is applied in so many landscape ecological studies (for example, Schreiber **1988)** is important in this context too. It is also important to note that border zones of two relatively homogeneous areas, *e.g.* beaches, shorelines, and forest edges, are more densely occupied by recreationists than the other parts of these homogeneous areas. This phenomenon is called the 'border effect' (De Jonge **1968).** The preference of visitors for 'border zones' in flat terrain is striking (De Jonge **1965).** This can be explained by the tendency of people to select a place with a certain visual shelter (especially at their back) but, at the same time, allowing a view over an open space (De Jonge **1968).**

Analysis of spatial behaviour of recreationists

The analysis of the way in which the structure of space influences the spatial behaviour of recreationists and their distribution over a recreation area can be done by field observations, marking on a map the places where groups or individuals settle down, and counting the number of people and groups in the various areas at specific times. Interviews can add to the information. By comparing observations of different areas and periods, conclusions can be drawn about choice and the way choice responds to changing circumstances (De Jonge **1968).** Such an approach is very labour intensive and is hardly suitable for large areas.

Indirect monitoring

When recreational use of the land results in the creation of more or less permanent recreational facilities, or clearly visible signs of impact, interpretation of a single coverage of aerial photographs may reveal the spatial pattern. However, interpretation of sequences of aerial photographs over several years reveals trends in both the preferences of recreationists and their pressure on the resources. Because the activities are not directly studied, this analysis of spatial behaviour is called 'indirect monitoring'. **An** example of an airphoto analysis of the pattern of paths in dune areas is that for the Dutch Wadden Sea islands (Van Ittersum and Kwakernaak **1977).** In addition to the assessment of the degree of impact, types of path-patterns were distinguished, which were correlated with the behavioural characteristics of the recreationists (Van der Zee **1983).**

Direct monitoring

The study of spatial behaviour can also be done by identifying recreationists, their vehicles, or vessels on sequences of aerial photographs taken during one day and/or in the course of one season. This is called 'direct monitoring'.

In the Netherlands, considerable experience has been gained in several surveys of water sports since **1969** (see Dodt and Van der Zee **1984).** In these surveys, aerial photography as well as visual observations from the air were used. The objects to be observed were counted directly, or on either vertical or (high and low) oblique airphotos. Boats were identified, distinguished by type, and marked in their approximate or exact location on a map. Boating densities were calculated per unit of area and length of shore line.

Similar studies have been carried out for beach or shoreline recreation. For example, the study of the

Randmeren (see Dodt and Van der Zee 1984), used large scale vertical airphotos to count people, tents, motorcars, surfboards, rubberboats, and other recreation paraphernalia for separate sections of beach and for different distances from the waterline. Distinct spatial patterns could easily be observed and analyzed. Irrespective of the natural qualities of an area, people tend to settle at the shortest distance from the parking place and/or entrance gate, cling to the roads and paths, and concentrate around facilities and attraction points (Van der Zee 1988b).

Landscape evaluation for recreation

Assessing the scenic quality of the landscape

Analysis of the spatial behaviour pattern reveals that most recreational use is restricted to small concentration points and that large parts of recreation and park areas have little activity, but provide the scenic setting for the recreation activities. The scenic quality, therefore, is one of the three aspects determining suitability for recreation. The analysis and assessment of this scenic quality is the subject of 'landscape evaluation'.

The way in which landscapes are seen and valued for their scenic quality is highly subjective (Clawson and Knetsch 1966; Zube 1987). Still, most people would agree that some areas are inherently more attractive than others (Clawson and Knetsch 1966). Such opinions have been compiled by enquiry surveys, sometimes referring to landscape elements depicted on a map or to photographs of specific landscape scenes (Baumgartner 1981; Zube 1987). Although subjective judgements can be clustered into reasonably objective results, this approach is rather laborious and is still not free from subjective tendencies.

The spatial behaviour of recreationists appears to be closely related to the spatial structure of the landscape and reveals preferences for certain landscapes and landscape elements. These landscape elements are reproducable by photography and sketches and accessible in cartographic form (Neef 1984), and, therefore, can be described by objective characteristics to which their apparent attractiveness can be related (Defert 1952). For comparative purposes, these chracteristics can be quantified (Cosgrove and Jackson 1972). Airphoto interpretation in this context can be a relatively fast, reliable and economic method to cover the need for data (Dodt and Van der Zee 1984). Approaching landscape evaluation in this way can make it more objective.

Analyzing the visual structure of the landscape

One approach to landscape evaluation for recreation was developed by Kiemstedt (1967, 1972 and 1975) who made use of the principles of Van der Ham and Iding (1971). By measuring and weighing climate, land use types, relief, and forest- and waterborders per square kilometer gridcell, an overall value was established that characterizes the landscape elements that affect the recreational attractiveness of an area. The inventory is restricted to the elements that visibly stucture the landscape and the open areas between. The elements are characterized by size, shape and density or transparency, the open areas by extent and the type of elements bordering them.

The spatial arrangement of these elements, called the 'visual structure' of the landscape, is of importance because it contributes to the visual information that is strongly related to the attractiveness of the landscape. In addition, the land use and field pattern contribute to the visual structure. Relief is significant, especially in a flat country such as the Netherlands.

For the inventory and analysis of space structure, topographic maps have been the main source of information on land use, field pattern, and relief. But newer methods have relied more on airphoto interpretation using units delineated by natural boundaries. Recently, satellite image analysis has been used (Janssens and Gulinck 1988).

Airphoto interpretation offers still other advantages. Colwell (1950) observed that points which have excellent views of the surrounding terrain are easily detected by stereoscopic airphoto interpretation. They can be used also to determine whether objects of scenic interest will be visible from certain

vantage points or will be obscured by intervening terrain. This means that 'viewsheds', the area seen from a viewing point can be determined (see for example: Aguilo and Ramos 1981).

When analyzing the visual structure of the landscape, it should not be forgotten that man perceives the landscape also by other senses (Bartkowski 1985), but that these ways of perception are more difficult to survey and analyze.

Conclusions

The relations between recreation and landscape are complex. While the various approaches and methods by which the different aspects of this relation can be analyzed could be only briefly described, it is clear that they are closely interrelated and are centered around land evaluation. Data collected for the analysis of one aspect also can help to explain other aspects of recreation. In many of the approaches, airphoto interpretation is a very useful tool, and it is worthwhile to further explore the possibilities of its use.

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