

THE IMPORTANCE OF WILDERNESS LANDSCAPE ANALYSIS IN DEVELOPMENT PLANNING SCHEMES FOR NATIONAL PARKS, WITH SPECIAL REFERENCE TO THE MOUNTAIN ZEBRA NATIONAL PARK

W VAN RIET

Landscape Architect
P O Box 3847
Pretoria
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Definition of the Concept "Wilderness"

The Wilderness Act of September 1964, of the United States of America, states that ". . . wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognised as an area where the earth and its community of life are not influenced by man and where man himself is a visitor who does not remain" (Nash 1967). The Act also states that a wilderness ". . . must retain its primeval character and influence and that it must be protected and managed in such a way that it appears to have been effected primarily by the forces of nature."

In essence the wilderness is an area where the impact of man appears to be absent. Firstly, this can mean that any person within a wilderness area must be able to appreciate wilderness through his senses. The influence of man must, therefore, not be seen, heard, smelled or touched. Secondly, in an ecological sense, wilderness can mean an ecosystem where the influence of man is absent.

In an ecological sense, man's influence on the ecosystem has extended in such a manner that neither the north nor south poles are completely uninfluenced by man. Man and various other factors involved have ensured that certain chemical substances have even spread to these extremities of the earth. There is, therefore, no place on earth where any ecosystem exists completely free of the influence of man.

In general, therefore, man's influence on wilderness must appear to be absent (Nash 1967). Wilderness is a visual situation and is delineated by man's perception. An important factor leading from this, is that wilderness can be recreated.

The wilderness experience

The wilderness experience can be classified into five areas of expression of the degree of feeling a person associates with a psychological object (Catton 1969). These five are physical, emotional, aesthetic, educational and social:

- (i) The physical act of walking or climbing and the stimulation of the body;
- (ii) Here a physical reaction takes place in response to a sensation of achieving something, such as exploring a new valley or viewing a large specimen of wildlife. Building a campfire or setting up camp could be of this nature;
- (iii) This type involves a mental reaction to a natural scene or colour and indicates appreciation. Two and three are easily confused;
- (iv) The opportunity to increase our knowledge of the whole range of environmental factors;
- (v) This is concerned with the interaction with other users, and is a type that becomes increasingly important with other types of visitation. In the wilderness it could mean contact with a friend accompanying the person or a brief conversation with a stranger during a chance meeting.

Research in the United States (Catton 1969) has indicated that the aesthetic and emotional experiences are the most highly valued of the five and only the physical experience that rates half as important, is considered valuable. Educational and social are not considered to be of value.

Why do we need wilderness?

In an age where an increasingly large percentage of the population now lives within urban precincts, a whole new connection between wilderness and the solution of the problems of living in the city has developed. This is the notion of withdrawal to the natural environment, a withdrawal from the "complex" to the "simple", that is deeply implanted in American culture and has fascinated American writers for some time. Can any corresponding movement be seen in the South African context? I would like to investigate this process of withdrawal explained by Marx (1968). Three actions are involved: a) the retreat from the city; b) the exploration of the wilderness and c) the return. The three landscape forms associated with each of the above are: the city, a middle zone neither wild nor civilised and the wilderness.

Movement is always away from the complex and artificial towards the "pure" and "simple" nature. The routine of existence and the dominance of the machine are the important factors that initiate this reaction. During the second period man stays temporarily in the middle zone that

is neither wild nor civilized. The presence of the city, however, follows and a final retreat is made. This period of stay in the wilderness is usually an exhilarating experience and a spiritual tonic. For civilized man no permanent stay in the wilderness is possible and he always returns to the city. He cannot stay or the machine will follow him to the wilderness and commence its destruction. He has inescapably, through his cultural evolution, removed himself from the wilderness.

What is the driving force behind modern man's impulse to retreat from a complex and advanced society to a simple life close to nature? Leopold (1972), and Marx (1968), believe that the answer to this urge to identify oneself with these two contrasting life styles, is to be found in the nature of two conflicting but inescapable human environments – one associated with man's biological origin, the other the result of man's technological and cultural evolution.

Inherent in the retreat is the subconscious rejection of the assumption of western culture that man can survive distinct from nature. The retreat results in a search for those values that our urban environment denies. No permanent solution can be found in this retreat though as Marx states, "... it makes possible moments of emotional release and integration, a recovery of psychic equilibrium". The main value is thus emotional as well as an attempt to bring back to our complex urban life some of the values found in the wilderness, as well as the awareness of the fact that man is an integrated part of the interacting environment.

One clear and undeniable conclusion can be drawn from the above. For the success of this action of withdrawal and return, diversity of physical environment is essential. This crossing of the boundary between city and wilderness and the value of the contrast must be preserved in an unblurred passion. The machine must not be brought into the garden – the wilderness has an essential part in solving the problems of life in the city.

Related to the need for contrast and diversity, is the success of what is possibly the most important value of conservation in the 20th century (Leopold 1972) i.e. the need to relate modern man to forces at work in the environment and bring man to realise his ultimate dependence on these factors. The way by which this realisation can be brought about is to re-awaken the age-old method of experiencing nature – through a combination of the senses. The sense of vision, smell, hearing and touch, something which is nearly subconscious in Bushmen, assimilating an understanding of the habitat. The hunter-gatherer lives in close contact with the pulse of his environment and the transmission of signals is nearly instantaneous, vastly different to the conditions existing today. In the case of modern man the social stratification and structure in his society, has created a buffer to these impulses as well as a time lag making vast sections of the population insensitive and unable to relate to the environment.

The correct introduction of the visitor to the protected landscape

requires a whole new approach to planning and it is an essential adjustment that must be made if conservation is to fulfil this interpretive function. Therein lies the ultimate value of a visit to the wilderness and thus the realisation that society must make in order to sustain the quality of life now in existence.

In the American context, the pioneer was confronted by a hostile wilderness. Physically the wilderness threatened his survival. It was to be struggled against. The wilderness had to be tamed and civilized. The American pioneers and Voortrekkers lived too close to the wilderness to appreciate it. Their major concern was to conquer nature. It is commonly accepted that the wilderness confronting the Voortrekkers was responsible for many of the desirable characteristics found in these pioneers. Because of the influence of wilderness on our history and culture, it is important that wilderness be protected. It is only now that the children and grandchildren of these people are so far removed from this condition that they are beginning to feel some aesthetical and historical value.

It is only recently that wilderness was actually recognised as an asset. As a natural resource to be recognised as a cultural or as a natural resource. Today wild scenery is seen as an extremely rare, valuable and a natural resource.

During a survey on visitor attitudes towards national parks the following two questions produced interesting results. It is clear that wilderness, although a vague term to many people, is an essential part of the total experience.

TABLE 1

Motivation factors for outdoor experience

People	Outdoors	Change of Place	Close to Nature	Getaway	New Friends	Unspoilt Nature
No	45	11	249	20	5	242
%	7,9	1,9	43,5	3,5	0,5	42,3

Of the six motivation types (Table 1), only two are worth discussing. The importance of being involved with "nature" on an intimate basis, and that "nature" must be in an unspoilt condition, reflects the importance of camp design and layout, as well as the method of experiencing nature. These are important planning factors that should allow for such interaction. The association with an unspoilt environment is very important, and the visitor does not consider the outdoors, new friends, a change of living environment and to get away, in themselves,

very important. These factors could play important smaller roles in providing a satisfying experience. It is, however, clear that wilderness can mean many things to many people.

TABLE 2
Activities Influencing Wilderness Experience

People	Wilderness Trail	Fishing	Driving & Sightseeing	Organised Walk	Recreational Activity
No	237	34	231	48	22
%	41,4	5,9	40,4	8,4	3,8

Activity participation, which is one of the most important questions, as it is related to the fulfilment of the visitor’s expectations, provided the greatest surprise. Fishing and organised walking activity types do not rate very high with visitors (Table 2), and as expected, driving and sightseeing is considered important. It is surprising that the largest percentage prefer the wilderness trail type of experience. This is even more so, as this experience is not always provided for by park authorities.

How do we plan for wilderness?

Any form of recreational use in a national park must result in some form of change and influence wilderness (Stankey and Frissell 1972; Stankey 1972). This impact can fall into two categories. Firstly activities and the related facilities can have an impact on the basic wilderness resource (Pienaar 1968). Secondly, the activities of one group can affect the success and quality of the national park experience of a second group (Attwell 1971). The aim of planning is, therefore, firstly to reduce the impact of an activity type and resultant facilities on the basic park wilderness resource and secondly, to reduce this impact on the quality of the experience of other national park users.

The activity types usually allowed within national parks can be grouped under the following four headings:

- (i) *Appreciative Symbolic* – This experience is usually associated with that of wilderness travel. Groups of people, usually small in number, will traverse an area on foot, experiencing nature in its most natural form. This activity type, by nature of its demands in terms of facilities, will have the least impact on the natural

environment. Facilities required would be: a main camp for the initial overnight stop; access and parking for automobile; wilderness trail through natural area; and wilderness camp in unspoiled surroundings.

The impact of this group on wilderness is slight and impact on the other three activity types is small.

- (ii) *Sociable Learning Activity Type* – This second group is made up of a large number of people, mainly interested in some social experience with others, but with the aim and interest of studying nature. Although some form of movement on foot will take place, a vehicle will be the usual form of transportation. Facilities required would be: a main camp; access by vehicle and parking; tourist roads through unspoiled natural area; and short wilderness trails.

The impact of this group on the wilderness experience activity type would be moderate, but the impact on Passive Freeplay and Extractive Symbolic activity types would be low.

- (iii) *Passive Freeplay* – This third group usually attracts the largest number of people visiting a national park. Activities associated with this group are usually that of driving around in a vehicle and viewing nature and the various wildlife species. This group will usually demand a large number of facilities and the necessary transportation, coupled with facilities, can have a great impact on the experience of the first two groups as well as the natural environment. Facilities required would be: access and parking for vehicle; camp with all necessary facilities; tourist roads through natural and wildlife areas; and stopping points at interesting sites with the opportunity of leaving the vehicle.

The impact of this group on the second activity type would be moderate and on the first would be extremely high.

- (iv) *Extractive Symbolic Activity Type* – Under this heading one would associate activities that aim at removing something tangible from the national park. Fishing would be a very clear example of this method of utilising a protected eco-system. Usually all kinds of facilities can be demanded by this group – from primitive wilderness camps to upper class facilities. The prime aim, however, will be fishing. This would also require access by vehicle and parking, as well as all kinds of facilities ranging from a wilderness camp to a high density camp. Access to fishing areas would also be required. The impact of this group on the Passive Freeplay experience type would be low, moderate on Sociable Learning and very high on Appreciative Symbolic.

The impact of this group on the basic park character can also be high if not controlled.

TABLE 3

A Summary of the Impact of Activity Types on the Wilderness (after Attwell 1971)

	Facilities Required	Impact on Wilderness	Impact on other Activity Types			
			i	ii	iii	iv
i Appreciative Symbolic	Access by vehicle to base camp Wilderness trail and wilderness camp	Low	Low	Low	Low	Low
ii Sociable Learning	Access by vehicle to base camp. Tourist road and small wilderness camp	Moderate	Moderate	Low	Low	Low
iii Passive Freeplay	Access by vehicle to large base Tourist routes	High camp.	High	Moderate	Low	High
iv Extractive Symbolic	Access by vehicle to base camp. Access to fishing spots	Moderate to High	High	Moderate	Low	Low

Landforms, their ability to accept change and to form enclosures

Landforms will differ in their capability to accept change. All use will result in some form of physical and, therefore, visual change. However, certain landscape facets can more readily accept this. What are the factors in the landscape that influence visual carrying capacity?

Research has indicated that two factors are of major importance. Firstly, the sense of topographical exposure and the ability of a landform to create a sense of visual enclosure. This is related to its exposure rating. Secondly, the vegetation opacity that exists on the landscape facet.

Landscape enclosure and exposure

The sense of landscape exposure (after Way & Jacobs 1969) is related to the extent that the topographical element is visible from the surrounding

areas. The various categories are as follows (the most sensitive stated first):

- (a) *Hill Tops* – The visual field would stretch a full 360° and the total area of land from which a hill top is visible is the largest of all classes. The most sensitive topographical situation.
- (b) *Ridges* – Similar in all cases to the above, but the visual field ($\pm 220^\circ$) is somewhat reduced according to the width of the ridge base.
- (c) *Plateau Edges* – The major difference between this category and the above, is the fact that the visual field is reduced to an arch of 180° due to the fact that land areas of lower elevation extend in one direction only.
- (d) *Hill Sides* – A very similar situation to the above, except for the lower elevation, and the fact that the background is hill side of a higher elevation and not sky as in the case of the plateau edge.
- (e) *Horizontal Flat Plains* – In all the other instances, height above the surrounding areas was an important factor in spreading the area of visual impact, and in this case the effective height is reduced to the height of the observer's eye above the landscape. Thus, although the field of vision is again increased to 360°, the distances of influence are reduced, and correspondingly the area of influence.
- (f) *The Open Valley* – In this case the area of impact is restricted to the distance of the valley side from the centre point, and although the field of vision is also 360° the distance is limited.
- (g) *The Narrow Gorge-like Valley* – Once again similar to the previous case, but the extent of influence is drastically reduced by the distance the valley sides are apart, so that now the arch is less than 360 degrees.
- (h) *The Elevated Plateau* – Although this case might seem strange, the fact is that a small elevated plateau, excluding the edge, has the smallest area of influence. The case is similar to that of the horizontal plain, except that the area of influence is drastically reduced and effectively eliminated at the edge, because all other landscapes are a lower elevation.

The above cases of exposure rating are diagrammatically illustrated in Table 4, while sensitivity and enclosure rating is listed in Table 5.

Vegetation opacity

The sense of opacity is directly related to vegetational density. The degree of vegetational density is related to the size of the specimen and branch and foliage characteristics. These characteristics can be grouped in three levels – the level with the largest specimens, the trees; the medium level, the shrub layer; and the lowest, the grass layer. Each of these levels is in itself influential in the ability of a plant community to act as a visual barrier.

TABLE 4
Exposure Rating of Land Forms

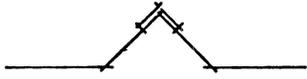
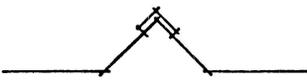
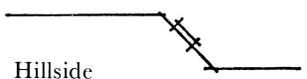
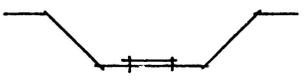
Exposure rating	Land form	Height above sea level	Extent of visual arc
a.	 Hill top	1000 750	 360°
b.	 Ridge	1000 750	 360°
c.	 Plateau edge	1000 750	 160°
d.	 Hillside	1000 750	 160°
e.	 Plains	750	 360°
f.	 Open valley	1000 750	 360°
g.	 Closed valley	1000 750	 320°
h.	 Elevated plateau	1000 750	 360°

TABLE 5

General Sensitivity and Enclosure Rating

Land form	Sensitivity to Change	Ability to Enclose
Hill Tops	1	4
Ridge Lines	2	3
Plateau Edges	3	3
Hill Sides	4	3
Flat Plains	5	5 (Dependent on vegetation)
Open Valleys	6	2
Narrow Gorges	7	1
Elevated Plateaux	8	5 (Dependent on vegetation)

(1 = highest rating)

The trees are most important in softening and hiding large scale topographical changes from a distance. The shrub layer is more important as a short distance screen, due to the concentration of vegetation density at eye level. On the other hand, the grass level is most important in hiding textural changes. At each of these levels the extent of time that leaves are carried on branches, deciduous, annual or perennial, are critical factors.

**Planning solution with specific reference to the
Mountain Zebra National Park (after Farrell & Van Riet 1976)**

The principle of peripheral development

From the earlier discussion it is clear that wilderness is a basic park resource necessary for the success of all activity types. The amount of wilderness and quality of wilderness necessary though, will vary from very highly valued at the appreciative symbolic type to less or not valued at all, for the extractive symbolic. The solution, therefore, lies in presenting a wilderness gradient, placing those activity types requiring the greatest wilderness atmosphere, the least facilities and, therefore,

having the least impact on other activities, closest to the major wilderness resource. On the other hand one would place those activities requiring the smallest amount of wilderness and which have the greatest impact on wilderness and the other activities, furthest away on the basic wilderness zone.

In its simplest form, his gradient and zoning principle can be illustrated by a series of concentric rings, orienting outwards from the central core of wilderness and each ring becomes progressively less wild with an increased amount of facilities and activity types allowed.

There is also an inverse relationship between the various activity types and their required facilities and the number of people required to service and run such a facility. As these facilities are usually run by people with no specific interest in the national parks system itself other than their prime objective of completing their work, it seems obvious that the facilities requiring the largest amount of service and number of people should be placed closest to the external boundary. It is clear that these people must also have an impact on the basic park resource and the success of the activity types and as they have no special need to be in the park, the best place for these facilities is on the boundary.

As mentioned previously, it is of utmost importance that the value of the parks system is also felt by those people living within close proximity of the park itself (Myers 1972). This is especially so in Africa. Traditionally the value of the park and the proceeds of the park have been removed to a faraway town or regional capital and the actual impact of a national park on people within its proximity is usually limited. One of the values of such a park would be to provide employment opportunities to people within its vicinity. Some of the obvious areas of work for these people are, firstly, in providing services required by the major camps, and secondly, providing basic foods and other tourist artifacts to these main camps. It is, therefore, in the interest of these people that the amount of travel between their place of residence and work is limited to the shortest possible distance.

Peripheral development would, therefore, also benefit those people living nearby and would also reduce the impact of movement of these people through a national park. This can only succeed in enhancing the attitude of these people towards the park and will result in easier management, as well as greater benefit to the surrounding people.

Resultant landforms

The landscape of the Mountain Zebra National Park (MZNP) developed on the sedimentary formations of the Beaufort Group of the Karoo Sequence. This geological system consists of thick sequential layers of horizontal, sedimentary formations, as well as intrusive dolerite dykes and sheets. The resultant landforms, due to weathering in the semi-arid climate, are scarp faces, talus slopes,

pediments and plains. The following river valley types are also found: valley within talus slopes; narrow, enclosed valleys between pediments and open flood plains on the plains themselves.

Vegetation

A large variety of vegetation exists within the park. Most of the diversity results from large geomorphological and geological differences, as well as changes in climate with elevation. Therefore a large variety of habitats exists within this park. As vegetation corresponds narrowly with geomorphological landforms, the vegetation mapping units are named as follows: plateau vegetation, talus vegetation, pediment vegetation, plains vegetation and vegetation associated with the river valleys.

As great differences in species composition occur in each habitat, no comment will be made on their composition, but a rating for each of these habitats with relation to their opacity is given:

Plateau vegetation	5
Talus vegetation	3
Pediment vegetation	3
Plains vegetation	5
Vegetation associated with low-lying rivier valleys	1

(1 = high opacity)

The planning solution

In utilizing the geomorphic landforms, the natural vegetation and the principle of peripheral development, the following land-use proposals are made.

In general, the MZNP consists of the Wilgerboom River valley, but can be subdivided into a narrow, introvert, upper volume and an open, extrovert, outwardly orientated, lower volume. The narrow, introvert, upper volume is completely enclosed by the higher crests and talus slopes. The extrovert, outwardly orientated, winding, open valley lower down is enclosed by the talus slopes on two sides, but as the valley opens, these slopes are falling away on either side and losing their protecting influence.

In utilizing the principle of peripheral development, which is considered to be absolutely necessary for a relatively small park like the MZNP, the camp must be placed within close proximity of either of the two flanking, protecting landforms. These landforms also form the boundary of the park. As the upper volume is totally enclosed by the flanking landscape shapes, visitor accommodation and staff accommodation is placed in such a manner that both the tourist and staff accommodation are invisible to each other, but that the park's super-

visor has visual contact with both these areas. The main camp and all these facilities have been placed in such a manner that it fully conforms to the principle of peripheral development, and that all of the important landforms required to protect the basic wilderness resource of this park, have been protected from development.

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