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"OUTDOOR RECREATION:  
A Case Study of the Upper  
Berg River Basin"

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C o n t e n t s .

<u>CHAPTER</u>	<u>Page</u>
1. I N T R O D U C T I O N	1
2. <u>GENERIC CONCEPTS OF BASIN DEVELOPMENT.</u>	3
2.1 HISTORIC PRECEDENTS	3
2.1.1 The Nile River	3
2.1.2 The Mesopotamian Basin	5
2.1.3 The Indus River	6
2.1.4 Brief Analysis of the above achievements	7
2.2 CONTEMPORARY EXAMPLES	8
2.2.1 The Tennessee Valley Authority	8
2.2.2 Lake St. Lawrence Region	10
2.2.3 The Wabash Basin	12
2.2.4 Summary of contemporary achievements	13
2.3 THE COMPONENTS OF MULTIPLE PURPOSE RIVER BASIN DEVELOPMENT	16
2.3.1 Flood Control	16
2.3.2 Navigation	16
2.3.3 Hydro-electric Power	17
2.3.4 Defence	18
2.3.5 Recreation	18
2.3.6 Irrigation/Agrilculture	18
2.3.7 Industrialisation	20
2.3.8 Urbanisation	21
2.4 BENEFIT AND COST ANALYSIS	22

<u>CHAPTER</u>	<u>Page</u>
3. <u>SOUTH AFRICAN RIVER BASIN PLANNING.</u>	24
3.1    SPECIFIC EXAMPLES	24
3.1.1    The Orange River Project	24
3.1.2    The Vaal River	25
3.1.3    The Tugela Basin	26
3.2    SHORTFALLS IN PRESENT THINKING, GIVEN FINDINGS OF 2.	28
4. <u>UPPER BERG RIVER BASIN.</u>	32
4.1    REGIONAL CONTEXT	32
4.2    HISTORY OF SETTLEMENT	34
4.3    HISTORY OF DEVELOPMENT PLANS AND REPORTS	36
4.4    CLIMATE	38
4.5    POTENTIAL	39
4.6    WEAKNESSES IN THE PRESENT PLANNING	43
5. <u>O U T D O O R    R E C R E A T I O N</u>	46
5.1    CLASSIFICATIONS OF OUTDOOR RECREATIONAL AREAS	47
5.1.1    User-oriented Areas	47
5.1.2    Resource-based Areas	49
5.1.3    Intermediate Area	49
5.1.4    Other Classifications	49
5.1.5    Comments on these Classifications	51
5.2    FACTORS EFFECTING THE DEMAND FOR OUTDOOR RECREATION	52
5.2.1    Population Growth	52
5.2.2    Recreation Expenditure	53
5.2.3    Leisure Time	56
5.2.4    Increased Mobility	58
5.2.5    Recreation Patterns	61

CHAPTER

Page

5.3 PLANNING PRINCIPLES REGARDING OUTDOOR RECREATION 64

    5.3.1 Opportunities for All 64

    5.3.2 Analysis of existing facilities 65

    5.3.3 Public participation in Plan 67

    5.3.4 Integrate Scheme with the other Elements of Development 68

    5.3.5 Unified system of inter-related areas 69

    5.3.6 Flexibility 70

5.4 CRITERIA TO BE APPLIED TO SITE SELECTIONS 72

    5.4.1 Accessibility 72

    5.4.2 Conflict with other land uses 74

    5.4.3 Incompatibility 75

    5.4.4 Aesthetics 76

    5.4.5 Present size - potential expansion 77

    5.4.6 Cost of development 78

5.5 FUNDAMENTAL APPROACHES TO PLAN EFFECTUATION 79

    5.5.1 Advance acquisition of site 79

    5.5.2 Perpetuity of use 80

    5.5.3 Achieving Space Standards 81

    5.5.4 Suitability of Sites 84

5.6 ECONOMICS OF OUTDOOR RECREATION 86

    5.6.1 Benefit-Cost Analysis of providing facilities 86

    5.6.2 Pricing of these facilities 87

    5.6.3 Economic Impact on local areas 89

6. SYNTHESIS 92

Appendix I 112

Bibliography 113

M a p s      a n d      G r a p h s

<u>FIGURE :</u>	<u>Page</u>
1.    National Map showing Orange, Vaal, Tugela and Berg Rivers.	95
2.    Regional Context - Surrounding towns and communications.	96
3.    Shand's Proposed Scheme for Upper Berg River Valley.	97
4.    Population Projection : Greater Cape Town Area.	98
5.    Population Projectinn : Paarl Magisterial District.	99
6.    Population Projection : Wellington Magisterial District.	100
7.    Histogram : Percentage Recreation Expenditure/Income.	101
8.    Sites of historic, natural and recreation interest.	102

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T a b l e s .

<u>TABLE :</u>	<u>Page</u>
1. A General Classification of Outdoor Recreational Uses and Resources.	48
2. Population of the Greater Cape Town Area by Race	103
3. Population of Paarl and Wellington Magisterial Districts according to Race.	104
4. Recreation Expenditure for Whites only (1966).	105
5. Outdoor Recreation Expenditure for Whites only (1966)	106
6. Recreation Structure in the U.S.A.	107
7. Preference for Recreation Activities in the U.S.A.	108
8. Recreation Pattern within the Pretoria/Witwatersrand/Vereeniging Region for an Ordinary Weekend in the summer.	109
9. Standards for Intermediate Parkland and Recreation areas in U.S.A.	110 111

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1. I N T R O D U C T I O N .

In this thesis I have developed a general concept of outdoor recreation in river basins, and where possible, have applied this study to the Upper Berg River Basin.<sup>1/</sup>

The formulation of a physical plan for the development of the outdoor recreation areas, is beyond the scope of this thesis. The comprehensive, local statistical data to be collected, analysed and synthesized for this purpose would take a team of planners, months, if not years, to complete.

I have, rather, examined the characteristics of outdoor recreation pertinent to multiple purpose river basin development. I am hoping that this study will direct greater attention to the multiple purpose benefits of the harnessing of the Berg River, by focusing attention on this one aspect : Outdoor Recreation.

I have chosen outdoor recreation as opposed to recreation as a whole. The purpose of this is to exclude the study of indoor recreational activities, such as various sports, cinemas, theatres, ice rinks, etc.

After having drawn the catchment area of the Berg River on a map, and empirically analysing the areas of natural attraction, I decided to confine my study to the Upper Berg River Basin, where the main concentration of population, economic activity and natural

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1 Hereafter referred to as 'the Valley'.

beauty exists.

The utilization of river water for multiple purposes from ancient historical examples to the contemporary multiple purpose river basin development schemes, is studied. A breakdown of the components of these schemes is made, together with a brief comment on the importance of a benefit-cost analysis.

The development programmes of three South African rivers are then compared with this multiple purpose concept of river basin development. The historical, regional and climatic characteristics of the Valley, are then examined in their regional and wider context.

The study of outdoor recreation within the concept of multiple purpose development, with particular reference to the Valley, is then commenced.

Two distinct complementary objectives have been borne in mind: To develop a theoretical concept of outdoor recreation, together with the principles involved in its planning, while also developing practical criteria and approaches specifically applicable to the executing of any plan.

Finally, the relevance of economic studies to outdoor recreation development, are briefly discussed.

## 2. GENERIC CONCEPTS OF BASIN DEVELOPMENT.

### 2.1 HISTORIC PRECEDENTS.

#### 2.1.1 The Nile River.<sup>1/</sup>

The Nile River in north eastern Africa is one of the two largest rivers in the world and its harnessing and utilization goes back many thousands of years. Its source is in Lake Victoria in Tanzania and it runs in a northerly direction for about 4,160 miles into the Mediterranean Sea. Pre-eminently it is the only source of water in this otherwise desert region.

One of the main features of the Nile is its regular annual flooding, commencing in July and lasting for 2 to 3 months. It is this characteristic of the Nile that man has developed over the centuries.

In the Pleistocene Period, urban settlements were scattered all over the desert. The climate appears to have become progressively drier, thus forcing the people to move in the Nile Valley. The flooding of the Nile caused it to overflow its banks and cover the area up to the desert, and when the waters subsided, the alluvial silt was deposited on this land. During these times the people located at the edge of the desert until the natural grasses that grew after the flood waters subsided, had been exhausted. They then moved to the river's edge until the next floods came down.

The draining of the flood waters left not only alluvial soils, but also many pools and swamps. These proved to be drinking places for game, and later cattle, and were ideal conditions for cultivation. The realisation of this phenomena created a change in the occupation of the inhabitants of the Nile Valley from hunters to herdsmen, and also the first signs of cultivation were noticed. These primitive

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1 Thomas : Man's Role in Changing the face of the Earth. p.175;195; 196; 680.

Hurst : The Nile. p.33-41.  
Enclopaedia Brittanica : Nile.

people collected the seeds from the natural grasses, planted them in the wet soil after the flood waters had subsided, and left them to germinate and mature. Water was initially carried in pots and later channels were built to irrigate these lands, and so began the germs of perennial irrigation. As the centuries passed, man became more knowledgeable and the irrigation system was duly improved. The fields were divided up into a series of basins and when the floods came, the water was channelled into canals which systematically filled these basins. Once the floods were over the basins were opened to drain into the falling river. This served the dual purpose of controlling the level of the flood waters in the river, as well as depositing the alluvial silt on the lands in the same process.

In recent times perennial irrigation has been further developed with the construction of a series of canals which regulate the flow of water to irrigated tracts of land. The government has also built large dams (e.g. Aswan), barrages, regulators and canals to assure a constant supply of irrigation water to the cotton and other crops.

The result of man's increasing control of the waters of the Nile has been the fact that no major floods have occurred in the last 90 years, although the banks<sup>1/</sup> of the river have sometimes been under tremendous pressure.

The towns and villages that were built were erected on higher ground to protect them from the flood waters, and their number and size varied with the amount and productivity of the agricultural land available. At times of flooding, boats were used to communicate between the villages. Navigation of the river took place from the earliest days. Boats would sail downstream with the current and upstream with the help of the following winds. Today boats can only navigate up to the Aswan Dam.

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1 Due to the continuous deposition of silt, the banks were sometimes ten feet higher than the adjoining land.

2.1.2 The Mesopotamian Basin.<sup>1/</sup>

The Mesopotamian Basin incorporates the two rivers, Tigris and Euphrates, which converge to form the Shattal Arab † 123 miles from its entry into the Persian Gulf.

The small Roman Province of Mesopotamia, which was of the highest strategic importance, was thoroughly colonized during the 3rd century A.D. Concomitant with this colonization was the early practice of mixed farming in the valley. During this period of development in irrigation farming and concentration of inland urban settlements, changes were taking place. The upper hills and mountains were denuded of their forests, and the grasslands deteriorated over many centuries of abusive use by numerous civilizations. The rivers and especially the floods of February to June, therefore, carried larger sedimentary loads, and increased alluviation of the plains occurred. This silting at the mouths of the rivers resulted in the extension of the delta and has been responsible for most of the 35,000 square miles of the great plain of Mesopotamia.

The inhabitants of the basin throughout its history have had marked effects on its development. When the maintenance of the canals and cultivation was neglected, there was greater extension at the delta, while retardation of this process occurred when the irrigation system worked effectively.

No references to floods in the ancient records can be found, which suggests that floods probably followed the advent of intensive settlements and agriculture that led to eroded uplands. These floods were controlled in a similar manner to that used on the Nile. The marshes and lakes on the plain inland from the present delta are below sea level and, therefore, form an effective reservoir for flood waters.

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1 William L. Thomas - op cit. p.175;509-511;531.

The only cheap means of transportation of heavy goods until 1840 was by the river and canals. There were communication routes between settlements as well as the navigational routes to the outside world. Navigation upstream proved more difficult than on the Nile, as there are no following winds.

### 2.1.3 Indus River.<sup>1/</sup>

The Indus River is one of the three great rivers of North India, and historically it has always been a valley which has proved a good starting point for an invasion of India. The changes in ownership of the valley have resulted in each of the different cultures leaving their mark on the development of the region.

Unlike the constant water supply of the Nile, it's flow is unpredictable, being dependent upon the melting snow on the Himalayan mountains in the summer months, and also the seasonal Monsoon rains. It has variable channels which are caused by the light shift soils and sand banks being destroyed by the forceful flood waters. No lake exists to regulate the floods, and attempts at irrigation were devastated by the occasions of high floods. This may well be one of the reasons for the non-existence of great or old towns in the valley.

Silting up of the irregularly shaped canals proved very troublesome to both irrigation and navigation. Archaeologists have proved that navigation did, in fact, take place on the river, and there appears to be historical evidence of this type of communication between the Mesopotamian basin and this region.

The Iranians developed the irrigation system (which was, in principle, similar to that used on the Nile). The celebrated Persian Wheel was a development they used for raising water to irrigate the wheat and cotton crops. After this initial development

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1 Pithawala : A geographical analysis of the Lower Indus Basin(Sind).  
Encyclopaedia Britannica : Indus.

in irrigation, nothing definite can be gathered about the system of irrigation in subsequent centuries, although it has been recorded that at one time the land was very prosperous, while at another it fell into disuse and was neglected.

It would appear as if the Valley is not as intensively cultivated as the Nile or Mesopotamian Basins, although the lower basin is said to be one of the largest canalised lands in the world.

#### 2.1.4 Brief Analysis of the above achievements.

Although the cultural, economic, and political skills of the various cultures or civilisations in these basins was not very advanced, they implicitly recognised certain benefits of the harnessing of these rivers.

The primitive methods described in controlling the floods meant that the inhabitants were able to extend their cultivated land by irrigation, as well as protecting themselves against the devastation caused by these floods. Developments in irrigation techniques and the resultant agricultural intensification made more profitable use of the alluvial soils. These developments brought an exchange of goods and services between the towns in the basin and later, trade with other nations followed. This intra-city and international communication was performed by the extensive navigational use of the canals and rivers.

The first signs of industrialisation were noticed with the making of crude farming implements, "shadups" for lifting the water, and boats for navigation purposes. Man began slowly to realise that if he co-operated with Nature instead of extensively killing game and neglecting the soil, he would ultimately be the benefactor.

It can, therefore, be seen that the primitive harnessing of these rivers achieved multiple benefits which have set a precedent for the present development of river basins.

## 2.2 CONTEMPORARY EXAMPLES.

The three contemporary examples of river basin development to be examined are different in that the Tennessee Valley Authority as a development scheme has reached completion; the Lake St. Lawrence Region is characteristic of the rapid development capable in modern times; while the Wabash Basin has had a regional survey made of it prior to a detailed development plan.

### 2.2.1 The Tennessee Valley Authority.<sup>1/</sup>

The Tennessee Valley Authority in the U.S.A. is the precedent to multiple purpose river basin development. It is continually referred to throughout the world as an example of integrated planning within a river basin.

The Valley was originally heavily wooded with much grass and pasture lands. Man began to fell trees injudiciously and over-cultivated the soil for his own financial gain. This caused widespread soil erosion, with the valuable top soil being washed down into the rivers. The countryside became more and more barren through this process, until the Tennessee Valley Authority was established. The TVA's task was to stop this desecration of the natural resources and beauty of the area, and to recreate, through multiple purpose basin development, an environment which would be aesthetically attractive and economically viable. It transcended state boundaries and as an autonomous body, was entrusted with the planning and development of the region.

One of the initial principles adopted by the TVA was that the people of the region were the most important factor in resource development and should, therefore, take as much part as possible in

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1 Huxley : TVA Adventure in Planning.  
Towards a Plan for the Tugela Basin : Contrasts with TVA  
p.228-231

its planning and development. This was instigated by sponsoring a series of demonstration farms which some of the farmers themselves managed in accordance with a development plan. The farmers met regularly to exchange experiences and discuss problems and in that way helped each other. Other ways in which this policy was encouraged was by inviting businessmen to stimulate river traffic; by organised labour participating in future fertilizer and soil conservation programmes; and by increased dialogue between farmers and technicians. TVA would endeavour to get any new activity required started and as it developed, its aid to states, local authorities, and other corporate units would progressively decrease until it was eventually completely run by these bodies.

31 dams were constructed in the basin for storage, navigational, hydro-electricity, recreational and flood control purposes. Crops, grasses and forests planted to assist in restoring the quality of the soil, made use of the irrigation water. The use of locks at the dams enabled small ships to navigate far up the river. Cheap electric power was obtained from the numerous hydro-electric power stations incorporated in the construction of the dams. Fishing, boating, parks and wild life sanctuaries were developed throughout the river basin.

A feature of the entire development was the care taken in design. Advancements in architectural design are noticeable between the first and later dams and power stations.

It was basically analysed that the soil lacked phosphates, and from the outset the manufacture of fertilizers proved an important industry. Another industry to develop was the pleasure boat industry, as a result of extensive participation in this sport.

The TVA is not without its critics. The criticisms most frequently made are <sup>1/</sup>:

- " (1) that TVA has subordinated its main operating functions, flood control and navigation, to the generation and sale of electricity;
- (2) that it has engaged in subsidiary activities, such as the manufacture and distribution of fertilizer, to an extent never visualized by its creators;
- (3) that it has charged off too much of its investment to flood control and navigation in order to hold down its electric rates, and
- (4) that it does not provide the advertised "Yardstick" for electric rates because TVA is excused from payment of interest on its investment and of local taxes, both considerable items in the calculation of private utility electric rates. "

The charges have all been answered by the authorities concerned, but still fail to satisfy the critics.

The project was started in 1933 and since then phenomenal changes have taken place due to man's scientific and technological ability and his co-operation with the forces of nature - a far cry from the slow progress of the historical precedents.

#### 2.2.2 Lake St. Lawrence Region. <sup>2/</sup>

The St. Lawrence River has long been used for navigation, although this was seriously hampered by rapids and the nature of the river itself.

It was only in the early 1950's that development in the region mushroomed. Canada and the U.S.A. combined in the

"basic planning which covered three main areas of endeavour : navigational improvements, hydro-electric dam construction, and the establishment of appropriate park lands. Ancillary planning extended into urban development and resettlement, as well as industrial development and expansion." <sup>3/</sup>

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1 Daniels. Should we have more T.V.A's ?  
 2 Planning 1965 : Planning the Lake St. Lawrence Region. p.82-89  
 3 Op cit. p.84

Seven entire communities were drowned as a result of the construction of locks and control dams. This necessitated the resettlement of 6,500 inhabitants into new communities. These communities were all planned to create environments of an individual character. The success of these accomplishments is evidenced by the lack of regret and no discernable sense of loss in those moved.

The deepening of the navigable channel of the river throughout its entire length allowed large vessels to export and import bulk goods at cheap transportation rates. The cheap hydro-electric power produced from the powerdam was distributed to the surrounding regions, as well as supplying local demand. This cheap electricity and the deep docking facilities will prove attractive to industry in the years to come.

While economic reasons necessitated navigation and power development, aesthetic reasons have promoted recreational development. The natural attractiveness of the river and surroundings has been developed into parklands, picnic areas, swimming and boating facilities. The region has had, on the average, just less than a million visitors per year since 1960. Comparing this with the total population of the region, which is less than 100,000, gives a crude indication of the impact of outdoor recreation on the region. The economic benefits of the expanded tourist industry alone could be assessed as a very significant contribution to community income in the region.

The phenomenal development by two neighbouring countries of this common resource indicates what can be achieved by positive planning and management, using the developments in scientific and technical knowledge for the benefit of all.

### 2.2.3 The Wabash Basin.<sup>1/</sup>

The Wabash Basin, situated mainly in the states of Indiana and Illinois in the U.S.A., has been approached in a different manner to the above two basins.

Fifteen authorities representing various universities and agencies have combined in exploring regional development and growth within the Wabash Basin. The result is a comprehensive survey on the problems of regional development. The collection of facts, figures and resource material has related this analysis to the Wabash Basin. The authors stress that this is not a regional development plan, but only a comprehensive regional analysis, prior to the formulation of a development plan. It is estimated that the population will more than double by the year 2000, and that the problems relating to change will primarily involve industrial development and water resources in the basin.

Firstly, the study provides a basis for understanding the structure of the basin by presenting a detailed economic survey of the region, including population characteristics, employment patterns, agriculture, industry and recreational resources. The interaction between these activities and their improvement potential is examined.

Secondly, it deals with the social, economic and political problems and conflicts that occur when change is brought about by regional development. It also suggests ways of avoiding or solving these problems.

Thirdly, it concentrates on water resource improvement and management by firstly discussing the allocation problems and conflicts in water use, and, secondly, outlining administrative

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1 Boyce : Regional Development and Wabash Basin.

and political frameworks within which the water resources can be most effectively managed and developed.

Fourthly, it underlines the gaps in the knowledge of the resources and regional development, and mentions some of the major unanswered questions. It describes the roles that public and private agencies, especially the universities, should play in any regional development. Finally, it develops a possible model for optimum regional development, including a mathematical method whereby priorities for development can be objectively determined.

The comprehensive manner in which this study has been conducted supplies resourceful information and provides an excellent base from which more detailed development can be constructed.

#### 2.2.4 Summary of contemporary achievements.

It is apparent from these studies that certain similar elements are evident in the contemporary development of river basins.

In the study of the historic precedents, it was noticed that certain benefits of flood control, irrigation, navigation, urbanisation and industrialisation stemmed from the harnessing of rivers. In the above analysis, these primitive conceptions have been developed, expanded, rationalised and incorporated in comprehensive regional development programmes for the rivers under survey.

In addition to the five components mentioned, hydro-electric power supply and recreation facilities are a further two elements which form an integral part of contemporary harnessing of rivers.

In addition to the similarities in the components of these

basins, others can also be described. The inter-related nature of these developments has been evidenced by the interstate and international co-operation in the harnessing of these rivers. This has been conducted by a development authority which transcends state, national or political divisions and is solely concerned with the comprehensive harnessing of the whole river for the benefit of all. The economic analysis of the region and its regional context has been shown to be an increasingly important prerequisite to development. Public participation and interest in the planning and development stages of the schemes have proved to be important factors in their success.<sup>1/</sup>

The benefits derived from modern river developments are more extensive than their predecessors due to the phenomenal advances in scientific and technological development. These have resulted in the large scale construction of dams, pipe lines, power lines, roads, new towns and industries, which all enable the benefits of the harnessing of the river to be felt beyond its region. This has encouraged the broadening of the economic base of the region by the inflow of capital, technical knowledge and entrepreneurship, and the outflow of goods and services. The recreational facilities have, in some cases, proved the most important industry in the economic development of the region. The multiple benefits derived from harnessing the rivers have had startling effects in uplifting the economy of these regions.

The above-mentioned similarities tend to develop criteria which could be applied to river basin developments generally, namely, the establishment of a multiple purpose development authority; a comprehensive regional survey; the formulation of a regional policy; an economic analysis of the problems and their potential;

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<sup>1</sup> These have been dealt with more comprehensively in my term paper "An Analysis of the Components of Multiple Purpose River Basin Development". p.3-9

public participation in the planning and development; inter-related study of all the components of river basin development, namely, flood control, navigation, hydro-electric power, recreation, irrigation, agriculture, industrialisation and urbanisation.

These similarities and criteria, although differing in detail for each basin, have developed basic common conceptions which can help to develop a general model for multiple purpose river basin development.

Within this contemporary concept of integrated development, an analysis of the components of a multiple purpose basin development programme is now made.

## 2.3 THE COMPONENTS OF MULTIPLE PURPOSE RIVER BASIN DEVELOPMENT.

### 2.3.1 Flood Control.

Floods are probably the first phenomena that brings public attention to the harnessing of rivers. The major damage and loss of life which they can bring was emphasized by the flooding of the Orange River two years ago and the damage caused particularly in the Uppington area. With the intensification and expansion of the urban and industrial areas, the flood problems will become more severe unless remedial action is taken.

Generally, rivers are dammed for two main reasons, namely, the control of flood water and/or for water storage. Controlling floods in this manner prevents flood damage caused to land and crops by the regulation of the flow of the river, while at the same time increasing the amount of water available for other uses.

In fact, flood control triggers off the development of all the other components mentioned below. Not only do the reservoirs supply water for urban industrial and irrigational use, but directly associated benefits, such as hydro-electric power, navigation and water-based recreation facilities are often created.

It has already been shown how the controlling of flood waters have economically uplifted river basin regions throughout the world.

### 2.3.2 Navigation.

In the study of the historic precedents to basin development, it was seen how rivers have been used as a means of communication for the last 7000 years. In the U.S.A. the rapid growth of inland water-borne transportation evidenced since World War II, is the result of scientific and technological advances which have

improved navigational techniques and canal linings. Locks have been used to control the flow of the water, thus enabling goods to be transported from one place to another by water transport. The use of waterways for navigable purposes is dependent upon the size, the distribution and the speed of flow of these rivers. These waterways will only be used for transportation if the benefits derived from this method are more than any alternative means, and also if this service draws additional traffic, which, because of prohibitive costs, previously never flowed.

### 2.3.3 Hydro-electric Power.

The advantages of hydro-electric power are that

- (1) it is instantly available by merely switching the turbines on or off;
- (2) it can be used for smoothing off the variable load supplied from the main output; and
- (3) it can be combined equally well with thermal or atomic power generation.

In order to provide these qualities, the plant requires an abundant, nearly uniform supply of water located at a high elevation to provide a large potential fall. When these criteria are fulfilled, hydro-electric power is said to be "cheap energy" and becomes the main supply in areas where it is cheaper than any other means of producing power, e.g. Kariba.

The additional energy produced by hydro-electric power could, amongst other uses, be integrated with the irrigation system to provide power for its pumps. In fact, it is generally postulated that the power market will absorb hydro-electric power output as rapidly as it can be made available.

The interdependence of hydro-electric power sites is essential

to optimise the economic efficiency of the river's power potential. It may prove necessary to forfeit power output at upstream stations for an ultimate increase in total output for the whole scheme. Certain constraints are also placed on power output when the prior needs of the scheme are for flood control, irrigation, storage and navigation. <sup>1/</sup>

#### 2.3.4 Defence.

In China in 500 BC dikes and water diversions were used as instruments of war, by either preventing irrigation water getting to the enemy's land or by diverting a flood and hence drowning him.

"A modern instance of this practice was the breaking of the Hwang Ho dike, west of Kaifeng in 1938, by the Chinese, as a defence against the Japanese. The Hwang poured southward into the basin of the Kwai and was not returned to its pre-1938 bed for a dozen years." <sup>2/</sup>

Not only do large expanses of dammed water on a nation's borders form difficult barriers to cross, but they are easier to patrol than the land. The advantage of underground hydro-electric power stations being less vulnerable to attack than their thermal counterparts, is obvious. Defence is becoming increasingly important as an integral component in river basin development.

#### 2.3.5 Recreation.

As outdoor recreation will be dealt with later in this thesis, suffice it at this stage to record its position as a component of multiple purpose river basin development.

#### 2.3.6 Irrigation/Agriculture.

Irrigation has, and always will, play a vital role in the agricultural development of river basins. With advanced irrigation

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1 Krutilla & Eckstein : Multiple Purpose River Development. p.66  
2 Thomas. loc cit. p.531

techniques it is becoming possible to irrigate larger tracts of land. The economies of scale attached to the large scale reclamation of desert or farm land by irrigation methods rule against irrigation systems for single farms. Large canal systems serving many farms overcome the problems of evaporation and seepage experienced on small streams of water serving the individual farms. The returns from the land thus irrigated justifies the expense involved in the canal system.<sup>1/</sup>

The improvement and extension of irrigation systems should be considered relative to the quality and workability of the top soil. At the recent festival of the soil in South Africa, it was stated that large amounts of the top soil is washed away annually as a result of flooding and poor soil conservation techniques. Soil can never be replaced. Once it is washed away, it can never be brought back again. The soil is man's life blood and if it is not protected and conserved, most parts of the country will be turned into desert land. This has been shown in the TVA, where the felling of forests resulted in the removal, by rain and denudation, of the valuable top soil. The conservation of the soil has one of the top priorities in contemporary development schemes.<sup>2/</sup>

Generally, with the availability of additional irrigation water, changes in agricultural land use occur as the more intensively cultivated crops take the place of those of less intensive use.<sup>3/</sup> Afforestation has provided an effective means of capturing a large amount of run-off as well as preserving and revitalising the top soil.

The topography of a river basin has a bearing on the type of development adopted for each particular scheme. It has been

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1 Krutilla & Eckstein. loc cit. p.57

2 A more detailed discussion of the analysed lack of phosphates in the soil, and the subsequent agricultural techniques and principles used to rectify this, is dealt with in 2.2.1

3 This continues until the threshold level of use has been reached.

expressed, as an example, that much of the hilly topography of the Tugela Basin does not lend itself to orthodox irrigation schemes, and that the considerable water supply should best be used in conjunction with the region's large coal deposits to promote industrial development.

The silting of canals and dams, the availability of a suitable top soil, and topography are factors which indicate that the additional supply of water by new irrigation techniques has certain problems to overcome prior to the increase in agricultural production.

#### 2.3.7 Industrialisation.

The location of industries within a river basin will be mainly dependent upon the source of raw materials, the proximity to the market, the labour pool, and existing capital investment.

Industries that are commonly found in river basins are those based on :

- (1) the agricultural products of the area, e.g. canneries, wineries, granaries;
- (2) the natural resources of the valley, e.g. mines, fish factory, pulp mills; and
- (3) the water intensive industries, e.g. breweries, etc.

These industries will, nevertheless, only locate in the basin if it is economically beneficial for them to do so.

Industrial development attracts service industries and certain commercial establishments. Ultimately industries totally unrelated to the use of water arise through localisation economies. The increased industrial growth creates problems, such as waste disposal and water pollution, which have to be dealt with. The

disposal of industrial waste and sewerage into rivers not only presents a serious threat to the health of the community, but also is contrary to the use of water for outdoor recreational purposes. In the U.S.A., the report of the Senate Select Committee on National Water Resources and the National Conference on Water Disposal noticed that waste disposal is rapidly becoming the heaviest user of U.S.A. rivers. The report further mentions that with the prospect of a near doubling of the U.S.A. population before the end of the century, and the quadrupling of economic output during this same period, the U.S.A. is threatened with a serious degradation of water quality in the years ahead. South Africa has not yet been faced with the large conurbations of the American continent, and, therefore, the problem of waste disposal and water pollution is not yet as pertinent, but due cognisance of this problem is an essential factor in the planning of our river basins.

#### 2.3.8 Urbanisation.

Where there is growth, there is urbanisation. As the initially small nodal service centres of a basin develop, and centralisation of economic activity takes place, so the social and cultural patterns of society will mature. The population movement from the rural to the urban areas will result in a change in the norms and values of the people, which will be evidenced by the creation of places of entertainment, churches, sport, social and service clubs.

## 2.4 BENEFIT AND COST ANALYSIS.

The ultimate aim of river basin projects and programmes is the development of water resources to satisfy human needs and desires. A prerequisite to any scheme should be an analysis of its economic viability. It is, therefore, essential to analyse the benefits and costs pertaining to the alternative uses of the resource.

"For the economic analysis to be most effective, it must be oriented to and be consistent with the following principles :

1. The goods or services to be produced by a project have value only to the extent that there will be need and demand for the product.
2. .... Maximisation of net benefits is a fundamental requirement for the <sup>formulation</sup> and economic justification of, projects and programs.
3. The project as well as any separable segment or increment thereof selected to accomplish a given purpose should be more economical than any other actual or potential available means, public or private, of accomplishing that specific purpose ....
4. .... The economic analysis should provide data which can ultimately be used for comparing the economic desirability of a number of justified projects .... " 1/

A period of a hundred years is usually considered as the upper limit on the economic life of any project, and all amortisation rates are worked out on this assumption. In the measurement of the benefits and costs of any project, various ambiguities and double countings may arise. These problems are too numerous and detailed to be dealt with in this study, but suffice it to say that care should be taken when these measurements are made.

The general objective or project formulation is to maximise net income returns and human satisfactions from the economic resources used in the project. The process of project and programme formulation from beginning to end is largely a matter of weighing alternatives. This assessment of the various programmes is done by breaking the

programmes down into projects, and the projects into increments. Each increment and/or project must add as much, or more, benefits than it adds costs. This principle is applied to all stages of the project analysis, until the numerous alternatives have been sifted to those warranting detailed analysis.

This now concludes a description of a model for multiple purpose river basin development evolved from a study of historical and contemporary examples, and incorporating administrative, financial, economic, regional and planning policies, together with an analysis of the components of such development.

### 3. SOUTH AFRICAN RIVER BASIN PLANNING.

I now want to examine river basin development in South Africa relative to the model just created. To do this, I have selected probably the three most important river basins in the Republic, namely, the Orange, Vaal and Tugela rivers. The salient points in their planning and development will be mentioned, and their shortfalls compared with the above-mentioned model, will be shown.

#### 3.1 SPECIFIC EXAMPLES.

##### 3.1.1 The Orange River Project.<sup>1/</sup>

The Orange River rises in the Drakensberg Mountains in Lesotho and flows for 1,100 miles westwards, through the Cape Province, into the Atlantic Ocean at Oranjemund on the West Coast. The last section of the river forms the boundary between South West Africa and South Africa. The Department of Water Affairs is the authority in charge of the administration and maintenance of the development of the river. It's activities, however, are guided penultimately by the Orange River Planning Advisory Council, which is an inter-departmental body with representatives of the private Sector also participating. The work has been divided into six phases and the first phase was commenced in 1963. This project has obtained the approval of Parliament, as laid out in three White Papers.

The first White Paper contained proposals for the construction of the dams and the development of hydro-electric power for the immediate surroundings. The second Paper extends the hydro-electric power supply to incorporate a wider region. The benefits

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1 White Papers X-62; AA-64 and LL-68.  
S.A. Journal of Science. October 1963. Articles on the Orange River Project.

of the scheme have been listed as irrigation, urban and industrial water supply, water supply to various Local Authorities, hydro-electric power development, settlement possibilities, flood control, industrial development, recreation facilities, employment, provision of public services, and finally, the adequacy of the project as planned.

The supply of hydro-electric power and water for irrigation have been studied in detail. Urban and industrial water supply, flood control and the storage capacity of the seven dams have been studied and assessed.

Flood damage is reported to be reduced by 50% with the raising of the P.K.le Roux and H.F. Verwoerd dam walls. It is also stated that the demand for irrigation water varies between 40% and 160% of the average demand.

The general impression obtained is that the Orange River Project has been planned and designed solely as an engineering problem, furnishing the engineer with the basic data he requires to construct the project.

### 3.1.2 The Vaal River. <sup>2/</sup>

This river is the main source of supply for the Rand and its controlling body is the Vaal River Catchment Association.

The Vereeniging Barrage on the Vaal River was completed in the early twenties to supply the then rapidly expanding Rand. The Vaal Dam was later constructed when it was obvious that the growth of the Rand would soon outstrip the supply of water. The wall of the dam was later raised to increase its storage capacity.

In 1953 reports were made on the water requirements and

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- 1 This only refers to the number of dams included in the Orange River Sector of the Project.
  - 2 The Vaal River Catchment Association Symposium. October 1961. Natural Resources Development Council : The Vaal River. February 1953.

supplies of the region. In this report, a recommendation is made for the construction of a series of barrages below the Vaal dam. In 1961 it was postulated that the Rand Water Board would require additional water within the next 15 years and that there appeared to be little possibility of obtaining additional water from the Vaal. It was concluded that the only practical sources of supply are either from the Tugela River or from the Caledon or Orange Rivers.

From the published data on the development of the Vaal River, it can be seen that the following studies have been made: a demographic profile of the region; the supply of and demand for water for urban, industrial and agricultural use to the year 2000; industrial and agricultural trends in water usage; and the re-use of water.

### 3.1.3 The Tugela Basin.<sup>1/</sup>

The Natal Town and Regional Planning Commission acquired the necessary basic information for the development plan for the Tugela Basin by means of an extensive programme of original research.

The first report on the Tugela, published in 1952, reviewed factors likely to influence development in the region, namely, geology and physiography, minerals, coal measures, climate, vegetation, soil conservation and reclamation, water resources, agriculture, forestry and timber resources, population and labour resources, distribution of population, transport and communications, electricity, industry, historical monuments, parks, game and natural reserves, and fishing waters.

Regional studies have been made of the quantity, quality and characteristics of the water of the rivers within the basin.

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1 Volume I : The Tugela Basin; Volume 5 : Towards a Plan for the Tugela Basin; Volume II : The possibility of Integrated Forest Industry in the Tugela Basin; Symposium on the Development Potentialities of the Tugela Basin, Session 3, Paper 6 & 7.

The agricultural potential of the region was based on a careful evaluation of the vegetation and soil conditions.

The second report deals with the economic possibilities of industrial location within the basin. Its economic environment is defined by a study of the location factors of secondary industry, and differential rail tariff rates to the various sources of raw materials and the region's relationship to the surrounding industrial and market areas.

In the survey of the region industrial location factors, such as the source of the raw materials, proximity to the market and labour pool, have been studied within the economic requirements of the region. The point is made that as a potential industrial area, it will have to compete with the four major industrial centres of South Africa. This can be accomplished with a policy of decentralisation of industry to the Bantu areas with the initial momentum being created by the Government or public utility company.

The fact that the Reef industrial complex will require additional water in the near future, and that industries using large quantities of water will have to locate outside the Vaal catchment area, indicates that the Tugela Basin is the only area reasonably nearby where rich water resources coincide with coal-fields, main railway lines, power lines and large labour pools.

The reports on the Tugela River Basin extensively cover the physical/agricultural and economic/industrial components of the region. Each river catchment area within the basin has been examined within this context.

### 3.2 SHORTFALLS IN PRESENT THINKING, GIVEN FINDINGS OF 2.0.

The Tugela Basin is unquestionably the most comprehensively planned basin of the three studied. It is, therefore, decided first of all to examine the shortfalls of the Tugela separately from the other two basins. This is done because the Orange and Vaal are basically similar in their planning and development, and have also been approached in a completely different manner to the Tugela.

In the Tugela survey, the majority of the criteria previously<sup>1/</sup> formulated for multiple purpose basin development have been met. The formulation of a clearly defined regional policy appears to be a weakness of the survey (this weakness will be covered by my main criticism further on). An economic analysis has been made of the basin, but no assessment of the benefits received and costs involved, either on an overall or on an individual component catchment area basis, has been performed. The active participation of the public in the planning of the scheme is not specifically mentioned, although mention is made of the numerous interviews conducted in the execution of the survey. The constant publication of reports on the scheme helps to retain and stimulate public interest. Noticeable omissions in the analysis of the components of the scheme have been recreation and urbanisation.

The main criticism I have of the survey is that it is a static analysis. No growth trends in population, employment or industry have been analysed. This results in the reader having difficulty in assessing what changes are actually taking place in the region. Research and field data have been recorded in a clear and attractive manner, yet it appears to lack the dynamic policy and purpose essential for any scheme to inspire the imagination and co-operation of the people.

Even although this scheme does fall short of the ideal multiple

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1 See para. 2.2.4

multiple purpose model, it does compare favourably with overseas schemes in its inter-related comprehensive approach to the problem.

The same, unfortunately, cannot be said for the Orange and Vaal River schemes. These basins do not conform to one of the multiple purpose criteria, as can be seen from their summaries, which are narrow in their overall conception.

The weakness of the Orange River Project in not having a multiple purpose development authority was emphasized in 1963 when it was said:

"since the project will affect both developed and undeveloped areas alike, it will, therefore, be both multi-regional as well as multi-purpose in character, and as such it will be necessary in executing the scheme to resolve conflicts in the fields of physical, economic, social and administrative planning. This will call for comprehensive planning which alone can achieve the integration necessary for true interdisciplinary action". 1/

The Department of Water Affairs is only competent in specific fields and is not the ideal authority to administer and maintain the multiple purpose development of the Republic's rivers. An advisory Council, although broadening the disciplines of the management, is not an autonomous development authority purposely established to direct development of specific rivers. The development of Planning Authorities similar to those established for the T.V.A. and Snowy River developments, representing all groups interested in the development of each respective basin, would overcome many of the shortfalls existing in present South African basin development. These Planning Authorities would work with the Prime Minister's Economic Advisory Council to ensure firstly, the correct choice of the various alternate national schemes available for development, and secondly, progress within the framework of the national economy. This Authority would be the administrator, planner and executor of its respective scheme, delegating authority,

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1 S.A.Journal of Science. Biesheuvel. p.508

where necessary, to public or private bodies, but at all times retaining management control of each of the integrated components of the scheme.

The lack of a regional analysis and survey of the basins fails to recognise the importance of these basins in their regional and national context. No attempts appear to have been made to formulate any regional policy or plan within which the individual schemes are correlated for the overall economic growth of the region. The construction costs of the schemes have been assessed, while no attempt has been made to quantify the benefits received. Thus, no proof is shown that the costs of the schemes are justified by the benefits resulting from them. A benefit cost analysis of each project and an economic analysis of the problems and potential of the regions is completely lacking.

The dearth of published material might be indicative of the public interest and support for these schemes.

An inter-related study of the components of these basins has been completely overlooked. In the survey already conducted of these basins, the supply of hydro-electric power and water for irrigation have been dealt with fairly comprehensively. Flood control has been mentioned, but the benefits derived from it have not been sufficiently analysed and stressed. It has been stated that navigation is unsuitable for South African rivers because of their size, irregularity of flow and physical features. This attitude may change with the development of scientific and technological techniques. The use of the water for defence purposes has hardly been mentioned. Industrialisation and urbanisation have been inadequately dealt with and require more extensive and specific study. The social and monetary benefits to be

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1 I refer here to the method of analysis Isard describes in "Methods of Regional Analysis".

derived from recreation facilities of river basins have not been studied at all and, in fact, recreation has only casually been mentioned as a benefit. No analyses or projections appear to have been made on the demands for hydro-electric power, irrigation water, urban and industrial consumption and many other smaller factors which will determine the rate of development of any scheme.

In general it can, therefore, be stated that South Africa has failed to recognise the consequences of harnessing its rivers, by not developing an incisive long-range, comprehensive planning policy for its river basins.<sup>1/</sup>

Having outlined the concept of multiple purpose river basin development and shown the shortfalls of South African development in this context, I now proceed to examine the Upper Berg River Basin.

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1 The writer is aware of the fact that a Commission of Enquiry, under the direction of the Planning Advisory Council is at present sitting to study the water affairs in the Republic, with the object of the creation of a comprehensive water plan.

#### 4. UPPER BERG RIVER BASIN.<sup>1/</sup>

##### 4.1 REGIONAL CONTEXT.

The Valley is situated about 35 miles from Cape Town, and extends about 20 miles on either side of the National Road, N9, to Johannesburg. It is defined by the vine and orchard farming lands of the upper Berg River, as north of Wellington these agricultural land-uses tend to change to the larger grain farms of the Swartland. The river has its source in the Jonkershoekberge and flows predominantly in a northerly direction through a fertile valley, with almost unbroken ranges of towering mountains on either side. (see Figure 2).

The region acts as a funnel to the Greater Cape Town and Swartland areas, for most traffic flowing inland has to pass through it. All reports on Greater or Metropolitan Cape Town include this region and it can, therefore, be classed to be in a "Metropolitan Region" of development.<sup>2/</sup> For the purposes of regional data for this thesis, I will, therefore, confine my analysis to the Region defined by the four magisterial districts of Cape Town, together with the Strand, Somerset West, Stellenbosch, Paarl, Franschoek and Wellington.<sup>3/</sup> From all reports,<sup>4/</sup> Paarl is growing at a faster rate than any of the other principal towns in the Greater Cape Town area. This can probably be put down, amongst other things, to the excellent N9 freeway to Cape Town, and its position en route to the interior.

The two roads running from beyond Wellington to just before Franschoek make all parts of the Valley easily accessible to the motorist. The Franschoek Pass at the southern end of the valley, has recently been reconstructed and tarred, and, therefore, affords

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1 For the remainder of the text, this will be referred to as the 'Valley'.

2 Friedman & Alonso. Regional Development & Planning. p.3, and Dept. of Planning Symposium 1967. Map 3.

3 This delimitation is the same as that used by the BEO verslag : Stellenbosch, and tallies with Development Region No.10 as defined by Mr.C.J. Viljoen, Dept. of Planning Symposium 1967. Map 7.

4 1960 Population Census figures & BEO report.

a good road link with Villiersdorp and Caledon. The good roads from Wellington northwards give the area direct access to Malmesbury, Porterville and the Northern Cape. The mountain range on the east of the valley forms a substantial barrier to social, cultural and economic interaction with the areas beyond the mountains<sup>1/</sup>. The interaction with areas outside the region are dominated by the regional centre, Cape Town.

Paarl, which is the largest country town in the Cape Province, serves as a dominant nodal service centre for the farms and towns in the valley. It is also a substantial and rapidly growing industrial area. The head offices of large industrial and commercial organisations, namely Rembrandt, K.W.V., Rabinowitz & Berman, H. Jones & Co., Berg River Textiles, Boland and Paarl Boards of Executors, Owen Wiggins Trust, etc. are located in Paarl.

The wine and canning industries in the region are heavily reliant upon overseas markets for the purchase of their goods. Further devaluation of sterling or sanctions could drastically curtail this market. This would have a detrimental effect on the overall growth of the economy in the Valley.

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1. This trend might alter with the proposed construction of a road and rail tunnel through the du Toit's Kloof mountains from Paarl to Worcester.

#### 4.2 HISTORY OF SETTLEMENT. <sup>1/</sup>

The bushmen and the Hottentots, who were respectively the first inhabitants of the valley, left no permanent imprint on the cultural landscape of the region. The Hottentots did, nevertheless, cultivate the level land close to the river. The cattle they farmed enabled them to use this as a basis of trade with the Dutch and passing ships in Table Bay.

By 1687 twenty-three Dutch and German families had settled at a place named Drakenstein, along the banks of the Upper Berg River, mainly near its confluence with the Dwars River. The first significant influx of immigrants since the establishment of the Cape settlement, occurred during the years 1688 and 1689, when about 200 French Huguenots arrived at the Cape. They located on the fertile soils in the Valley, and their farms soon became interspersed with the Dutch. By the start of the 19th century, the Huguenots had lost their identity and the only evidence of their influence in the Valley was in the numerous remaining French names, and their contribution to agriculture by the introduction of viticulture.

The irregular flooding of the river and periodic droughts made the development of the lands a hazardous occupation in these early days of settlement and the eighteenth century saw very little development. It is of interest to note that as early as the 1700's, the farmers in the Valley depended for their livelihood on the sale of their produce to the ships that called at Table Bay.

The Valley benefitted from improved communication links with the interior, and in 1853 Bain's Kloof Pass was opened, to be followed by the railway line from Cape Town to Wellington in 1863. The branch line to serve the deciduous fruit growing areas of the Franschhoek

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1 de Villiers : In the valley of the Berg.  
 Impey : A regional survey of the Berg River Valley.  
 Verschoyle : Paarl Joint Town Planning Scheme.

valley was built in 1904. Early urban settlement was concentrated around the site of the present Strooidak Church in Paarl. In the first quarter of the 19th century, it was noticed that :

"as the town grew, its semi-rural setting began to attract tourists and earned it a reputation as a summer holiday resort, although until 1828 it lacked accommodation for these visitors. In that year a boarding-house was opened, thus laying the foundation of its tourist industry. The first of its recreational amenities had already been established when in 1816, the Paarl Turf Club was founded and a race course laid out near Courtraai, on the southern side of the village. This was really the first step towards the achievement of a reputation as a sporting centre." <sup>1/</sup>

The wine and wagon making industry were the first industries in the Valley located at Paarl and Wellington. The wool washery in Suider Paarl proved to be the start of the extensive textile industries. Later other industries based on the agricultural products of the Valley were clustered around Paarl, Huguenot, Dal Josaphat and Wellington stations.

The churches played an important role in the cultural, social and educational development of the early Valley, and today they are located at the centroids of development, in Paarl and Wellington, as well as the smaller urban settlements at Franschhoek, Pniel and Simondium. Other smaller settlements in the region occurred at Le Rouxdorp and La Motte.

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1 Impey : op cit. p.45.

#### 4.3 HISTORY OF DEVELOPMENT PLANS AND REPORTS.<sup>1/</sup>

The development plans and reports covering the Berg River fall into two categories, namely, those of the Western Cape or Greater Cape Town, and those specifically confined to the Berg River. The contents of these reports relevant to the Berg River, require some discussion.

The Regional Survey of the Western Cape covered the geographic background, natural resources, population and general economic structure of a much wider region than Greater Cape Town. This survey provides a setting for the Valley within this wider context. One of the final recommendations made for this region was for an investigation into the potential and better utilisation of tourism and open-air recreation.<sup>2/</sup>

The reports have all emphasized the fact that water for irrigation might well limit the growth in industries solely reliant upon agriculture for their raw materials. This will detrimentally affect the growth of the region. Underlining this is the fact that industrial, urban and agricultural use of water in the Western Cape is at present 1%, 4% and 15% (total 20%) respectively of the estimated usable water compared with the national average of 40%.<sup>3/</sup> Shand claims that 65% of the water flowing in the river is available for use for all purposes. Of this, 45% at the moment remains unused. If by the year 2000 the estimate of 4% and 10% for industrial and urban usage is correct, then it means that 51% will be available for irrigation. Even if all this water is used for irrigation, the potential land which could be irrigated would require an amount of 33½% in excess of this figure.<sup>4/</sup>

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- 1 Shand : Report on the Water Resources & Requirements of the Berg River Valley. October 1961.  
 Paarl Joint Town Planning Scheme. January 1962.  
 N.R.D.C. : Regional Survey of the Western Cape. September 1964.  
 Blersch : The Role of Water Resources in the development of the Western Cape. June 1965.  
 White Papers : G.G.'68; K-'68; O-'66; BB-'66; Z-'66.  
 B.E.O. : Ondersoek na die Ekonomiese Struktuur van die Groter Kaapstad-gebied. Jan. 1968.  
 Blersch : Tegnikon. Feb.1968.
- 2 N.R.D.C. loc.cit.p.110; 3 Tegnikon loc.cit.p.49; 4 Shand.loc.cit.p.4.

The Berg River remains the only worthwhile source for the supply of water for Greater Cape Town. It has also been pointed out that the supply from the Wemmershoek and Steenbras Dams will be inadequate to meet the demand by 1971. Shand's report on the water resources and requirements of the Berg River Valley was published in 1961 with proposals to overcome these problems. The proposals relative to the valley are shown in Figure 3. The scheme has been approved in principle, although no developments have yet taken place in the Valley. These proposals make provision for two dams in the mountains and a further half a dozen on lower lying land.

From the administrative and organisational viewpoint, an attempt was made to establish a Paarl Town Planning Scheme with the intention of forming basic planning proposals for the region, to which each constituent local authority would be obliged to conform. This report was put forward for the constructive criticism of all the constituent local authorities, but has unfortunately not been taken any further due to lack of interest.

Apart from the proposals made for the harnessing of the water of the Upper Berg River, it can be seen that no other plans or proposals have been formulated for the future development of the Valley.

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1 Encompassing the following urban settlements : Paarl, Wellington, Kraaifontein, Franschoek (it is included in the report even although it resigned from the scheme), Le Rouxdorp, Hermon, Klapmuts, Windmeul, Groot Drakenstein, Simondium and Pniel.

#### 4.4 CLIMATE.

The climate of the Upper Berg River Valley is a Mediterranean climate, with warm to hot, dry summers during which a high percentage of the possible bright sunshine is recorded, and evaporation is rapid. The winters are relatively cool and wet with little frost, and considering this is a wet period, a fairly high percentage of sunshine.

The prevailing winds are the south-easterlies in summer, and the north-westerlies in winter. The south easters do, on occasions, rise to gale force, but are generally of moderate velocity. This is due to the protection afforded by the surrounding mountains. These mountains play a major part in determining the micro-climate of the region. Most of the annual rainfall falls in them and becomes progressively less (from 3000 mm. to 500 mm.) as distance from the mountains is increased. Similarly, temperatures in the Valley generally increase from the mountains to the riverbed.

The driest and hottest months of the year are January and February. It is during this period that the demand for irrigation water is the greatest, while the natural flow of the Berg River is the least. Prior to the construction of, and subsequent controlled summer discharge from, the Wemmershoek Dam, the summer flow in the river was almost negligible.

#### 4.5 POTENTIAL.

Paarl is said to be the fastest growing peripheral town of Greater Cape Town. The fact that the annual growth in the gross regional product for Greater Cape Town for the period 1954 - 1960 was the highest of the five most important industrial areas in the Republic, and that Paarl's contribution to the gross regional product per capita in 1960 was second only to Cape Town, indicates the vital role it is playing in the growth of the region.<sup>1/</sup>

The population projections for the Valley give an indication of the probable growth of the various population groups.<sup>2/</sup> It will be noticed that while the Coloureds and the Bantu will increase by just less than four and three times respectively, the Whites will not even double their number. This means that more labour intensive work opportunities will have to be devised for this captive population, or else a migration of the population to Cape Town must take place. Unfortunately, this increase in the population will consist mainly of unskilled labour. This labour, while suitable for work on the farms, needs certain training if it is to be of value to expanding industries. This could be overcome by the establishment of technical colleges and trade schools.

The first element necessary for growth to take place within the Valley can, therefore, be made available, namely, labour.

The second element to be considered is land. Of the zoned industrial land in Wellington and Paarl, only about a third has actually been used. This, together with the fact that easily serviceable, poor quality, flat land is available next to the railway line and the river between Paarl and Wellington, ensures an abundant supply of land for future industrial growth. The agricultural usage of land would

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1 B.E.O. loc.cit. p.19 & 20.

2 See figures 5 and 6.

probably change to a more intensive form of use with the availability of additional water. The granite-based soils of the Valley lend themselves to greater intensification, and the possibility of vegetable farming replacing the less productive vineyards and fruit trees, should be investigated.<sup>1/</sup> With more land being irrigated and greater pressures of White urbanisation being brought to bear on many export grape farms within the Municipality of Paarl, it is expected that these farmers will ultimately find it more profitable to sell and relocate on cheaper land, outside the town. In fact, there is within the Municipal area of Paarl much agricultural land that has not been developed for urban use.

The growth trends in the urban settlement pattern of the Coloured and Bantu population appear to be an expansion and filling in of the land between Wellington, Newton and Huguenot. This land adjoins the industrial areas, is easily accessible, and has a low intensity of agricultural use. A new growth point at Windmeul on the northern slopes of Paarl Mountain is beginning to develop with the recent erection of a new school and church. It can, thus, be seen that the availability of land for any use is no problem in the Valley.

The third element necessary for growth is capital. The large number of trust organisations, building societies and banks in the Valley are evidence of substantial commercial activity. It must be stressed that capital is highly mobile and can be attracted to almost any location. The larger, better-known firms in the Valley (Boland and Paarl Boards of Executors, Owen Wiggins Trust, etc.) can secure investment capital from outside the region, while the smaller firms rely upon their local business associates to assist them. The preparedness of the local financial institutions to loan money to the smaller businesses in the Valley is an encouraging factor, as in the long-run

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1 Vegetable farming is a distinct possibility for agricultural development, as it is not dependent on the overseas markets like many of the other agricultural products in the Valley. It is also labour intensive and would, therefore, absorb much of the predicted unskilled labour force.

the accelerated local economic development will be to their own benefit.

The existence of the last element, entrepreneurship, within the firms in Paarl is apparent by the number of young businessmen in managerial positions in the larger firms. Recent innovations that have occurred in industry have been the export of wine pressure separators to Australia, and the only assemblage and distribution plant in South Africa for a new truck from America. The recent tremendous growth of the Boland Board and Owen Wiggins Trust are indications of dynamic entrepreneurs setting the pace for other firms.

These elements, combined with the critical factors in city growth, namely, momentum, city size, managerial capacity and cyclical stability, will ensure that the Valley will retain and expand its position in its regional context. With the increased availability of water from the Berg River<sup>1/</sup>, this growth could be further extended as the increase in agricultural intensification will instigate further industrialisation, which will, in turn, attract commercial activities. The process of agglomeration can, therefore, be seen to be accelerated by the increased availability of water.

In addition to the Valley's agricultural, industrial, commercial and residential potential, it has great possibilities as a recreational area. The natural beauty of the mountains, rivers and farmlands, and its proximity to Greater Cape Town are features that make it one of the most attractive, potential outdoor recreation areas in the Western Cape. Franschhoek, with its solitude and beautiful surroundings, is already a popular place of rest and relaxation for holiday and picnic makers.

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Note 1 Shand : Water Resources and requirements of the Berg River Valley (p.10) claims that an additional 97,500 morgen feet of water can be made available by adopting his proposals.

The Valley has the potential to develop into an important peripheral node, relieving pressure on the regional centre while at the same time, offering the rural atmosphere sought after by the city dwellers.

#### 4.6 WEAKNESSES IN THE PRESENT PLANNING.

The earlier criticisms levelled at river basin developments in South Africa as a whole, are all applicable to this Valley.<sup>1/</sup> No regional development authority exists to correlate the planning and development of local authorities or Government departments in the Valley.<sup>2/</sup> This allows each authority/department to carry out its autonomous development without due regard to its regional context.<sup>3/</sup>

The failure of the integration of the Berg River Scheme in to a comprehensive development plan for the region overlooks the manifold benefits that can be derived from such a scheme. No thought has been given to the effects of such harnessing on the overall social, cultural and economic structure of the Valley. Because of this, the interaction of the components of the basin development, namely, flood control, hydro-electric power, recreation, irrigation, agriculture, industrialisation and urbanisation, have not been studied.<sup>4/</sup>

In the collection of information for this thesis, the lack of data, studies or knowledge in the following specific fields was noticed :

- (1) The absence of a detailed analysis of the ability and extent to which the soils of the Valley can absorb additional irrigation water in intensifying agricultural methods.
- (2) The absence of a detailed analysis of employment in and the growth of existing industries within the Valley.
- (3) The almost complete unawareness of the authorities of the potential of the Valley as a regional recreation attraction.

These would fall under irrigation, industrialisation and recreation in a comprehensive management authority.

1 See paragraph 3.2

2 The Berg River Irrigation Board controls the distribution of the water from the Wemmershoek Dam to the farmers. The Berg River Development Association is a group interested in the development of the region, but possesses no statutory powers.

3 An example of the type of 'clash' that can occur in planning of this nature is the recent proposal of the Department of Water Affairs to construct dams over the proposed du Toit's Kloof tunnel. (see note page 33 para. 4.1)

4 By the 'Berg River Scheme' I mean the development scheme suggested by Shand and shown on Figure 3. Stages of this scheme already approved in principle are the Assegaaibos (a smaller dam than the Bergrivierhoek dam shown), Voëlvlei and Keerom dams and the Twenty Four rivers project.

To overcome these weaknesses, I would recommend that the Planning Advisory Council <sup>1/</sup> establish a Berg River Valley Authority (B.R.V.A.) for the region. This Authority would be a permanent statutory body controlling the planning and development of the whole of the Berg River Valley. The B.R.V.A. should consist of two component sections, namely, the Administrative Section and the Technical Section.

The Administrative Section would comprise representatives from all the Government departments and local authorities concerned, together with representatives of any other interest groups. Their main task would be to administer and ensure compliance with the overall scheme. This Section should co-operate closely with the Technical Section in all phases of the project.

The Technical Section would be comprised of professional and technical men from all the various disciplines involved in multiple river basin development. They would be responsible for the collecting and analysing of all necessary data, and finally developing a Master Plan for the region. Each section, though co-operating with each other, would carry out their duties separately. The Administrative Section, although having the right to criticise or comment on plans developed by the Technical Section, should not have the power to veto any such plans. This is recommended as a safeguard against any political interest groups bringing pressure to bear on the Administrative Section which would prove detrimental to the overall development.

The establishment of such an authority would maximise the benefits obtained from the resources of the region, as well as integrating the development within the region with surrounding regions.

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1 I suggest this body so that all development taking place in the B.R.V.A. is within the context of the National Development Programme.

The background of the Valley, its potential and its weaknesses provide the setting within which an examination of outdoor recreation is made.

## 5. OUTDOOR RECREATION.

Outdoor recreation can be defined as the utilization of the outdoor environment for enjoyment, relaxation and stimulation of body, mind and spirit. This experience can be divided into five phases, namely, anticipation, travel to, on site, travel back, and recollection.<sup>1/</sup> Most writing on outdoor recreation implicitly deals with the on site experience, while it is the total recreation experience that should be studied.

The anticipation of any holiday or outing is the exciting stage of planning and preparing for it. This normally takes place in the recreationist's own home. It is the most important stage of the whole experience, because it determines what will later take place. The costs of recreation equipment and planned accommodation come into this stage and are dependent on the nature of the outing.

The travel to the site can either be pleasant or unpleasant, depending, firstly, on whether the recreationist likes car travel or not, and, secondly, on the type of road to the site. To many people sightseeing and travel is one of the most pleasurable parts of the whole experience. This journey can range from being very short, to very long, with the proportionate costs of travel involved.<sup>2/</sup>

The on site experience is that enjoyment of activities such as swimming, hiking, camping, picnicking, hunting, fishing, playing games

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1 Clawson & Knetsch : Economics of Outdoor Recreation. p.33 & 34, and Clawson : Land and Water for Recreation. p.41 & 42.

2 I am assuming here that most recreation travel is made by the motorcar. The same argument could also be applied to public transport.

and a myriad other experiences and the satisfactions obtained from them. Misconceived as being the total outdoor recreation experience, this may be less than half of the total, whether measured by time involved, expense incurred, or total satisfaction gained.

The travel back need not be the same as the travel to phase.

A different route may be taken. But even if the same route is taken, the psychological attitude of the recreationist is different. The holiday or outing is over and he is nostalgic and/or tired as the case may be.

The recollection of memories of the experience normally takes place, once again, in the recreationist's home. Experiences are re-lived. Troubles laughed at and stories exaggerated. These memories inspire the recreationist to plan for the next holiday or outing - to the same or different places, depending on the enjoyment derived from the first experience.

## 5.1 CLASSIFICATIONS OF OUTDOOR RECREATIONAL AREAS.

Outdoor recreation can be broadly classified into three categories.<sup>1/</sup> (See Table I for a fuller description of these areas.)

### 5.1.1 User-oriented Areas.

The main characteristic of these areas is that they are easily accessible and within quick and easy reach of public transport. Their physical characteristics are secondary to the location factor. For the purpose of further analysis in this thesis, I

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1 Clawson, Held & Stoddard : Land for the future. p.136

T A B L E 1  
A GENERAL CLASSIFICATION OF OUTDOOR RECREATIONAL USES AND RESOURCES

T y p e o f r e c r e a t i o n a r e a			
I t e m	User oriented	Resource Based	Intermediate
1. General Location.	Close to users; on whatever resources are available.	Where outstanding resources can be found; may be distant from most users.	Must not be too remote from users, on best resources available within distance limitation.
2. Major types of activity.	Games, such as golf and tennis, swimming; picnicking; walks and horse riding; zoos, etc. playing by children.	Major sightseeing; scientific and historical interest; hiking and mountain climbing; camping fishing and hunting.	Camping, picnicking; hiking, swimming, hunting, fishing.
3. When major use occurs.	After hours (school or work).	Vacations.	Day outings and weekends.
4. Typical sizes of areas.	One to a hundred, or at most to a few hundred acres.	Usually some thousands of acres, perhaps many thousands.	A hundred to several thousand acres.
5. Common types of agency responsibility.	City, county, or other local government; private.	National parks and national forests primarily; state parks in some cases; private, especially for seashore and major lakes.	State parks, private.

class all children's playgrounds, playing fields, swimming pools, picnic grounds, parks, walks, museums, etc. within the urban area of development in Paarl, Wellington and Franschoek in this category.

### 5.1.2 Resource-based Areas.

These areas are attractions because of their outstanding aesthetic quality, and often trips of a thousand miles or more will be undertaken to visit them. Examples of this type of area in Southern Africa would be the Kruger National Park, the Victoria Falls and the Congo Caves. For the purpose of this analysis, I will assume that this Valley does not have any such superior natural features.<sup>1/</sup> The proposed nature reserve on Paarl mountain, the mountains and the rivers, in fact, the Valley as a whole, could approach this type of area if very extensively developed.

### 5.1.3 Intermediate Area.

This area is between the above two extremes, and would be within easy reach for a day or weekend outing, and contain some natural, historic or scientific attractiveness, which may or may not require some measure of improvement.

This will be the predominant type of recreation area studied in this thesis, and can generally be said to be those areas outside the areas of urban development.

For the purposes of this thesis, the arboretum, the golf course and Wateruintjiesvlei at Paarl, and the caravan park at Wellington are treated as falling in this category. The Paarl facilities are excluded from the user-oriented type because they are beyond walking distance of the urban development, and the Wellington caravan park because it caters mainly for daily and weekend visitors.

### 5.1.4 Other Classifications.<sup>2/</sup>

Another classification to be offered is based in part upon management criteria, and in part upon physical characteristics of

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1 I recognise this as a subjective statement at this stage. My purpose is to classify the type of outdoor recreation in the Valley into one category for later ease of reference.

2 Clawson & Knetsch : loc.cit. p.37

the areas, and is as follows:

- "Class I - High density Recreation Areas; areas intensively developed and managed for mass use.
- Class II - General Outdoor Recreation Areas; areas subject to substantial development for a wide variety of specific recreation uses.
- Class III - Natural Environment Areas; various types of areas that are suitable for recreation in a natural environment and usually in combination with other uses.
- Class IV - Unique Natural Areas; areas of outstanding scenic splendour, natural wonder, or scientific importance.
- Class V - Primitive Areas, undisturbed roadless areas, characterized by natural, wild conditions, including 'wilderness areas'.
- Class VI - Historic and Cultural Sites; sites of major historic or cultural significance, either local, regional or national."

Classes I; II and III; and IV, V and VI would, in general, resemble user-oriented, intermediate and resource-based areas respectively.

The intensity of use of these recreation areas can be roughly classified as follows:

- " 1. Very heavy, with perhaps 1,500 or more total uses or visits per acre per year. A large share of the municipal parks will fall into this use classification, in whole or in part, and perhaps some highly popular areas within state or national parks.
2. Heavy, with typically 50 to 100 uses or visits per acre per year. Camps and picnic areas, popular lakes and stream edges, and some other types of areas would fall into this use class.
3. Moderate, with typically one to three uses or visits per acre per year. Many hunting and fishing areas, hiking and riding areas, and others would fall into this class.
4. Light, with typically one-tenth use or visit or less per acre per year. This class would include the "back country" of national and state parks and forests; sometimes even the more remote corners of large municipal parks would qualify. <sup>1/</sup>

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1 Clawson, Held and Stoddard : loc.cit. p.139

### 5.1.5 Comments on these Classifications.

The different classifications of the various types of area is recognised, but, as previously mentioned the "wider" definition of intermediate area, as defined earlier<sup>1/</sup>, will mainly be studied in this thesis.

It is obvious that these are not watertight categories, but they do form a basis on which classification can be made.

Substitutability will mainly be made within the groups rather than between one group and another, e.g. youth will play tennis if the swimming bath is closed rather than pay a visit to a national park. People coming to the Valley for outdoor recreation are unlikely to turn back and go to the beach if they find one facility closed. The physical form of the Valley tends to "hold" them and they will search for some substitute within the Valley. To achieve this necessary substitutability, a certain degree of flexibility in provision and management of the outdoor recreation areas is required.

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1 See paragraph 5.1.3.

## 5.2 FACTORS EFFECTING THE DEMAND FOR OUTDOOR RECREATION.

### 5.2.1 Population Growth.

Recreation facilities are supplied for, or demanded by people and, therefore, the number to be catered for, their age composition and their growth trends is essential in the determination of the quality and quantity of recreation facilities required.

With the centripetal movement of the population to urban concentrations, a greater need for the "restoring, of 'recreating', <sup>1/</sup> health, energy, and mental equilibrium" is required. Many areas in the city centre become overpopulated and the procurement of land for recreation in these areas is financially beyond them.

The declining death rate amongst babies and older people due to the advances of medical science underlines the need for a wider range in recreation facilities. The tiny tots will require well-policed, small play-lots, or adjoining adult facilities, near to their homes, while the aged will need easily accessible parks for quiet walks with many resting places. Benches placed at strategic points so that they can enjoy the scenery, or overlooking active sporting facilities, could be erected for these folk.

"As all recreation specialists know, the kinds and amounts of recreation demanded are affected by the age of the person concerned. The small child wants one kind of activity, the youth another, the younger married adult still another, the older married adult something different again, and the older citizen still another lot of activities. Interests and abilities to engage in recreation change with advancing age, as, in many cases, does the economic ability to procure what is desired." <sup>2/</sup>

To establish some idea of the population size of the market for the recreational facilities in the region under survey, projections for the Greater Cape Town area have been estimated

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1 Thomas : loc.cit. p.897

2 Glawson & Knetsch : loc.cit. p.96

(Figure 4), together with separate projections for the magisterial districts of Paarl and Wellington (Figures 5 and 6 respectively).

The Greater Cape Town figures include the magisterial districts of the Metropolitan area of Cape Town, Somerset West, Stellenbosch, Malmesbury, Wellington and Paarl. These estimates have been projected on a logarithmic scale by adopting the growth rate of the 1951-1960 period and extending it linearly. The projections for Paarl and Wellington magisterial districts have been made in the same manner for these figures respectively. The only exception is the figure for Bantu where the Greater Cape Town growth rate is adopted rather than extending the magisterial districts growth rate. Theoretically, the Bantus are supposed to be migrated out of the area at the rate of 5% per annum. Practically, however, many stay in the area as migrant labour and, therefore, must be considered in the population projections. Being small in number and of relatively insignificant economic importance, errors in their population projections will not have any marked effect on recreation expenditure.

In general, it can be stated that the population in the Greater Cape Town area, by the year 2000, is expected to be 2.4 times as great as it is now, which will be made up of 1.7 times the Whites; 3.1 times the Coloureds; and 2.2 times the Bantu, while in the Valley, the corresponding figures are 1.6, 3.7 and 2.6 respectively. This shows that the Valley's non-white population is increasing relatively faster, while the Whites are increasing relatively slower, than the Greater Cape Town region.

#### 5.2.2 Recreation Expenditure.

The amount spent on recreation varies according to income

per capita and the economic and social changes within a country.

Table 4 shows the amount spent by the Whites of the specified areas, on recreation. In 1966, this was found to be 5.9% of total expenditure. This is compared with 5.6% for a similar assessment in the U.S.A. for 1962.<sup>1/</sup> These percentages do not include amounts for recreation motor transport, the cost of holiday buildings, such as mountain huts, seaside cottages, etc., the possible increased cost of food for recreation, and alcoholic/non-alcoholic beverages. The final percentage could, therefore, possibly be in the double figures. The difference obtained between the United States and South Africa figure is negligible and to all intents and purposes, can be classed as the same.

No trends in the increase of incomes have been found for Greater Cape Town. To obtain an approximate idea of what the demand for recreation will be by the year 2000, I adopt the U.S.A. assumption that income per capita will double by then.<sup>2/</sup> A doubling in income and 2.4 times as big a population will be equivalent to recreation expenditures 4.8 times those of today. Only a 1.6 times increase in the demand for recreation is necessary to bring this figure into agreement with the U.S.A. estimate of 8 times by the year 2000. Even although these figures are only approximate, they do give an indication of the tremendous increase that can be expected in recreation expenditure by 2000.

From the report published by the Director of Statistics,<sup>3/</sup> it will be noticed that only 2.5% has been allowed for recreation expenditure, compared with 5.9% as calculated in Table 4. The subsequent improvement ratio (i.e.  $\frac{5.9}{2.5} = 2.36$ ) is applied to the

1 Clawson & Knetsch : loc.cit. p.105

2 Ibid. p.111

3 Report No. 11.06.02. p.67

expenditure percentage shown for each income group (see Figure 7) to obtain percentages in sympathy with my 5.9%.

In 1966 the total income of Whites in the Greater Cape Town area was R290.5m. per annum and of Coloureds R81.5m. per annum.<sup>1/</sup> Knowing<sup>2/</sup> the income of the Coloureds to be on the average less than R2,000 per annum, the % expenditure spent in recreation is, therefore, assumed to be 3.5% (from Figure 7).<sup>3/</sup> Adopting the U.S. figure of total expenditure to gross income as being three quarters,<sup>4/</sup> and with the previously determined recreation expenditures of 5.9% and 3.5% for Whites and Coloureds respectively, the amounts spent in recreation in the Greater Cape Town area can be established. The Whites spend R12.8m per annum and the Coloureds R2.1m per annum, which results in a total expenditure of R14.9m per annum by the Greater Cape Town population. Assuming that the above averages are all applicable to the Valley, and calculating the expenditure as a ratio proportional to the population of the Valley, the amount spent on recreation by the population of the Valley is R1m per annum.

From Table 5, it can be seen that 0.96% of expenditure is spent on outdoor recreation by Whites in Cape Town. This is equal to a figure of 0.57% for the Coloureds. This figure once again compares favourably with the 0.7% obtained in America.<sup>5/</sup> Assuming this percentage to be the same for the Valley, the expenditures on outdoor recreation by the population of the Greater Cape Town region and the Valley in 1966 were R2.5m and R170,000 per annum respectively. By my previous supposition these figures will increase to <sup>±</sup> R20m and R1.4m respectively by 2000.

1 B.E.O. verslag : loc.cit. p.32

2 Ibid.

3 This figure is probably rather high as the per capita income of the Coloureds in the central and outer area in the BEO report (p.32) was estimated to be R165 and R85 per person per annum respectively. As no income figures are available for the Bantu, it is decided to leave this figure unadjusted on the assumption that it includes the Bantu.

4 Clawson & Knetsch : loc.cit.p.107      5 Ibid.

These figures only approximately indicate the amount spent on outdoor recreation by the population of the respective areas. This does not necessarily mean that these amounts are spent in the region, although money flowing into the region will probably tend to balance that flowing out. How much of the expenditure on outdoor recreation will be retained or attracted to the Valley is dependent upon the development of the outdoor recreation resources in the Valley.

This analysis gives a rough idea of the large sums of money that people are willing to spend on outdoor recreation.

### 5.2.3 Leisure Time.

Apart from the essential activities of life, such as sleeping, eating, washing and working, man has much time to do as he chooses. The time, therefore, left over after the essentials of life have been attended to, is classed as leisure time. This leisure time is often governed by the social and economic forces existing within society and the way people use it can shape society as much as the way they work. In the past, leisure was the privilege of the few.

In general, it may be said that leisure and work compete for the same time.

"While the desire for leisure may be great, the incentive to work longer hours lies in increased money income, and the taking of more leisure time consequently becomes a cost." <sup>1/</sup>

Higher wages will enable better living or more leisure time. The choice is that of the individual.

It has been suggested in the U.S.A. that average per capita leisure may rise by 12% by 2000,<sup>2/</sup> but this increase will be very unevenly distributed among people of different ages, occupations

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1 Clawson & Knetsch.: op.cit. p.13.

2 Ibid. p.24.

and other characteristics. The extent of leisure time and its timing may have a more important effect upon various kinds of outdoor recreation than total leisure per person. The patterns of leisure time depend mainly on such things as workweek, vacation, and retirement years. In the U.S.A. the trends have been for more leisure time; workweeks are becoming shorter, vacation periods are becoming longer and more generally available, and retirement periods are increasing. It is prophesied in America that these trends will each continue in these directions in the future.

To my knowledge, no surveys of leisure time or patterns have been made in the Valley, or for that matter in South Africa; yet from empirical observations, it appears as if the American trends are applicable to the Valley. There has been a tendency over the past few years for many businesses to close on Saturday mornings, the latest of these being the garage workshops. The majority of those business houses working on Saturdays get Wednesday afternoons off, which results in an average working week in the business sector of about 37 hours. This figure is compared with America where :

"in 1850, the average workweek was 70 hours - about 72 hours for agriculture and about 65 hours for all non-agricultural employment. By 1900, the average was down to 60 hours, and by 1920 to 50 hours, and today (1966) to about 40 hours". <sup>1/</sup>

A decrease in the hours of a working week means that there is generally a greater opportunity to participate in recreation after work or over the weekend. The increasingly popular five day working week enables the recreationist to use the whole weekend for his leisure, if he so desires. These increases in leisure time might change the pattern of recreational use, e.g. a day outing over the weekend could change to a weekend away from home, or a

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1 Clawson & Knetsch : op.cit. p.16

quick game of tennis after work could be replaced by a round of golf.

Empirical observations show that the non-whites in the Valley work longer hours, have shorter vacations, and generally, die at a much earlier age than the Whites. These factors, combined with their lower incomes and lack of mobility, result in small demand for outdoor recreation from their population groups. This pattern must change as they develop socially and economically, and consequently more time will be available for leisure.

It can, therefore, be seen that the increased leisure time will have important repercussions on the demand for outdoor recreation facilities, while the use of this leisure time will effect the type of facility needed.

#### 5.2.4 Increased Mobility.

It has already been shown that enjoyment of the majority of outdoor recreation facilities involves travel to and travel from the site, be it by private or public transport.

This transportation factor affects this enjoyment in three ways :

- (1) The kind of facility determines the travel time. This governs the amount of onsite outdoor recreation that can be enjoyed.
- (2) In terms of monetary cost. In the United States, studies have shown that the major part of the total monetary cost is associated with travel distance and time. A powerful factor influencing the use of parks and other outdoor recreation areas has been the fact that marginal costs of travel for recreation are relatively low once the motor car has been paid for.
- (3) They influence the character of the recreation experience. A rough, dusty, dangerous, boring, uncomfortable journey and poor accommodation will

make this part of a trip a burden for the traveller. The recreationist, the park planner and the highway engineer should endeavour to make this part of the journey more pleasurable, by integrating their disciplines in a more functional design.

The assumed increasing mobility of the population,<sup>1/</sup> the constant improvement in the power and comfort of motor cars, and the advancing techniques in road design and construction, enables areas which were previously isolated and unknown, to be economically developed and opened to the public. The result is that over the last few decades, greater proportions of travelling is being engaged in general recreation purposes. The Outdoor Recreation Resources Review Commission (O.R.R.R.C.) in the U.S.A. reported that 61% of adults participated in travel for pleasure in 1960 (see Table 7).

The distance travelled to recreation facilities depends on the kind of activity, the amount of leisure time available, the weather, their accessibility, the ability and desire to travel longer distances. Bearing in mind these factors, a typical one-way distance for certain types of outdoor recreation may be as follows:

<sup>2/</sup> " After school and during the day for mothers with small children.	Less than 1 mile, preferably less than $\frac{1}{2}$ mile.
After work, for adults seeking special opportunities.	Up to 5 miles.
One-day outing.	20 to 50 miles (farther if traffic is light and attractive areas are unavailable nearer).
Weekend outing.	100 to 150 miles.
Short vacation (two weeks or less).	400 to 600 miles.
Longer vacation (more than two weeks).	1,000 miles or more. "

1 Clawson & Knetsch : op.cit. p.98. In the U.S.: 3000 miles in 1930.  
 2 Ibid. p.98 & 99. 5,000 miles in 1960.

The Valley predominantly caters for one-day outings, although during the summer months, it is often used for weekends and vacations. The increase in car ownership, miles travelled per capita, and leisure time each year result in congestion occurring on recreational routes over weekends, and it has become increasingly obvious that the motivation for travel is becoming an important demand factor on the major freeways. This has necessitated the recent doubling of the National Road to Cape Town and the tarring of the Franschoek Pass. The congestion of traffic during the weekends in Franschoek, Bain's and du Toit's Kloof is indicative of the number of people who come into, or travel through, this region during their leisure time. These travellers are at the moment predominantly Whites, while the Coloured and Bantu are to be seen in ever increasing numbers on the roads. Whether all of these groups are utilising the available facilities or are just sightseeing, can only be determined by a detailed traffic survey.

An increase in mobility tends to shift the demand from user-oriented areas to intermediate areas, as the various population groups become more mobile. The White population of South Africa has a relatively larger number of motor cars per population than all but two of the other countries of the world.<sup>1/</sup> It is, therefore, assumed that this statement is applicable to the Whites of the Valley. This would tend to indicate that the mobility of the White population would predominantly demand intermediate facilities. The demands of the Coloureds and the Bantu still appear to be directed towards the user-oriented areas.

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1 Jooste & Venter : The open-air potential of certain Government ground in the Republic of South Africa. p.2

Country.	<u>Number of population per motor car.</u>
Canada	3.4
U.S.A.	2.4
U.K.	7.3
France	6.3
S.Africa	4.0

### 5.2.5 Recreation Patterns.

Two tables have been reproduced showing the recreation structure in the U.S.A. (Table 6), and the preference for recreation activities in the U.S.A. (Table 7).

Table 6 indicates that pleasure journeys, walking for pleasure and participation in open air games and sport were the most popular outdoor recreation activities in 1962. Table 7 underlines the importance attached to motoring and its complementary activity, picnicking. These two activities appear to have almost reached saturation use in the U.S.A., as very few additional people wish to participate in them. Fishing and swimming are the two activities which indicate the greatest demand for future outdoor recreation facilities. Horse riding is an activity which has only a small percentage of present use, yet is the most desired future activity.

Table 8 shows the recreation pattern within the Pretoria/Witwatersrand/Vereeniging Region (P.W.V.) for an ordinary weekend in the summer. In comparing these percentages with those of Table 6, it must be borne in mind that the U.S. figures have been obtained after more intensive study covering a whole year. To facilitate this comparison, the U.S.A. figures have been placed in brackets. The Transvaal winter would drastically reduce the swimming, picnicking and camping figures, while boat sport and fishing will also drop. This will cause journeys for pleasure to soar. Making an allowance for these adjustments, generally good agreement with the U.S.A. figures is obtained. The one obvious exception is the pleasure journey. The 37.0% is far below the P.W.V. average for the year, as the winter figure is certain to boost it considerably. This indicates the extreme pleasure the average South African obtains

from driving his car. I don't think that the Capetonian or Bolander would spend as much time in pleasure journeys, as there are many more attractions to detract him. Nevertheless, it is felt that the percentage for the Valley would be much higher than the U.S.A. figure. The question now posed is : If more extensive outdoor recreation facilities were established in the Valley, would the motorist substitute his travelling for these activities? I would say he would. Journeys for pleasure would in all probability not be short journeys and, therefore, the travelling itself would be costly. The motorist will generally journey for pleasure to view beauty spots or because he has nothing else to do. If outdoor recreation facilities could be cheaply provided, this substitution might take place.

The lack of information on the needs and tendencies of the non-whites of the Valley (and, in fact, South Africa) will create problems in establishing future facilities for them. It has been mentioned that the Bantu do not like swimming. A possible reason given for this is that they have never been taught to swim, and, therefore, are afraid of the water. Organised sports such as rugby, soccer, cricket, etc. appear to be the main activities of non-white groups.

From observation it is noticed that the main desire of the Whites in the Valley is to swim and to go to the sea. Motoring and picnicking are activities which are also popular. The tendency found in the P.W.V. of a greater desire for participation in water sport also appears to be repeated in the Valley. Horse-riding was shown to have the greatest potential of all uses in the U.S.A. and it is, therefore, interesting to observe

that an hotel in Franschhoek intends developing this activity. The construction of contour paths on the slopes of the mountains surrounding the Valley would encourage hiking and horse-riding. The development of additional picnic and camping areas, integrated with swimming opportunities on the banks of the rivers in the Valley would stimulate greater participation in this activity.

The policy of the Paarl Municipality is, firstly, to develop the user-oriented facilities, such as children's parks, and then to move outwards developing the banks of the Berg River, merging this development with the intermediate areas within its boundaries. The construction of weirs, and the subsequent damming up of the river water, could afford sites for swimming, fishing and boating, as well as providing areas for walking and sightseeing along the river banks.

To establish the demand for and nature of the recreation patterns of the three racial groups in the Valley, requires a comprehensive analysis of the existing patterns and a survey of their needs and wishes for future participation.

### 5.3 PLANNING PRINCIPLES REGARDING OUTDOOR RECREATION.

To ensure the comprehensive nature of a physical plan for outdoor recreation, certain principles should be cognized and agreed to before the commencement of the survey.

#### 5.3.1 Opportunities for All.

This is an important principle to decide upon before any planning is commenced. It is easy to get carried away by the need of the "active" group (i.e. people involved in energetic sports etc.), while the younger children and older folk become neglected. In the Valley the needs of the non-white population groups could easily be overlooked in this manner.

It is, therefore, necessary for recreational planners to recognise that facilities must cater for all age groups, and within Governmental policy, for all race groups. It has already <sup>1/</sup> been mentioned that the needs of the youngsters and the older folk differ. These separate needs should not be neglected in the provision of facilities.

The facilities for the Coloured and Bantu would have to be designed to fit into the overall plan. While at the moment nothing, or very little, is known about their needs and desires for outdoor recreation, this should not be the reason for jeopardising their chances of obtaining facilities. In the Valley these facilities should be created within walking distance of their urban settlements, as their mobility is restricted by a small car ownership.

To obtain data on which to adequately plan facilities for outdoor recreation in the Valley, a survey would have to be made of the requirements of all age groups within their respective racial groups, incorporating urban as well as rural inhabitants.

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1 See paragraph 5.2.1

Only in this manner will opportunities be created for all those who will be affected by the plan.

### 5.3.2 Analysis of existing Facilities.

A detailed analysis of existing facilities would enable an overall view to be obtained of all facilities within the Valley. It is far easier and cheaper to develop an existing facility, which is already attracting a certain number of people, than to create and develop an entirely new area. I would, therefore, envisage development taking place centrifugally from the existing facilities mentioned below. This development will ultimately fuse to form inter-related areas throughout the Valley.

Not many developed intermediate types of area exist in the Valley. Those areas that are known and can be classed in this category, are shown on Figure 8.

The Municipalities of Paarl and Wellington have zoned strips along the banks of the river for future open space development. Most of this land is already owned by the Municipalities. At the moment these banks are mainly undeveloped or underdeveloped and tend to harbour undesirable elements. Most of the river banks outside the Municipality are privately owned. This is not necessarily detrimental to their development. In fact, it has been mainly the private entrepreneur who has developed the river at all; for example, Campers' Paradise, Watervaland De Hollandsche Molen. These facilities are all of a similar nature, providing camping, swimming and caravan accommodation with an adjoining restaurant.

The Swiss Farm, Excelsior at Franschhoek is an extremely popular recreation attraction, whether it be for a day, weekend

or holiday outing. For Sunday midday dinner and afternoon tea, they have, throughout the year, 100 and 200 visitors respectively. The hotel itself can accommodate 100 guests and is fully booked for the months October to March. The guests come from all over South Africa, with a fair number of regular overseas visitors. With the large number of visitors that are regularly turned away, the management believes that another hotel of similar nature could profitably be established in the area.

The Huguenot Monument and Museum are also attractions which make Franschoek a popular rendezvous for a day's outing. The many pleasant walks in the forest reserves surrounding the Valley have not been sufficiently advertised to attract any one but the knowledgeable recreationists. This is understandable, as the fire hazard is a particular danger during the dry summer months. With adequate protection and policing, this hazard could be overcome.

The Paarl golf course, Wateruintjiesvlei and the arboretum tend to form a recreation node in Suider Paarl, which has many possibilities of development. The historical monuments in the town itself are places of attraction to a limited group of people. The wild flower garden and the huge granite rocks on Paarl Mountain already attract many recreationists, particularly those of the Valley itself. This limited development, together with the picnic spots in Bain's and du Toit's Kloof show the great appeal that the mountains have in the area.

The existing facilities for the non-whites are almost negligible and certainly not of the quality and development of the 'white' facilities.

The analysis conducted of the existing facilities should include the type of outdoor recreation supplied, the demand for its use, the area and capacity of the site, the possibilities for expansion, the revenue from services rendered etc. This would enable the planner to make an analysis of the region and its potential. The shortfalls would thus be pinpointed immediately, and rational decisions would be able to be made on sound social and economic principles. Without this basic data, outdoor recreational planning becomes pragmatic and haphazard and can fail to make the best use of the available resources.

### 5.3.3 Public participation in Plan.

The importance of public participation in the successful development of the resources of the Valley, has already been dealt with. The enthusiasm of the people of the Valley needs to be encouraged for the successful planning and development of its outdoor recreational facilities. This could be achieved by the formation of an Outdoor Recreation Development Committee, which would be the spokesman of all interested in the development of the river for this purpose. This interest group would then be represented in the Administrative Section of the previously developed Berg River Valley Authority.<sup>1/</sup>

Farmers whose land abuts the river, could be encouraged by State subsidies to develop this land in accordance with a master plan, or failing this, sell it to the State for development by them. With the co-operation of the farmer, and encouragement from the development authority, bird sanctuaries and wild life reserves could be developed, initially in private, to be later opened to

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1 See paragraph 4.6

the public once they had 'matured'. Two private game reserves do already exist in the Valley.

Once the co-operation of the people of the Valley is obtained in this type of development, the economic benefits accruing from making such services available, will provide the necessary momentum for greater participation. As the O.R.R.R.C. report stated <sup>1/</sup> :

"Opportunity to participate becomes a significant factor in outdoor recreation activities. When facilities are there, people use them".

Given the inspiration and the guidance necessary, I am sure that the people of the Valley will respond.

#### 5.3.4 Integrate Scheme with the other Elements of Development.

The position of recreation as a component of multiple purpose river basin development has already been recognised <sup>2/</sup>. It is, therefore, within this context that planning for outdoor recreation should be conducted. The planning of facilities should be integrated with the overall development of other land uses. If this principle is not adhered to, then competition and conflict of land use, poor site selection, water pollution and many other problems could arise.

The user-oriented facilities should be designed to serve adequately the physical, social and cultural needs of the urban areas. The industrial and commercial areas should have places of outdoor recreation and relaxation where workers and shoppers can sit and relax in natural surroundings during leisure times.

It would be suicidal to develop outdoor recreation areas

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1 P.W.V.verslag: loc.cit. p.11. Original: O.R.R.R.C. report. p.81  
2 Dealt with under 2.3

which utilise the river's water, without taking due cognisance of the developments for flood control. New dam or weir sites could flood recreation areas unless an integrated development scheme is commenced prior to outdoor recreation planning.

The B.R.V.A. would be able to fulfil this important task of integrating outdoor recreation with the other elements of development. Any proposed development in the Valley would then be subject to its approval.

As well as integrating the recreation facilities with other uses, it is also necessary to ensure a balance and inter-relationship between the various recreation types.

#### 5.3.5 Unified system of inter-related areas.

To enable the balancing of outdoor recreation types, a unified system needs to be developed whereby these areas are inter-related in some development structure. If all areas are developed for the same recreational use, the supply of these areas will far exceed the demand. This will result in the better managed areas dominating the market, while others become unused and neglected. The areas should, therefore, consist of different types of recreational use, catering for all ages within each racial group. Seldom is it possible to create such diversity within one area and, therefore, an inter-relationship between areas is essential.

The potential to create such a balanced area exists in the present Wateruintjiesvlei-Paarl golf course area. Plans are already under way to develop Wateruintjiesvlei into a caravan park-cum-picnic area, with small sailing vessels utilising the

vlei. This area, intelligently planned for all needs and integrated with the adjoining golf course, could prove to be one of the first areas of a unified system stretching northwards along the Berg River from this point. The arboretum could be eventually planned to link up with this area (by constructing either a subway under, or footbridge over, the National road) the zoned open spaces along the banks of the river, through the urban areas of Paarl.

Probable areas for the Coloureds and Bantu could be developed in the same unified manner on the strips next to the river, linking the towns of Wellington and Paarl. This would result in an almost uninterrupted inter-related area of outdoor recreation from Wellington to the Paarl golf course. This indicates how the existing town planning schemes for Paarl and Wellington can be incorporated into this concept of a unified system of inter-related areas. This concept should be continued along the river and should, where possible, become inter-related with forestry areas and mountainwalks.

#### 5.3.6 Flexibility.

Flexibility within the development plan for outdoor recreation areas is as important as the plan itself. It has already been recognised that recreation patterns change over time and are, in fact, dependent upon many variable factors. The tremendous development anticipated in outdoor recreation makes it impossible to forecast what the patterns will be like in twenty, let alone forty, years time. Flexibility in the plan, therefore, is essential to absorb these changes in demand. Detailed design of sites should only take place just prior to their construction,

thus enabling the designer to incorporate up-to-date recreational needs. An area planned and designed for a particular use today might possibly be developed for a completely different use in ten year's time. Substitutionability of the various recreation uses in the selected sites would contribute to this flexibility.

A plan containing this flexibility can be adapted to any changes that might take place in the physical, social or cultural needs of the people.

#### 5.4 CRITERIA TO BE APPLIED TO SITE SELECTIONS.

These criteria are one method of evaluating the choice of a site for a particular use. They are not the only criteria that have to be applied, although they are recognised as being the main ones.

##### 5.4.1 Accessibility.

The accessibility of a site depends largely on the transportation used in getting to it. New methods of transportation might have a serious impact on outdoor recreation.

"For example, if air platforms, cars riding on air-streams, or other personalized means of transportation not dependent upon roads were to become technically practical and economically usable, the impact upon wilderness and other remote areas might be very great." 1/

If the mountains surrounding the Valley could be made more accessible to those who aren't keen mountaineers, by some new means of transportation, this could mean the development of a new pattern of outdoor recreation.

The selection of an attractive outdoor recreation site calls for roads into and out of it. The highway engineer needs to know its potential use, so that he can obtain some idea of the traffic volume using the site. His design will have to blend with the natural scenic beauty which is the site's attractiveness, rather than destroy it. In the U.S.A. it has been seen how many national parks and forests have been made more accessible by the construction of roads.

Factors to be borne in mind when considering the accessibility of sites, is the location of potential users and the location of alternate facilities. These factors are extremely

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1 Clawson & Knetsch : loc.cit. p.100

pertinent in the selection of user-oriented sites, while of lesser importance to intermediate types. In the Valley customers travelling about 40 miles to visit a recreational resort, will be more affected by the second factor than the first. This factor can be largely overcome if the previously mentioned unified system of inter-related recreational areas is adhered to.

The recreation areas should be located relative to the freeways and other main roads, although not too close so as to introduce sights and sounds undesirable for such areas. A comfortable, smooth journey on a freeway should provide most of the travel distance from home to the recreation site.

The table (included under 5.2.4.) gives some indication of approximate home to site distance for different types of areas.

According to the distance classification, the Valley falls into the one-day outing group. From observation, this is generally the case, although in the summer months more weekend outings and holidays occur than in the winter.

The accessibility of sites is not only dependent upon distance and the type of roads, but also upon the amount of congestion experienced in getting to the sites. An area forty miles away and taking forty minutes to get to, is considered more accessible than an area twenty miles away, which takes an hour to get to. In many cases, improved accessibility to sites has led to an increase in recreation use, while, conversely, an increase in recreation demand has put a strain on the transportation system.

The whole Valley is within an hour's drive of Cape Town and is traversed by a fairly comprehensive network of tarred roads (see Figure 8). These roads form the backbone to the Valley and

the foot of the surrounding mountains is never further than four miles.

#### 5.4.2 Conflict with other land uses.

The discharge of industrial waste and sewerage into rivers is in direct conflict with the use of water for recreation purposes. This pollution of the upper Berg River has been overcome by the Department of Water Affairs laying down stringent laws, enforcing the purification of the industrial effluent prior to discharge into the river.

Air pollution can also be in conflict with the use of land for recreation. This is pertinent to the immediate section of the river just north of the tannery at Wellington. The prevailing southerly winds in summer will make this area undesirable for any outdoor recreation. Legislation is at the moment being devised to control air pollution, and it is envisaged that this will no longer be a problem in a few years time.

The use of reservoirs and storage dams for water sport of any kind is largely limited by the fluctuating levels of these reservoirs. When the need for this type of recreation facility is the greatest, that is, during the summer months, the demand for the water is the highest and the level of water in these dams drops accordingly. A similar difficulty arises with prospective water sport on the Berg River, although this could be overcome with the erection of a number of weirs on the river. It would then be possible to keep these lakes full by the control of the flow of summer water, exercised by the Wemmershoek Dam, and later, the Riversonderend (Keerom) and Assegaisbos Dams.

This control would ensure a constant summer flow in the river. I don't envisage the weirs creating large lakes which would impede the flow and supply of water. In fact, the only water that would be used for these facilities would be that used for the initial filling of these lakes. This could easily be done in the rainy season and, therefore, any summer flow in the river would remain unimpeded.

The Cape Town City Council will not allow entry to any of its dam sites without previously obtaining a permit, and prohibits any recreation activities on or in the water, because of the danger of pollution. These two factors have been the drawbacks to any extensive development of the Wemmershoek Dam site as a recreational resort.

The development of the river banks might create a great deal of opposition from the farming community adjoining these areas. The contention might be that the damage caused to the crops by the recreationists might not be compensated by the benefits obtained from the recreation facilities.

The possibility of water or air pollution, fluctuating water level and crop damage should all be examined before any sites for water sport are adopted.

#### 5.4.3 Incompatibility.

Incompatibility between the different types of outdoor recreation on rivers or expanses of water seem to centre around the use of speed boats. These conflict with the same area of water for fishing, bird sanctuaries, swimming, sailing and canoeing. If the water area is large enough, recreational use zoning could be effected

to overcome this conflict. Certain other incompatibilities of use also occur between fishing and swimming and sailing.

Wild life protection and game reserves can conflict with hunting and duck shooting, and/or even urban settlement if located too close to it. The latter could be a problem if the proposal to develop Paarl mountain as a nature reserve is adopted.

The only use made of the river at the moment, from the boating point of view, are the regular canoe races which are held on it throughout the winter months of the year. The proposed creation of weirs would then conflict with, and possibly eliminate, this existing use of the river.

The incompatibilities between land uses and between the various types of recreation outlined in the last two sections, again underline the need for a comprehensive development authority, or at least an Outdoor Recreation Development Committee.

#### 5.4.4 Aesthetics.

Sites should be selected in areas of natural beauty which would, even in their native state, be an attraction to the users. Failing this, selections should be made in areas where the natural surroundings can be developed to be aesthetically attractive. A probable exception would be the picnic sites created next to roads in areas devoid of trees. Often these selections are not near to water and, therefore, have to be watered by the management authority, particularly when the trees are seedlings.

The Valley abounds in sites of natural beauty and, therefore, this criteria will not be difficult to fulfil. The beauty of the

Berg and its tributary rivers offer potential areas for development which many areas in the drier regions of our country, would long for. It's natural vegetation, pools created by the rivers' flow, and the existing bird life and fish present opportunities which the recreation planner does not often find. There are also the many forest plantations and beautiful mountain gorges which could be developed for picnic spots, hiking and horse riding, and many other activities.

The natural beauty of its rivers, mountains and streams is the most valuable resource of the Valley, in relation to its development for outdoor recreation. It is a resource that is, at the moment, virtually untapped and, therefore, has unlimited potential.

5.4.5 Present size - potential expansion.

Related to, yet different from aesthetics, is the existing size of the site selected. This should be correlated to the demand for the facility, and an assessment should be made to what extent it supplies that demand. The space standards later mentioned<sup>1/</sup> should give a rough indication of the sizes necessary for intermediate sites. This size should be viewed relative to the number of other sites within the locality. A general rule that can be adopted, is that where there are many sites, the size of each one need not be large, while few sites will require larger areas.

Most outdoor recreation sites will initially be developed on a small scale to test the market reaction, and only then be further developed if the need arises. For this reason, potential expansion and extension of sites onto neighbouring undeveloped land

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1 See paragraph 5.5.2

is an important factor to be considered in their selection.

The size of sites may be limited by the cultivated land that is developed up to the river banks in many parts of the Valley. At Campers' Paradise this is the case, where the camping/picnic area is a narrow piece of ground immediately alongside the river.

#### 5.4.6 Cost of development.

It is not within the scope of this thesis to go into the economic aspects of the cost of development. A brief account of the benefit-cost analysis of providing these facilities is recorded later.

The reason for introducing the cost of development as a criteria to be applied to site selections, is that the ultimate decision might depend upon it. Probable costs that might be incurred in such development would be the purchasing or hiring price of the land, water or other resources, provision of access roads, necessary buildings, sanitary facilities, campgrounds, play equipment, etc. The managerial and maintenance costs, together with improvement costs have also to be reckoned with.

The cost of providing the above facilities is likely to increase, and with the increasing demand for the facilities, higher costs must eventuate. The competition for the use of the natural resources is also bound to increase, resulting in higher procurement costs.

An equating of these costs against the benefits received would give the planner the available data on which to assess each site selection.

## 5.5 FUNDAMENTAL APPROACHES TO PLAN EFFECTUATION.

### 5.5.1 Advance acquisition of site.

The advance acquisition of sites for outdoor recreation has two advantages, namely, that the sites cost less and are easier to procure than at a later date. The economics in land acquisition and park management may suggest fewer and larger sites, while the public prefers more sites of a modest size.

The problem of outdoor recreation planning is not merely the cost of the land desired, but its availability for recreational use when needed for this purpose. This is particularly pertinent in user-oriented areas. When urban expansion starts, recreational land can be obtained at no more cost than the purchase price of the land. Once it is developed, the same land is secured with great difficulty. Timing of acquiring land in these areas is acute where location is so extremely important. In the intermediate areas, early acquisition may pay rich dividends even although there is a greater flexibility in location.

Incorporated within the Paarl and Wellington Town Planning Schemes are areas along the Berg River specifically zoned for open space. Once recreational development reaches these areas, the owners can request the Municipalities to acquire the land. The banks of the river within the outskirts of the Municipal area have not been zoned. This land has been left in its original agricultural use, which does, in fact, serve as open space in its present concept. Any proposed buildings within 200 feet of the farm boundaries and labourers cottages have to first obtain the approval of the Municipality prior to construction. When

urban development does reach this land, plans will have to be submitted for its subdivision. It is only then that the Municipality will insist on the land being set aside for open space. In the meantime, the Municipality cannot be requested to acquire the land, the farmer can continue to use the land for agricultural purposes, and the value of the land will not appreciate to such an extent as to make later acquisition uneconomical.

The acquisition of land for intermediate sites in the Valley will almost solely be from agricultural usages. Problems might arise by the farmer placing too high a price on his land in an endeavour to chase away the recreation developer. An objection that might arise is that development has not, as yet, reached his farm and, therefore, why should he now have to surrender the land. Others might object to having outdoor recreation users on the boundaries of their farms, as damage to and stealing of their fruit crops is bound to occur.

These objections have their valid points, but if the development authority could persuade the farmer to develop the resources himself, a large number of the above and other objections might be overcome. Development of this nature would be in accordance with the principle of public participation in the planning and development of a scheme.

The advance acquisition of sites by the authority ensures their recreational use in perpetuity. This leads on to the next section.

#### 5.5.2 Perpetuity of use.

The perpetuity of use of recreation areas is an important

guarantee against the invasion of other land uses, and a right that should be protected from the outset. If a public or private developer was aware that his recreational area might be taken away from him at some time in the future, the quality of the area is bound to suffer through reticence to invest large amounts in its development.

Under this heading, reference should also be made to the maintenance of existing facilities. Careless use, bad management, overcrowding and fire can all destroy the character and appearance of these areas. The Valley Authority should have vested powers whereby it can enforce certain standards upon both private and public developers. The standard quality of these areas would be difficult to assess, as each individual has his own personal standards. Generally, though, everyone can distinguish between a good and a bad quality resort and the ultimate decision should be left to the recreation committee within the authority.

Not only would the maintenance of quality and perpetuity of use enable the recreation entrepreneur to develop his facilities in peace of mind, but the society as a whole would benefit from this added stability. In all likelihood the outdoor recreation industry might then expand to become an economic force of some magnitude.

These rights could be protected by an appropriate clause being inserted in the title deeds of the property owners, or by the approval of the Town Planning Scheme governing the land.

### 5.5.3 Achieving Space Standards.

For the effective development of any recreation area, a set

of space standards need to be achieved. These standards can only be a guide to future development. Trial and error techniques cannot be expected to be as efficient as those decisions based on space standards.

"Standards can never be rigid; each community must determine what its citizens want, and what role they assign to recreation. What can the community afford, and what is it willing to pay for? How does the demand for outdoor recreation compare with the demand or need for other public services, which may compete for the same (usually limited) public investment funds? Parks and recreation are considered necessities by some, but luxuries by others; willingness and ability to pay may be more critical than 'need' and hence standards can be only general guides." 1/

This analysis will be confined mainly to the wider definition of intermediate areas previously established for the Valley. There has been a great deal of reticence to apply standards to intermediate types, as the standards vary according to location, from small acreages per capita in user-oriented areas, to large acreages per capita in resource-based areas.

A standard of 10 acres of park and open space per 1,000 of population within each city, and an equal area in parkways, larger parks, forests, and the like, either within or adjacent to the city, set the precedent for standard formulations. 2/

Apart from the location standard, other various 'standards' have been applied which, although not 'space' standards, are applicable and of interest. 3/ In Detroit it was proposed that intermediate parks should be able to accommodate at one time 15% of the total regional population (a number that various studies suggested would seek parks on a pleasant Sunday afternoon.)

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1 Clawson & Knetsch : loc.cit. p.147  
 2 Ibid.  
 3 Ibid.

In another study it was proposed that one or more state parks should be within two hours driving time of 90% of the state's population.

Table 9 shows standards for intermediate type recreation and parkland areas presently adopted in America. The range of these standards from 2 to 60 acres per 1000 population, emphasizes the need to determine a specific set of standards for each area according to the area's demand for recreation, location, resources and social structure of the region. The average standard from these figures appears to be from 15 to 20 acres per 1000 population.

In the Pretoria/Witwatersrand/Vereeniging study, <sup>1/</sup> 12, 15 and 20 acres per 1000 population was adopted as the minimum standard for the years 1970, 1980 and 2000 respectively. The probable demand for the year 2000 was estimated to be 30 to 40 acres per 1000. This study also included the following guides for specific regional recreation types :

Picnicking	3 acres/1000 population.	
Swimming, fishing, boat sport.	1/1000	
Sport and games.	1/1000	
Golf.	2/1000	
Natural surroundings.	5/1000	<u>2/</u>

The above figures afford a crude guide to recreation development in the Valley until a further study is undertaken. Such a study should determine the local needs, willingness to pay, availability and location of areas in the Valley, and is the only sound means of obtaining local space standards. Even having achieved these standards, they should be used merely as a guide to future development.

1 P.W.V. verslag : loc.cit. p.109

2 A detailed analysis of the different standards used for these areas in the U.S.A. is contained in Recreation Space Standards. p 12-56.

#### 5.5.4 Suitability of Sites.

Sites of natural attraction might be suitable for one kind of recreation use, while being unsuitable for another. A similar choice might occur between recreation and other land uses. It is essential, for the social, cultural and economic benefit of the whole Valley, that the suitability of recreation sites be examined relative to the other land use demands for the same site. Only after this has been done and the alternatives weighed, should a choice be made as to which sites will be developed for recreation. A similar process should be followed in the choosing of alternative sites for the suitability of various recreational uses. Each site has its own peculiar characteristics which are suitable for a particular use.

"A valley bottom subject to moderately frequent overflowing, perhaps with relatively steep side slopes, may have limited value for agriculture, forestry, residential, industrial, or other use; yet these same characteristics may make it a good park and recreation site. A body of water need not be a natural one to be highly valuable for recreation; relatively small dams with fixed overflow height can often, in a few years, create a lake almost indistinguishable from a natural one. Moreover, the choice need not be limited to sites that are presently readily accessible by arterial or other major highways; the latter can often be built to available and desirable intermediate type areas." 1/

In the Valley are several areas suitable for recreational use, which are probably not highly valuable for other land uses. The many gorges in the surrounding mountains, and the overgrown banks of the rivers are but two examples of such areas.

The availability of the dams in the Berg River Scheme for recreation purposes will be dependent upon the governing authorities. If the existing pattern in the Western Cape continues, extensive recreation use of these dams will be prohibited, because of the dangers of water

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1 Clawson & Knetsch : loc.cit. p.152

pollution. The constant development in the scientific methods of water purification must eventually result in an economic solution to this problem. The relaxation of these prohibitions will immediately trigger off water sport development on Wemmershoek Dam.

The problem of the suitability of the numerous sites for recreation in the Valley is that of allocating the various resources to their most beneficial use. From the economics point of view, this decision can be assisted by a benefit cost analysis.

## 6 ECONOMICS OF OUTDOOR RECREATION.

It is impossible, within a few pages, to cover all aspects of this subject, and as a result I have dealt with three elements which are considered to be particularly pertinent to what has already been discussed. The main purpose is to show the importance of economic analysis to outdoor recreation planning and development.

### 5.6.1 Benefit-Cost Analysis of providing facilities.<sup>1/</sup>

In outdoor recreation planning, choices have to be made between various alternatives, and benefit-cost analysis provides a means for making more rational decisions. As previously mentioned, a benefit-cost analysis should be made for each recreation investment. The benefits and the costs are estimated for each project and if the total benefits exceed the costs, the project is economically feasible. This analysis also indicates the priorities among the various alternatives.

"In general, there are three types of financial benefits:

- (1) the value to the area, derived from the introduction of 'new' money spent by visitors and the circulation of money in the area due to the stimulation of the money spent by them;
- (2) the appreciation of property values due to stimulated business and increased interest in the area;
- (3) the value, appraised in dollars (rands), that could be considered a minimum worth for that recreation to the user, whether or not he has to pay it." <sup>2/</sup>

Apart from these financial benefits, there exist many intangible benefits which have to be given imputed values, such as the renewal of body, mind and spirit, resulting from participation in these facilities. The imputed values could possibly be determined by establishing the amount the recreationist would be

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1 The matter relative to basin development has been dealt with under paragraph 2.4. The principles mentioned there also apply to this section.

2 California Public Outdoor Recreation Plan (C.P.O.R.P.) : p.200

prepared to pay for the benefit if it had not been provided.

Costs are more easily assessed than benefits, as they have no intangibles or imputed values. The biggest danger in costing is double counting. If a multiple purpose river basin development project includes outdoor recreation as one of its components, then some portion of the overhead costs should be included against this purpose, e.g. costs of roads, fire protection, forest disease protection, general administration, and other management activities.

Difficulties do exist in defining all the benefits and costs involved, but this does not detract from the usefulness of such an analysis in guiding decision-making.

#### 5.6.2 Pricing of these facilities.

The main, yet not the only reason for pricing the facilities by means of fees, is to repay the costs of installation, operation and maintenance, and collection of revenues to pay for new facilities.

Prices serve to allocate natural resources, labour, capital and management among various activities or uses, e.g. allocation of forests to recreation rather than the sawmills, or the allocation of water resources to recreation rather than irrigation or hydro-electric power. They also help the customers to choose between the alternative uses of recreation.

The prices are levied in the form of user charges, and they can range from nothing to a sum equal to, or greater than, the cost of maintenance<sup>1/</sup>. Generally, these user charges are low for

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1 There are always costs involved in producing a facility, which have to be borne by someone, even although the facility is free to the consumer.

children, medium rate for teen-agers and highest for adults.

User charges should be based on what the user is able to pay, rather than what he is willing to pay. This would take the form of a sliding scale where the lowest fees should be for activities such as swimming, where capital outlay is small, i.e. only for a bathing costume, to the highest fees for costly sports, such as golf and power boating, which require substantial capital outlays to procure the necessary equipment. This principle in pricing ensures that those who can afford to pay, pay most.

Following from this, once the customer has got used to paying the user charges, they can be slowly raised until the operating level is reached or exceeded. This would be the optimum position of usage. Increasing the user charges in this manner merely because they can be collected, does bring dangers. As the prices increase more and more, lower income group customers are <sup>1/</sup> eliminated, although in California it has been shown that mainly only the high and middle income groups used the facilities. The lower income groups appeared to have been already eliminated by transportation or allied costs, or else by their own personal taste.

Another method of pricing would be to charge the peak hour users only. This would save on collection costs, as well as shifting the demand for the facility to off-peak hours. It has been postulated that part of the apparent rising demand for outdoor recreation has been due to users paying less than the full cost of their use.<sup>2/</sup>

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1 C.P.O.R.P. : loc.cit. p.202

2 Clawson & Knetsch : loc.cit. p.276

The guiding principles for levying recreation user-charges can be summarised as follows :<sup>1/</sup>

- (1) Avoid user charges which are administratively unworkable or unsound.
  - (2) Define carefully the purpose to be achieved by the collection of user charges.
  - (3) Choose the method or methods of levying charges which are appropriate to the goal.
  - (4) Tell recreation users why a charge is imposed and what will be done with the funds.
- and (5) Consider carefully the equity considerations in any proposed fee schedule.

Campers' Paradise, De Hollandsche Molen and Waterval all levy user charges, but only in the season and at other peak periods.

### 5.6.3 Economic Impact on local areas.

The development of recreation areas and the subsequent expenditures involved, make certain economic impacts on the towns within the region. The most important consequences on the local towns can be enumerated as follows :

- (1) Not all expenditures made by the tourists are made in the nearest town.
- (2) The type of expenditures made in these towns are of specific kinds, viz. lodging, food, sports equipment, garage services, etc.
- (3) The type of location of the recreation area will cause different types of expenditure patterns, e.g. the intermediate type in the Valley will create little demand for lodging.
- (4) Total expenditures are not all net income to the locality. Much of the gross income goes out of the area to purchase goods and products needed by the tourist. Other goods and products are purchased locally, as well as payments for wages, salaries,

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1 Clawson & Knetsch : loc.cit.p.284

profits, interest and rents to members of the local community. This indicates that the economic impact on a local area cannot be measured by total expenditure alone.

Surveys conducted in the United States have shown that while a good portion of money spent leaves the area, a certain portion does remain. In Hawaii it was found that of every dollar spent, 95 cents denoted an increase in local income. The Outdoor Recreation Resources Review Commission studies placed the figure at 75 cents.<sup>1/</sup> A multiplier formula has been devised to assess this total increase in local income, viz. :

$$\text{Total income increase} = A \times \frac{1}{1 - BC}$$

Where A = proportion of income remaining to be spent in area, i.e. for locally produced goods & services.

B = proportion of income that local people spend in local goods and services, i.e. propensity to spend locally, and

C = proportion of expenditures of local people that accrue as local income.

To illustrate this equation, a set of hypothetical numbers is used. It is assumed that of every rand spent in the community, 0.5 is spent on locally produced goods and services (the other half is spent on goods and services produced outside). It is also assumed that the propensity to consume locally is 0.4 for the community, and that the income created in the form of wages, salaries, etc. per rand of local sales, is 0.6.

$$\begin{aligned} \text{Then the Total income increase} &= 0.5 \times \frac{1}{1 - (0.4 \times 0.6)} \\ &= 0.66 \end{aligned}$$

This means that for every rand received from recreation expenditure, the resultant increase in local income is 66 cents.

1 Clawson & Knetsch: loc.cit. p.242

2 Ibid. p.241

If the above figures (i.e. A.B. & C.) had been available for the Valley, it would have been possible to establish the total increase in local income from the previously derived recreation expenditure figures.<sup>1/</sup>

In California it is claimed that recreation as a business may well be a life-saver of areas that are dominated by one industry, such as logging or mining.<sup>2/</sup> The warning must be echoed :

"that in assessing the potential of recreation and tourism as a means of economic support, it must be remembered that a recreation business can be a hazardous undertaking. Among the difficulties are the extreme seasonal patterns of demand, the susceptibility of this kind of expenditure to fluctuations in the business cycle, the hazards of weather, and the somewhat unusual type of business skills called for in this type of industry."<sup>3/</sup>

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1 An estimate would first have to be made on how much recreation expenditure in the Valley is not earned as income in the Valley. That recreation expenditure derived as income in the Valley will have no value added, as it is expenditure that has merely been shifted from another use to recreation.

2 C.P.O.R.P. : loc.cit. p.200

3 Clawson & Knetsch : loc.cit. p.243

6. S Y N T H E S I S .

Rivers have been found to play an important part in the development of their regions ever since man began to realise their worth over 7,000 years ago. This development has increased and intensified through the centuries, until today multiple purpose development of rivers is an accepted phenomena.

South Africa, during this century, has taken greater notice of the potential of her rivers, albeit mainly for the supply of consumption water. The Berg River, similarly, is the main source of water supply for the Greater Cape Town and the West coast regions. It's strategic importance to this wider region, and especially Cape Town, is evidenced by the Cape Town City Council's construction of Wemmershoek Dam, and their present scheme to raise the Voëlvlei Dam wall. Grandiose other schemes affecting the Valley have been devised to supply the future water needs of Greater Cape Town. The removal of water from the Valley has, generally, been the main concern in present development. The incorporation of this process into a multiple purpose development scheme has been overlooked.

The benefits derived from this type of development in America have been shown to be beyond the wildest expectations. It is with this purpose in mind that I have recommended the formation of a Berg

River Valley Authority, a body which can administer and plan all the components of development within the Valley. One of the technical sections in this Authority would be devoted to the integrated development of outdoor recreation facilities.

The demand for outdoor recreation in the Valley and wider region will increase alarmingly to the year 2000. The existence of natural resources in the Valley, typical of the beautiful Cape, is not, in itself, sufficient to supply this demand. A development of these natural resources is, therefore, essential and a systematic method of approach to the problem has been formulated.

Certain principles have to be created prior to any field survey and analysis. These should include a comprehensive statement on what is to be achieved and how it is to be tackled. The necessary data collection can then be undertaken by the B.R.V.A. The analysis conducted within the context of the planning principles, will lead on to the classification of the data and ultimate assessment of priorities. Here the criteria developed should be applied to each possibility in turn. This will determine the alternative schemes most beneficial to the social, cultural and economic development of the Valley. Finally, certain fundamental approaches have to be attended to before the plan can finally be effected.

If this approach is adopted in the Valley, the trends and

tendencies touched upon will be crystallised, and rational proposals for the development of outdoor recreation facilities within the multiple purpose development of the basin, will be able to be made.





Figure 2. REGIONAL CONTEXT  
 Surrounding Towns and Communications.  
 Scale: 1 : 500,000



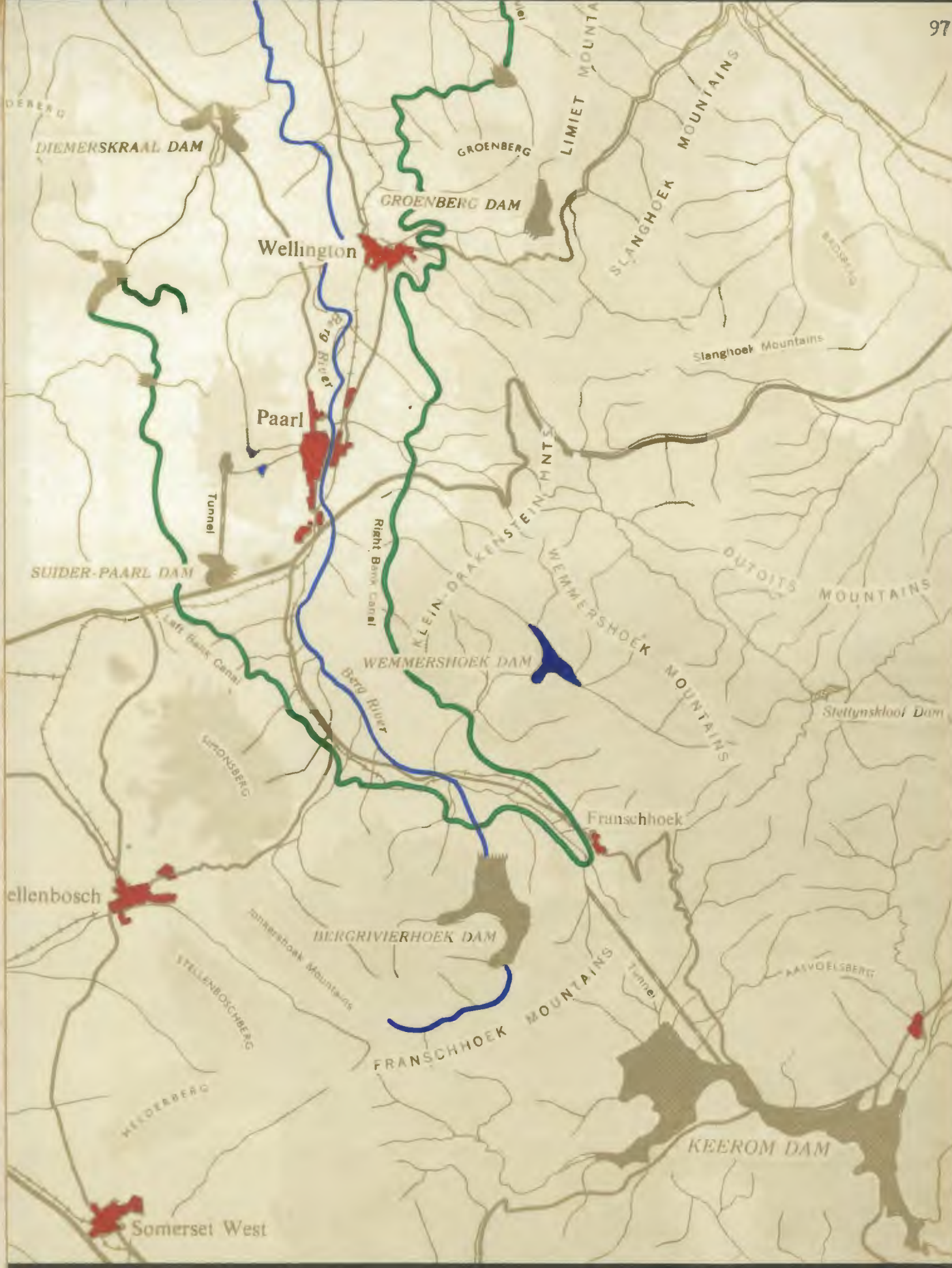


FIGURE 3. SHAND'S PROPOSED SCHEME FOR UPPER BERG RIVER VALLEY.

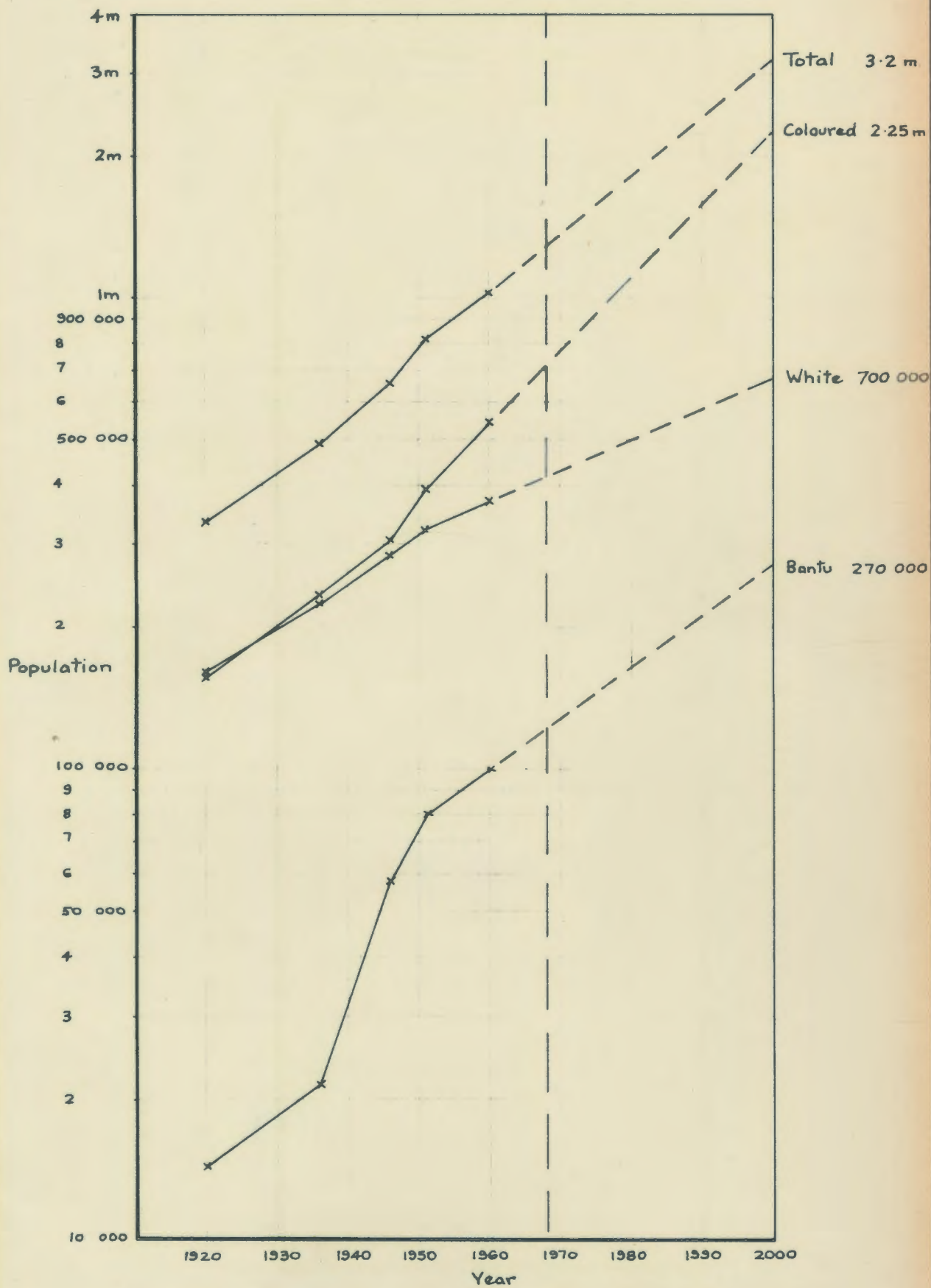
Scale : 1 : 250,000

Blue - existing dams.  
Black - proposed dams.

Referred to in script as the 'Berg River Scheme' (Pa...4.3)

# FIGURE 4

## Population Projection Greater Cape Town Area.



Source : Population Census 1960 .

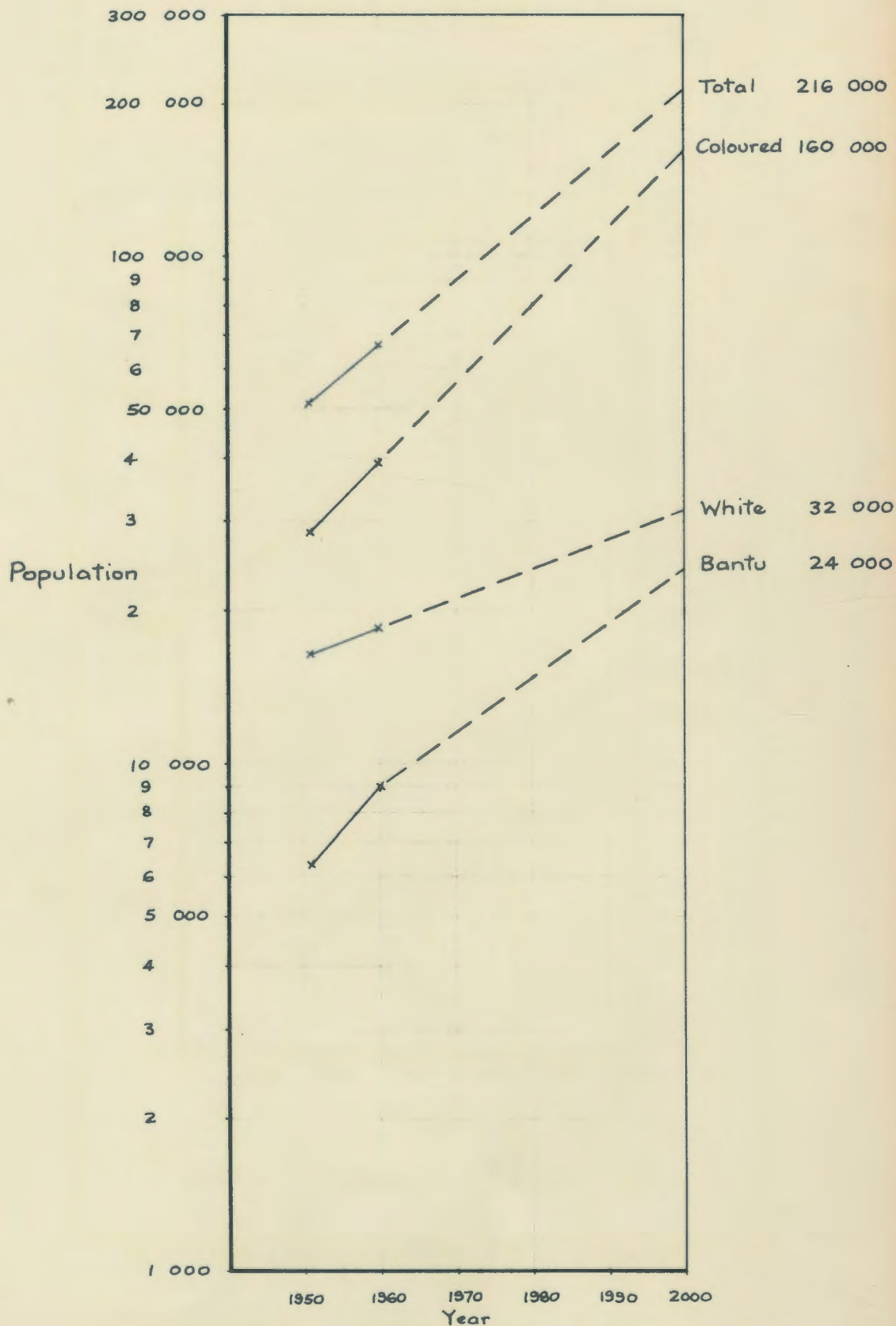
Refer to paragraph 5.2.1. in script.

# FIGURE 5.

## Population Projection.

### Paarl Magisterial District.

(including Franschoek, Le Rouxdorp & Pniel).



Source : Population Census 1960.

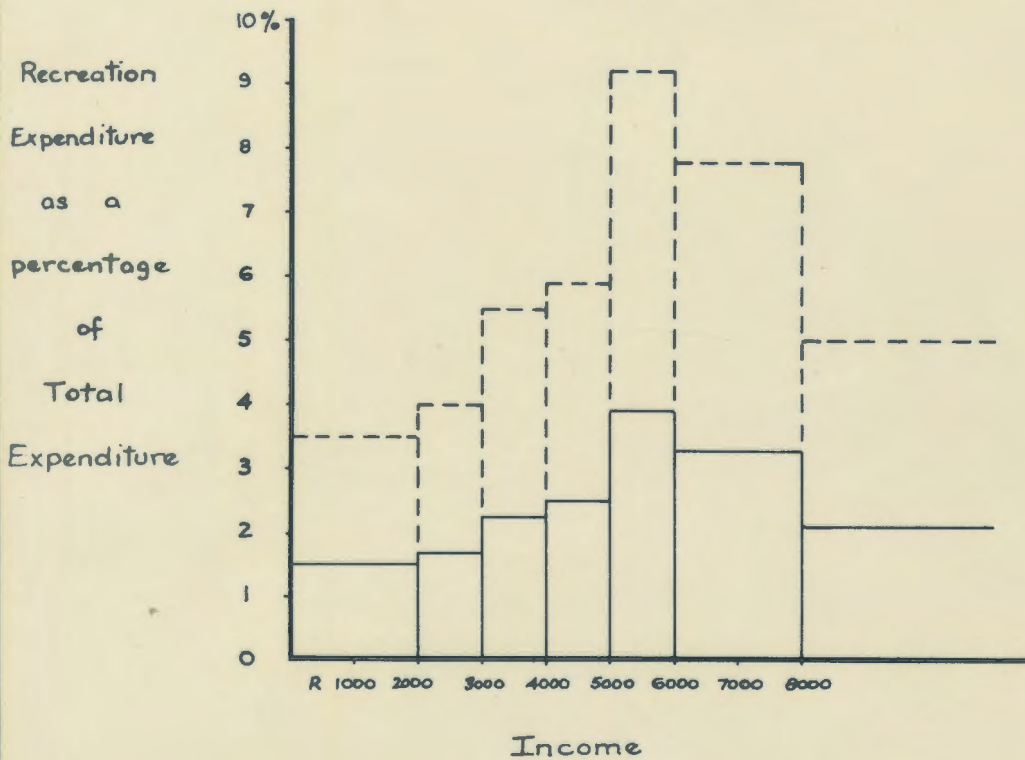
Refer to paragraph 5.2.1. in script

## FIGURE 7.

### Histogram.

#### Percentage Recreation Expenditure / Income.

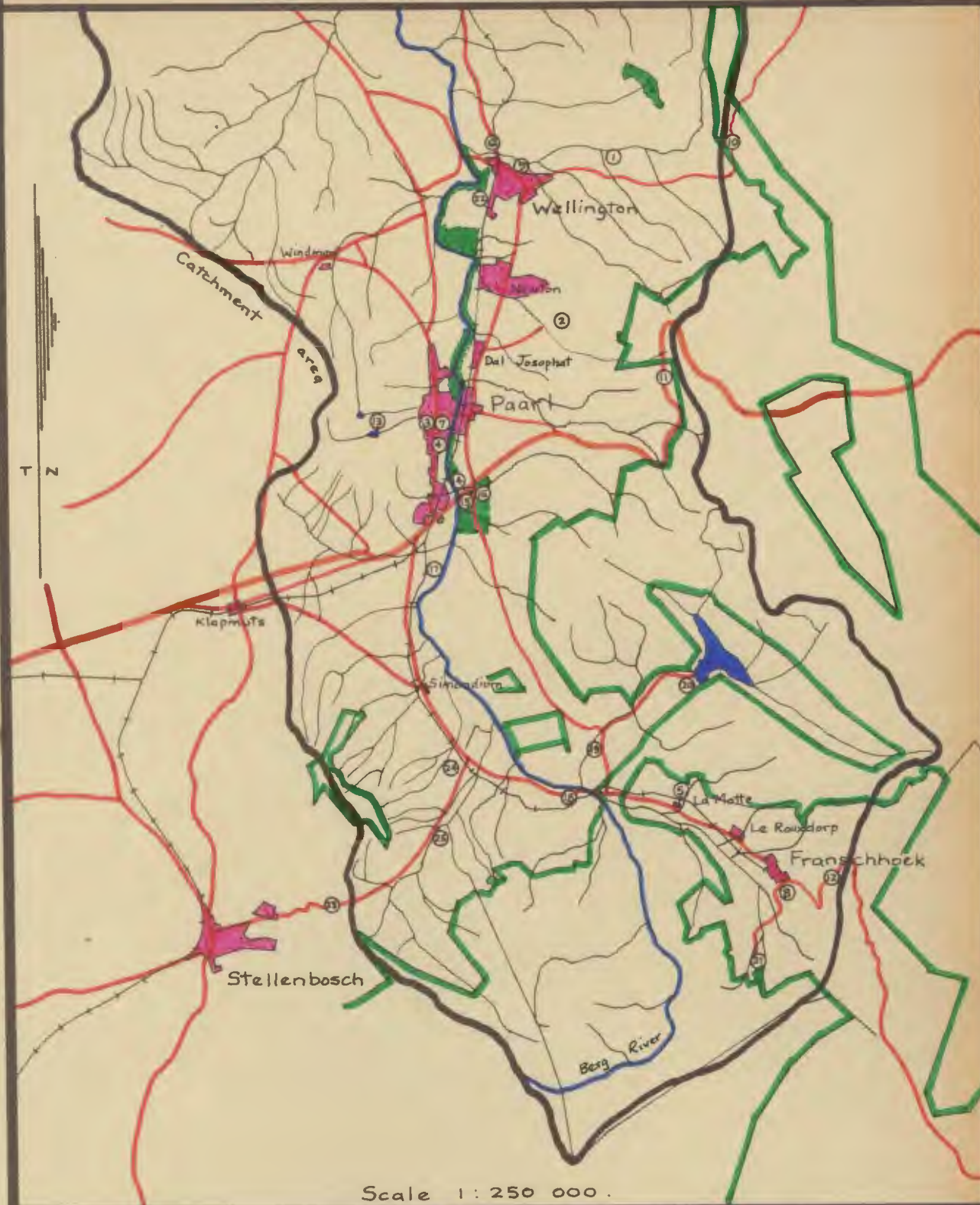
before and after adjustment.



Note. 1. Solid lines represent statistics for Cape Town  
- Report 11.06.01 . p. 30.

2. Dotted lines represent adjusted values.

Refer to paragraph 5.2.2. of script.



Scale 1 : 250 000 .

Forestry Reserve.
  Zoned Open Space.
  Catchment Area

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Mission Church, Bovlei.</li> <li>2. Daliosophat Cemetery.</li> <li>3. Gymnasium School.</li> <li>4. Strooidak Church.</li> <li>5. La Motte Cemetery.</li> <li>6. Block house (Anglo-Boer war).</li> <li>7. Huguenot Museum, Paarl.</li> <li>8. Huguenot Monument and Museum.</li> <li>9. Caravan Park.</li> <li>10. Main's Kloof Pass.</li> <li>11. du Toit's Kloof Pass.</li> <li>12. Franschhoek Pass.</li> <li>13. Paarl Mountain - Granite Rocks, Flower Garden and Barr.</li> </ol> | <ol style="list-style-type: none"> <li>14. Arboretum.</li> <li>15. Paarl Golf Course.</li> <li>16. Wat ruintjiesvlei.</li> <li>17. Campers' Paradise.</li> <li>18. Waterval.</li> <li>19. De Hollandsche Mol.</li> <li>20. Lemmershoek Dam.</li> <li>21. Swiss Farm Excel.</li> <li>22. Wellington Golf Course.</li> <li>23. Jels Hoojte.</li> <li>24. Historic farm house, root Drakenstein.</li> <li>25. Coloured Mission, Pniel.</li> </ol> |
|--|--|

T A B L E 2

POPULATION OF THE GREATER CAPE TOWN AREA BY RACE

	1921	1936	1946	1951	1960	From Fig. 4. 2000
Whites	161,941	225,935	287,018	325,094	372,755	700,000
Coloureds	158,684	237,608	308,062	391,690	544,957	2,250,000
Asiatics	2,769	4,174	7,317	8,653	9,221	-
Bantu	14,400	21,559	57,947	80,222	99,838	270,000
<b>T O T A L</b>	<b>337,794</b>	<b>489,276</b>	<b>660,344</b>	<b>805,659</b>	<b>1,026,771</b>	<b>3,220,000</b>

Source : Census Report 1921 - 1960

T A B L E 3

POPULATION OF PAARL AND WELLINGTON MAGISTERIAL DISTRICTS ACCORDING TO RACE

	1951	1960	Fig. 5 2000	1951	1960	Fig. 6 2000	2000
White	PAARL 16,342	18,545	32,000	WELLINGTON 4,858	5,010	5,600	VALLEY 37,600
Coloured	28,580	38,995	160,000	9,720	12,187	31,000	(Paarl and 191,000
Asiatic	59	44	-	44	20	-	Wellington) -
Bantu	6,160	8,965	24,000	1,385	1,795	4,600	28,600
<b>T O T A L</b>	<b>51,141</b>	<b>66,549</b>	<b>216,000</b>	<b>16,007</b>	<b>19,012</b>	<b>41,200</b>	<b>257,200</b>

Source : Census Report 1951 - 1960

T A B L E            4

RECREATION EXPENDITURE FOR WHITES ONLY (1966).

	<u>Cape Town.</u>		<u>All areas.</u>	
	<u>Expenditure</u>	<u>%</u>	<u>Expenditure</u>	<u>%</u>
Recreation, Amusement and Sport.	R110.44	2.50	R110.78	2.47
Meals & refreshments away from home.	70.83	1.60	71.68	1.60
Lodging expenses else- where.	20.43	.46	23.94	.53
Holiday Journey : bus, train, taxi, boat, aircraft.	24.48	.55	25.63	.57
Reading matter.	35.82	.80	33.76	.75
	<u>R262.00</u>	<u>5.91%</u>	<u>R265.79</u>	<u>5.92%</u>

Ref. : Report No. 11.06.02. Survey of Family Expenditure, 1966.

Ten principal urban areas and the urban areas of the Vaal Triangle and the O.F.S. Goldfields.

The Government Printer : Pretoria.

The following rows of figures from this Report have been used :

- 18. p.65, 67, 68 & 70.
- 1. (ii)(a)+(b) p.14 & 16.
- 4. (ix)(a)+(b) p.17 & 19.
- 13. b.(1)-(3) p.50 + 52.
- 17. (i)-(v) p.65 & 67.

Note : Every effort has been made to match these figures with the United States method of calculation.

T A B L E 5

OUTDOOR RECREATION EXPENDITURE FOR WHITES ONLY (1966).

	<u>Cape Town</u>		<u>All areas.</u>	
	<u>Expenditure</u>	<u>%</u>	<u>Expenditure</u>	<u>%</u>
Entrance fees to sport and social clubs.	2.30	.05	1.86	.04
Subscriptions fees to sport and social clubs. $(\frac{1}{2})^1$	4.57	.10	3.92	.09
Licences in connection with amusement (e.g. radio, game & fishing licences) $(\frac{1}{2})^1$	2.46	.05	2.39	.05
Concerts, dances, sport events, zoos, etc. $(\frac{1}{2})^1$	3.27	.07	2.88	.06
Sporting equipment (tennis rackets, balls, golf bags, boxing gloves, rifles, motor boats, etc.)	14.88	.34	11.12	.25
Special sportswear (jerseys, tennis shoes, football boots, spikes, stockings, caps, etc.)	2.61	.06	2.73	.06
Cameras, projectors and accessories.	5.77	.13	6.88	.15
Toys and games.	6.87	.16	7.44	.17
T O T A L :	R42.73	.96%	R39.22	.87%

Ref. : Report No. 11.06.02. op.cit.

The following rows of figures from this report have been used:

<u>18</u> (i)	p.65 & 68.
(ii) $x \frac{1}{2}^1$	p.65 & 68.
(iii) $x \frac{1}{2}^1$	p.65 & 68.
(iv) $b x \frac{1}{2}^1$	p.65 & 68.
(v)	p.67 & 70.
(vi)	p.67 & 70.
(ix)a	p.67 & 70.
(x)	p.67 & 70.

1 These figures have been taken at half their tabulated value to allow for the indoor recreation expenditure included in them.

Note : Every effort has been made to match these figures with the U.S. method of calculation.

T A B L E 6.

RECREATION STRUCTURE IN THE U.S.A.

	%
Pleasure journeys . . . . .	20.73
Walking for pleasure . . . . .	17.93
Participation in open air games and sport . . . . .	12.71
Swimming . . . . .	6.47
Sightseeing . . . . .	5.91
Cycling . . . . .	5.15
Fishing . . . . .	4.9
Attendance at sport meetings . . . . .	3.75
Picnicking . . . . .	3.53
Walking in scenic areas . . . . .	2.70
Boat sport (excluding canoeing and sailing) . . . . .	1.95
Hunting . . . . .	1.85
Horse riding . . . . .	1.25
Camping . . . . .	0.86
Ice skating . . . . .	0.51
Hiking . . . . .	0.42
Waterskiing . . . . .	0.41
Attendance at open air concerts . . . . .	0.39
Canoeing . . . . .	0.12
Sailing . . . . .	0.11
Mountain climbing . . . . .	0.09
Skiing . . . . .	0.07
	100 .00

Ref. P.W.V. report; Table 1, p.9. which had been abstracted from Outdoor Recreation for America - a Report to the President and to the Congress by the Outdoor Recreation Resources Review Commission, U.S.Government Printing Office, Washington, 1962. p.34.

T A B L E 7.

PREFERENCE FOR RECREATION ACTIVITIES IN THE U.S.A.

	A %	B %	C %
Motor trips for recreation and sightseeing . . . . .	61	10	3
Picnicking . . . . .	59	7	3
Open air swimming or visits to beach . . . . .	36	9	5
Fishing. . . . .	25	13	8
Boatsport and canoe trips . . . . .	23	5	6
Hiking . . . . .	17	5	5
Nature walks and bird watching . . . . .	12	2	2
Hunting . . . . .	12	5	5
Camping . . . . .	11	5	5
Horse riding . . . . .	5	2	10
Skiing and other winter sport . . . . .	5	1	4

To establish the trends in recreation needs, the O.R.R.R.C. obtained the following data :

- (A) Activities in which they participate, but have no desire for further participation.
- (B) Activities in which they participate and wish to further participate.
- (C) Activities in which they don't participate, but would further like to.

(A), (B) and (C) are correlated with the groups of Table 6 in the above Table 7.

T A B L E 8

RECREATION PATTERN WITHIN THE PRETORIA/WITWATERSRAND/VEREENIGING  
REGION FOR AN ORDINARY WEEKEND IN THE SUMMER

	<u>% participation</u>	<u>(U.S. A.) (Table 6.)</u>
Pleasure journeys . . . . .	37.0	(20.7)
Swimming . . . . .	18.8	( 6.5)
Sport . . . . .	17.5	(12.7)
Picnicking . . . . .	11.3	( 3.5)
Walking for pleasure . . . . .	6.4	(17.9)
Fishing . . . . .	3.7	( 4.9)
Camping . . . . .	2.8	( 0.9)
Boat Sport . . . . .	1.6	( 2.2)
Bird watching . . . . .	0.5	-
Mountain climbing . . . . .	0.4	( 0.1)
T o t a l	<u>100.0</u>	

T A B L E 9

STANDARDS FOR

INTERMEDIATE PARKLAND AND RECREATION AREAS IN U.S.A.

<u>Reference</u>	<u>Facility</u>	<u>Space Standards</u>	<u>Additional Comments</u>
Meyer and Brightbill Community Recreation (69).	Regional parks and reservations.	2+ acres per 1000 Population.	
Recreation and Open Space in the Onondaga Syracuse Metropolitan Area. (106).	Country parks.	12 / 1000.	
Kentucky Outdoor Recreation Plan (56).	Regional Reservation area.	10 / 1000.	Minimum size 500 acres.
Tennessee State Planning Commission. (126).	Regional parks.	4 / 1000.	Or 1 - 60 acre park for 25,000.
Twin Cities Metro- politan Planning Com- mission, St. Paul Minneapolis. (129).	Local and regional recreation area.	20 / 1000.	
National Park, Service Parks and Recreation for New Mexico.(74).	Parks, wilderness areas, nature preser- ves, scientific monu- ments, historic monu- ments.	15 / 1000. 30 / 1000.	Radius 25 miles or 1 hrs. drive. Rad. 50m. 1½ hrs. drive.
G.D.Butler, Intro- duction to Community Recreation. (17).	Large parks.	2½ - 4 / 1000.	Or 40,000 to 50,000/park. Park size: 100-300 acres.
Dallas, Texas, Parks and Open spaces.(35).	Reservations in outlying areas.	10 / 1000.	
Erie County, Pa. Planning Commission. (38).	Parks.	20 / 1000.	
New Mexico Comprehen- sive Plan for Outdoor Recreation.(101).	Regional parks.	15+/1000.	
New Jersey Department of Conservation and Economic Development. (99).	Low intensive use areas(state parks and forests, fish and game lands, etc)	20 / 1000.	

T A B L E            9        cont.

<u>Reference</u>	<u>Facility</u>	<u>Space Standards</u>	<u>Additional Comments.</u>
Outdoor Recreation in Arizona.(9).	District and regional parks.	18 / 1000.	
Oklahoma State outdoor recreation plan. (104).	General recreation.	20 / 1000.	100+ acres for 5000 rad.25-50m.
National Recreation and Park Association Outdoor Recreation Space Standards.(94).	Extra urban open space.	15 / 1000.	
P.H. Lewis, Recreation and Open Space in Illinois.(62).	Total regional recreation area.	40 / 1000. 60 / 1000.	rad. $\frac{1}{2}$ -1 hr. rad. $\frac{1}{2}$ -2 hrs.
Planning Commission of Lackawana County. (59)	State park areas.	45 / 1000.	Min.size 2000 acres, rad. 25 m.
Connecticut Development Commission.(29).	Regional recreation land.	30 / 1000.	
South Caroline Wildlife Resources Department.(121).	Regional parks.	10 / 1000.	500+ acres rad.less than 25 m. or $\frac{1}{2}$ hr.
Connecticut Department of Agriculture and Natural Resources.(28).	Statewide recreation lands.	10 / 1000.	1+ hour.
Comprehensive Plan for Wisconsin, Outdoor recreation.(135).	County parks and beaches.	15 / 1000.	

Ref. : These figures have been abstracted from Outdoor Recreation Space Standards. p.1 - 11.

Note : The numbers in brackets refer to the full reference described in the Bibliography of that publication.

A P P E N D I X I

METHOD OF CALCULATION OF EXPENDITURE FIGURES OF 5.2.2

(1) Calculation of recreation expenditure in Greater Cape Town.

<u>Whites</u>		<u>Coloureds</u>
$290 \times \frac{3}{4} \times \frac{5.9}{100}$		$81 \times \frac{3}{4} \times \frac{3.5}{100}$
= 12.8	+	2.1
= R 14.9m		

(2) Calculation of recreation expenditure in Valley.

<u>Whites</u>		<u>Coloureds</u>
1960 Valley Greater Cape Town $\frac{23,555}{372,755} \times 12.8$		$\frac{51,182}{544,957} \times 2.1$
= R810,000		= R197,000

∴ Recreation Expenditure in Valley = R1,007,000

(3) Calculation of Outdoor Recreation in Greater Cape Town.

<u>Whites</u>		<u>Coloureds</u>
$290 \times \frac{3}{4} \times \frac{0.96}{100}$		$81 \times \frac{3}{4} \times \frac{0.57}{100}$
= R2.1m	+	R350,000
= R 2.45m		

Proportion of Outdoor recreation  
spent in Valley =  $2.45 \times \frac{1}{14.9}$

= R170,000

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Department of Urban and Regional Planning,  
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SUMMARY OF THESIS :

" Outdoor Recreation : A Case Study of the Upper Berg River Valley "

October 1968.

John E. Duxbury.

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Rivers have been found to play an important part in the development of their regions ever since man began to realise their worth over 7,000 years ago. This development has increased and intensified through the centuries, until today multiple purpose development of rivers is an accepted phenomena.

South Africa, during this century, has taken greater notice of the potential of her rivers, albeit mainly for the supply of consumption water. The Berg River, similarly, is the main source of water supply for the Greater Cape Town and the West coast regions. It's strategic importance to this wider region, and especially Cape Town, is evidenced by the Cape Town City Council's construction of Wemmershoek Dam, and their present scheme to raise the Voëlvlei Dam wall. Grandiose other schemes affecting the Valley have been devised to supply the future water needs of Greater Cape Town. The removal of water from the Valley has, generally, been the main concern in present development. The incorporation of this process into a multiple purpose development scheme has been overlooked.

The benefits derived from this type of development in America have been shown to be beyond the wildest expectations. It is with

this purpose in mind that I have recommended the formation of a Berg River Valley Authority, a body which can administer and plan all the components of development within the Valley. One of the technical sections of this Authority would be devoted to the integrated development of outdoor recreation facilities.

The demand for outdoor recreation in the Valley and wider region will increase alarmingly to the year 2000. The existence of natural resources in the Valley, typical of the beautiful Cape, is not, in itself, sufficient to supply this demand. A development of these natural resources is, therefore, essential and a systematic method of approach to the problem has been formulated.

Certain principles have to be created prior to any field survey and analysis. These should include a comprehensive statement on what is to be achieved and how it is to be tackled. The necessary data collection can then be undertaken by the B.R.V.A. The analysis conducted within the context of the planning principles, will lead on to the classification of the data and ultimate assessment of priorities. Here the criteria developed should be applied to each possibility in turn. This will determine the alternative schemes most beneficial to the social, cultural and economic development of the Valley. Finally, certain fundamental approaches have to be attended to before the plan can finally be effected.

If this approach is adopted in the Valley, the trends and tendencies touched upon, will be crystallised, and rational proposals for the development of outdoor recreation facilities within the multiple purpose development of the basin, will be able to be made.

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