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A planning approach to naatural conservation in South Africa

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A PLANNING APPROACH TO NATURE CONSERVATION IN SOUTH AFRICA

Judith Helen Johnston

A dissertation submitted to the Faculty of Architecture, University of the Witwatersrand, Johannesburg, in Partial Fulfilment of Requirements for the Degree of Bachelor of Science in Town and Regional Planning.

July, 1975

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GLOSSARY OF TERMS

Biome	A major biotic community, composed of all types of communities and including all processes carried out within this area.
Conservation	The wise use and management of natural resources for their optimum use for the longest period of time. It is an act by man for his own benefit, in that a number of values are involved in the conservation of natural areas (Table 4).
Ecosystem	A single unit area where biotic, climatic and organic factors are integrated and live and develop together.
Environment	Our entire surroundings that encompasses all organisms and features (including man) on earth, that interact together and live in harmony and equilibrium with each other, to form a balanced system.
Management	Administration and the conducting of control over something.
National Park	Internationally defined and used concept to describe a type of conserved area that has defined characteristics, size, purposes and controlling authority.
Natural Area	Environmental area, as near unmodified as possible, being not artificial. Generally considered to have some unique, outstanding or aesthetic interest.
Nature	A term embracing all plant and animal life.
Nature Reserves	Areas set aside for the preservation, protection and propagation of indigenous fauna and flora for scientific and aesthetic reasons. Under different levels and bodies of control.

Preservation	Keep from injury or destruction with no use or development of the resource.
Wilderness	Areas in the environment entirely untouched, or minimally modified by man.

CHAPTER 1: INTRODUCTION

CHAPTER 1 INTRODUCTION

It is only recently that man has become aware of and has accepted his responsibility in safe-guarding the natural environment. This change of attitude has developed over the last two decades, with the emergence of a realisation by man of the inter-dependency between his species and nature. This realisation has strengthened as man has observed that his demands for energy and raw materials have exceeded the environments capacity to sustain the level of supply. With an increase in his awareness of the needs and desires that the values of natural areas satisfy, man has now taken action. He is making desperate attempts to reverse many of his past errors and to save what is left of nature, that is not already totally destroyed.

Traditionally, man's belief has been that his existence is dependent on the inevitability of human progress and unlimited economic growth, and his ability to conquer, modify and control his environment. This fact is supported by the results of scientific, industrial, agricultural and urban revolutions that have shown it is possible for greater numbers to live in the man-made environment. This had further eroded the general public's consciousness of the inter-dependency between man and the natural environment.

But man has taken too much for granted in his own abilities and powers, and in believing that the environment is self-sustaining and self-perpetuating. Fragile and sensitive terrains, that have been subject to diverse pressures are disappearing. Natural ecosystems have been neglected, abused and degraded for so long now that a crisis situation has been reached. The natural environment can no longer compete with man's dominance for he is destroying the ecological equilibrium of his environment, and so the criterion on which he ultimately depends for his survival.

The change in attitude has been slow, as has been the action to deal with the problem of restoring the balance with nature. This has been because :

(a) there has been no concensus as to what the problem is,
(b) how to deal with it, and
(c) the old belief has persisted that technology and economic growth will solve the problem, and the belief
(d) that progress is inevitable.

However, in some of the more advanced countries such as Britain and America, the governments and the public are now taking greater action to establish national policy frameworks for nature conservation. Large scale movements by the more concerned public have stimulated these governments to create procedures for ensuring that deserving areas are conserved.

South Africa has not felt the same sense of urgency in conserving the natural heritage as Britain or America because :

(a) it is less urbanized
(b) has a lower average population density, and
(c) has more open space and reduced sense of pressures.

The political leadership, having been involved in greater, more urgent, and more dramatic issues, has been blinded to their responsibilities towards the natural environment. It was not until recently in South Africa, that some action has taken place, following the same path as America did about twenty years before. South Africa is in the early stages of this issue, and has much ground to cover before reaching an effective method to conserve the natural and unique landscape of the country.

1.1 Aims of the Thesis

(a) To analyze the prevailing situation in South Africa regarding the protection and utilization of unique and natural areas in the environment.
(b) Using overseas approaches and experience, to produce a local classification of the natural environment and to establish a policy framework.

1.2 Methodology to be used

The thesis is to be approached in three stages.

(a) Theoretical Base

Basic definitions of terms will be discussed related to natural and wilderness areas as well as conservation and management. This includes attempts to classify these areas. This will be followed by man's need for these areas, and his attitude towards them as well as changes in these attitudes over time. Then follows a brief outline of overseas attempts to formulate a national framework for conservation. Principles of these overseas frameworks will be used to analyse the South African situation.

(b) Analysis

A look at the ecosystems in South Africa and at the present situation regarding their conservation. Pressures relating to these areas will be examined as will attempts to formulate policies for them.

A problem situation existing in South Africa should arise out of this analysis and this will form the basis for formulating a policy framework.

(c) Solution Stage

Establishment of a classification system of natural areas to help develop a nature conservation policy framework. Guidelines will be recommended for future planning, development and treatment of the natural environment.

CHAPTER 2: DEFINITIONS, CONCEPTS & VALUES.

CHAPTER 2 DEFINITIONS, CONCEPTS AND VALUES

2.1 Concepts of "Natural Areas" and their classification

There has really been no nation-wide or international concensus on the definition of terms such as "natural areas", "primitive areas", and "wilderness areas" because of the differences in perception of natural environmental values held by different cultures. Generally most sources agree that these terms refer to areas where the impact of man appears to be absent, and where the ecosystem is untouched by man's influence.

However, because man's influence has in fact spread across the whole world, even as far as the poles, through the drift of pollutants, (Brockman 1973) there exist no untouched areas anywhere on earth. So definitions of these areas are visual perceptions delineated by man. This implies that definitions of natural and wilderness areas are in fact artificial concepts. Various definitions have been put forward.

(a) The natural environment encompasses all organisms on earth that interact together and live in harmony and equilibrium with each other to form a balanced system.

(b) An ecosystem is a single unit area where biotic, climatic and organic factors are integrated and develop together.

(c) Nature is a collective term embracing all plants and animals. The Oxford Dictionary defines a wilderness as land that is wild and uncultivated, and which is uninhabited or inhabited only by wild animals. Natural is defined by the dictionary as "existing in or formed by nature, not artificial".

(d) The United States Wilderness Act, 1964 defines wilderness as an area not influenced by man, and where man is merely a visitor.

(e) Tinley (Tinley, 1971) sees them as areas where man's impact appears to be absent, but that wilderness or naturalness can only be appreciated through the senses.

(f) The term 'wilderness' implies the action and interaction of the physical forces of nature unimpeded by the activity of man. (Heydom 1977)

(g) Others, (Patmore 1970, Lucas 1960) agree that natural and wilderness areas are those entirely untouched, or minimally modified by man and development.

Because these disparities do exist, and because it is necessary to have some nation-wide uniformity in identification of these areas (for development, planning, conservation, exploitation etc.) attempts have been made to establish a classification of these areas. However, the classifications so far developed have been related, not so much to physical characteristics of areas, but more to types of activities in an area, and to intensities of these activities, that is uses of areas.

Classification of the uses of these areas, have been mainly developed in relation to the field of recreation. So categories in a natural area classification have been related to types of recreation as well as intensity of recreational activities. They are also related to the corresponding facilities and services necessary for these activities.

Economic activities, second homes etc., and other types of uses of these areas have been barely covered and have not been considered as very important.

In the United States a fairly comprehensive classification has been developed by the Outdoor Recreation Resources Review Commission (ORRRC) in their attempt to define natural areas for different types and intensities of recreational use (see Table 1). A few other types of uses have also been referred to in the classification such as lumbering, mining, etc. (ORRRC, 1962).

TABLE I THE ORRRC CLASSIFICATION OF NATURAL AREAS FOR RECREATIONAL USES

CLASS	CHARACTERISTICS	MAJOR TYPES OF ACTIVITY
I HIGH DENSITY RECREATION AREAS	HIGH DEGREE OF FACILITY DEVELOPMENT. MANAGED EXCLUSIVELY FOR RECREATION PURPOSES. SOME DEVELOPMENTS INCLUDE PLAYING FIELDS, ARTIFICIAL LAKES, ROAD NETWORKS AND PARKING AREAS. USUALLY CLOSE TO MAJOR CENTRES OF POPULATION	WIDE RANGE FOR MANY PEOPLE, SUITED FOR DAY AND WEEKEND USE.
II GENERAL OUTDOOR RECREATION AREAS	NATURAL, BUT ALWAYS EQUIPPED WITH MAN-MADE FACILITIES VARYING FROM SIMPLE TO ELABORATE. MAY INCLUDE PORTIONS OF PUBLIC PARKS, FORESTS, LAKES, COASTAL AREAS AND HUNTING PRESERVES. A WIDE VARIETY OF PHYSICAL RESOURCES. FOR DAY, WEEKEND AND VACATION USE.	LARGE AND VARIED AMOUNT OF ACTIVITY, CAMPING, PICNICKING, OUTDOOR GAMES, WALKS
III NATURAL ENVIRONMENT AREAS	PROVIDES FOR TRADITIONAL RECREATION EXPERIENCE IN THE OUT-OF-DOORS. ATTRACTIVE SETTINGS WITH VARIED LANDFORMS, NATUAL ENVIRONMENT EMPHASISED, RATHER THAN PROVISION OF MAN MADE FACILITIES, WHICH ARE BASIC DEVELOPMENTS. NATURAL CHARACTERISTICS LARGELY UNCHANGED.	HIKING, HUNTING, FISHING, CAMPING, CANOEING, SIGHT SEEING - MAN HAS TO FEND LARGELY FOR HIMSELF. ALSO SUPPORTS GRAZING, LUMBERING AND MINING.
IV UNIQUE NATURAL AREAS	INDIVIDUAL AREAS OF REMARKABLE AND NATURAL WONDER, HIGH SCENIC SPLENDOUR, OR SCIENTIFIC IMPORTANCE. FACILITIES & DEVELOPMENTS PERIPHERAL TO AREA & THEY BLEND IN AND HARMONIZE WITH THE PHYSICAL ENVIRONMENT.	WALKING ONLY, PRESERVED FOR INSPIRATIONAL, EDUCATIONAL OR SCIENTIFIC PURPOSES.
V PRIMITIVE AREAS	NATURAL ENVIRONMENT IS UNDISTURBED BY COMMERCIAL USE & THERE IS NO MECHANIZED TRANSPORT. WILD & UNDEVELOPED, & PEOPLE EXPERIENCE A SENSE OF BEING FAR REMOVED FROM SIGHTS AND SOUNDS OF CIVILIZATION. NO DEVELOPMENT OF ROADS, PERMANENT HABITATIONS OR RECREATION FACILITIES	USED FOR ITS INSPIRATIONAL, AESTHETIC, SCIENTIFIC, & CULTURAL VALUE.
VI HISTORIC & CULTURAL SITES	SITES ASSOCIATED WITH HISTORY, TRADITION OR CULTURAL HERITAGE OF SIGNIFICANCE THAT MERIT PRESERVATION.	DON'T PROVIDE RECREATION OPPORTUNITIES, BUT ASSOCIATED WITH VACATION TRAVEL.

COMPILED FROM "A REPORT OF THE OUTDOOR RECREATION RESOURCES REVIEW COMMISSION TO THE PRESIDENT & CONGRESS" U.S. GOVERNMENT PRINTING OFFICE, WASHING D.C. 1962.

Clawson (Clawson, 1960) also outlines an approach to the classification of natural areas in the environment, mainly for recreational use (Table 2). This is a much broader classification of areas and is explicitly used to classify classes of recreation on different types of land. These two approaches are in fact very similar, even though the primary basis of distinction is different.

Dasmann (Dasmann, 1973) discusses a classification system that is based more on the characteristics of the area related to vegetation, animal life and physical features in conjunction with the uses permitted in these areas (Table 3). The areas have been specifically set aside because of the characteristics they have, and so use of the land is determined by these natural phenomena. Dasmann's approach is perhaps a more general system in its definition of area types, and has in fact been accepted by the International Union for the Conservation of Nature and Natural Resources (I.U.C.N.), for nation-wide use. They, too, have developed a definition for a 'national park', that has become a world-wide concept, involving the following criteria:

(a) the aim of a national park is to protect natural ecosystems of special interest

(b) it is a relatively large area

(c) the ecosystems are not materially altered by human exploitation and occupation

(d) it is protected and managed by the highest competent authority of the country and is covered by statutory legislation

(e) it is open to visitors for inspirational, educational, cultural and recreational purposes (Dasmann, 1973).

These classification approaches thus reflect a combination of different perceptions of natural, unique, primitive, etc., areas, and of how they

TABLE 2 CLAWSON'S CLASSIFICATION APPROACH

	TYPE OF RECREATION AREA		
ITEM	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; picknicking; walks and horse riding; pets 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 thousand 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	Federal reservoirs; state parks, private.

EXTRACTED FROM M. CLAWSON & S.L. KNETSCH "THE ECONOMICS OF OUTDOOR RECREATION"
JOHN HOPKINS PRESS. BALTIMORE, 1966.

TABLE 3 DASMANN'S CLASSIFICATION OF NATURAL AREAS

1. PROTECTED NATURAL AREAS

Areas set aside primarily for the conservation of natural biotic communities and associated physiographic features and within which only those activities are permitted which do not interfere with the long-term protection of these natural features. Excluded are areas set aside primarily for the production and exploitation of natural resources, for recreation as a principle use, or for residential, commercial, industrial or their associated forms of land use. Included are :

(a) Strict Natural Areas

To protect nature in an undisturbed state for scientific study, aesthetic interest or for the contribution it can make to the value of other areas. Natural processes are allowed to dominate in the absence of any direct human interference. Man-made disturbance of any kind is necessarily excluded.

(b) Managed Natural Areas

Their purpose is to protect a species, group of species, biotic communities or physical features of the environment, where these require specific human interference for their perpetuation and consequently would be in danger of disappearance in (a). There may be a certain amount of management and modification to afford near optimum conditions. Primary concern is protection of nature and not production.

(c) Wilderness Areas

Their purposes are to protect nature and to provide recreation for those capable of enduring vicissitudes of wilderness travel by primitive means. Area maintained in the state in which its wilderness or primitive appearance is not impaired by any form

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of development.

2. MULTIPLE USE AREAS

Their purpose is to protect nature or cultural sites other than those above. They serve a purpose for which they were not principally intended. Protection of nature may be subordinate to other uses : timber, recreation etc. These areas, in fact, may become artificial.

extracted from : R.F. Dasmann
"Classification and Use of Natural and Cultural Areas"
IUCN OCCASIONAL PAPER NO. 4 1973

should be used. These classification systems have been used mainly in America for identifying areas that have been considered for conservation purposes.

It is uncertain, for there is no literature, as to how these systems were derived and upon what criteria categories were based. But from certain indications in the literature, extensive studies were made on recreational demands and the impact this was having on the country. On the other hand, characteristics of the landscape were also considered.

These systems are a useful planning tool for permitting amounts and types of development in the conserved areas. In fact these systems form the basis for policy formulation in nature conservation.

2.3 Concepts of "Preservation", "Conservation" and "Management"

These different and controversial terms reflect the attitudes of concerned individuals as well as their behaviour in protection methods of the natural environment.

The first conservationists were "protectionists" whose aim it was to protect endangered species. They attempted "preservation" of the natural environment. This is referred to as the preserving or keeping from injury or destruction, and implies no utilization or development of resources. These measures proved inadequate and impractical.

Not only preservation of a resource is important, as stressed by conservationists, but also the usefulness and quality it offers through wise utilization, rather than the "sterile fossilization" (Patmore, 1970). This is where the term "conservation" becomes effective. It implies "both the protection and development of resources, the one as much as the other" according to G. Pinchot, one of the forerunners of conservation in America. (Herfindahl, 1960).

Conservation emphasises action by man for man. It is interpreted as the wise development and usage of natural resources, for the best long-term interests.

Conservation thus implies the prevention of waste of precious resources and of despoilment, while preserving, improving and renewing the quality and usefulness of the resource. This further implies that conservation is more than usage, as there is an obligation to conserve species that have no direct "value", but are of scientific, cultural and inspirational interest.

Conservation implies organization, which is crucial to balance man's demands for environmental service and environmental resources. It is equated with management which involves maintenance of environmental interest in a state which gives maximum sustained benefit to both man and wildlife concerns.

Below, (Table 4) is a summary of the values of conservation areas, of parks and reserves. These cover values for man's use, the values of the areas for themselves and the values of these areas as they visually affect man, in terms of the use he has put them to :

TABLE 4 THE VALUES OF CONSERVED AREAS

PRODUCTIVITY VALUE RELATED TO MAN	VALUE OF THE NATURAL PROCESSES	VALUE OF THE VISUAL CHARACTERISTICS
Scientific Cultural Educational Recreational Economic	The maintenance of the ecological balance	The natural form in its connection with the productivity value

After Van Riet & Mansvelt, 1971

One of the striking and frustrating characteristics of conservation of natural resources, is that in practice it "is almost purely a social problem, a human problem and not an environmental problem" (Tinley, 1971). This is particularly emphasised in South Africa. Tinley implies that conservation is bogged down by the lack of communication and by red tape in the administrative and political processes, as well as the general apathy of

the public and the "unenlightened habitual peasant cultures which resist change" (Tinley, 1971).

This demonstrates that conservation is also concerned with ethics and a system of values. Different beliefs and behaviours are dependent on individual and/or group evaluation and assessment, through a process of perception (Patrician, 1976). As there can be no universally recognized system of values, although there can be common cultural values, conservation must consequently be reflected in the views and beliefs of its proponents. These may be similar for people and groups of the same culture, but different for other cultures, social class, age, etc. This accounts for international disparities and perceptions of need and conservation.

2.3 The Need for Areas to be Conserved and Man's Attitude towards Nature

Man's attitude to nature is coloured by his perception of it. His individual assessment of nature has been determined by the usefulness of nature to him, and the need he has of it, and this has influenced his behaviour towards it over time. These needs and uses (and so man's attitudes to nature) have changed with scientific and technical progress which has resulted in changed demands upon the natural environment. It is unfortunate that the nature of these demands has been such as to increase pressure on the natural environment, and to cause despoliation and exploitation. And because of man's increasing reliance and dependence on his self-made environment, the result has been the neglect of the natural environment.

2.3.1 Changes in Needs and Attitudes

Demands of man on the natural environment and his attitude towards it have changed basically through five periods of development (Hey, 1973).

(a) Gatherer-hunter: His need was the basic necessity of life - food. He regarded nature as a worthy adversary and had a non-destructive relationship with it, and so had little impact on it.

(b) Domestication of animals: Dependence on wildlife decreased, but there was a greater impact on the environment as man began to modify it when he settled in large groups, cultivating the land and raising herds. At the same time animal hunting became a sport and animals were killed in their thousands in hunting, in the amphitheatres, etc.

(c) Culture and Faith: Some early cultures had a profound respect for nature and life. - The American Indian, and the Buddists who believed that they should not kill or hunt wildlife for food. The Greeks had a respect for nature, clouded in mysteries, and belief in nature's powers and spirits. But Judeo-Christians believed earth was to serve man and that his rewards or punishments had little to do with treatment of the environment or natural resources. They regarded nature as part of a "brute creation" (Hey, 1973) that had to be subdued and consequently a great deal of destruction of wildlife and nature occurred in the Christian era.

(d) Technological Age: Since the time of the industrial revolution and the harnessing of power, man has developed the means of changing the face of the earth, and doing irreparable damage to the environment. At the same time man's personal need for nature decreased because of the belief that his own inventions supplied for all his needs. His demands on nature were for natural resources necessary to run his machines, etc., and his attitude to the environment was that it was a treasure chest to be plundered.

(e) Invention of Firearms: This began an era of destruction and exploitation on an unbelievable

scale. It was increased during the colonial period when there was an incredible exploitation of natural resources. The attitude was that resources were renewable, or infinite, and so no-one cared that they migh be over-exploited.

(f) Ecological awareness: Since the early 60's with the publication of Rachel Carson's book "Silent Spring", there has been an increasing awareness of man's impacts on the environment. She writes of man's "alarming assaults" on the environment through the use of chemicals and insecticides which have caused irreversible harm. Since this time improvements in their use and distribution have been developed. At the same time there grew a concern for controlling and preventing pollution of the environment from other sources besides chemicals. This concern was demonstrated in litter campaigns, etc.

However, this negative attitude to nature has not always existed as there have always been some conservational values present. The earliest were those of the nobility, who conserved areas for personal pleasure and "self-aggrandizement". Through time hunters have been concerned about the protection and management of wildlife for hunti/ Towards the end of the 19th century there were numerous individuals who were deeply concerned about the degredation of nature, especially the pressures on large forests, and they began some action which later resulted in full scale conservation movements.

Exploitative attitudes and beliefs were based on changing needs and desires through time, and positive changes in attitude to nature came only through the appearance of scarcity of natural resources, which enhanced their value. Decolonization too, created a realization of the scarcity of natural resources. Much of this change was due to the interest and pressures of those perceptive individuals who, through their outcries brought about a greater awareness of the

need to have areas conserved. This created a broader public awareness which was really the beginning of organized procedures of wilderness and natural area conservation.

2.3.2 Philosophy of the Need for Conserved Areas

Having realized man's enormous destructive powers and their effects on the landscape, a philosophy of their conservation should be considered. What is the need to ensure some areas of natural wilderness remain?

This need basically falls under two headings:

(a) Man's psychological needs for these areas.

(b) Need of the environment itself to be preserved in terms of its own "laws".

The need of conserved areas for man goes beyond hi[illegible]sic needs and desirability of these areas (for recreation, economics etc.) and beyond the fact that these desires depend on the individual's own resources, intellect, and education, all varying in time, place and for individual preference. The need to have natural areas is summed up by Lovejoy (Lovejoy, 1973). It is because they "protect the diversity and dynamism of man's environment for his survival, enhancement and joy in the social, physical and biological sense".

Man is part of the environment, and he psychologically needs to return periodically to nature in order to balance himself and protect the quality of his human life. Man needs natural areas because nature is a source of knowledge and scientific advancement, and nature is of cultural and educational value to man's learning process. Nature too, plays a large part in man's religion and faith, and is also of economic importance. So man bears a solemn responsibility to protect these areas and to improve the environment for present and future generations, who too will rely on nature for social, economic and cultural reasons for a life of "dignity and well-being".

(Lovejoy, 1973). Further, these generations cannot be denied first hand knowledge of natural areas for the quality of life they ensure.

There is a need to conserve forests, coasts, mountains and inland wilderness areas in order to protect unique ecosystems from damage by human greed or ignorance. They must be protected and managed for their own intrinsic worth as living, integrated components of a system. This is to ensure the survival of features for which they were originally conserved.

In summary, the need for someone to conserve and protect natural and wilderness areas is because nature and wildlife cannot cope with environmental changes on a scale proportionate with the world's economic and technological development. Therefore, for man to be able to survive and gain knowledge as well as for the environment to continue to evolve, it is man's responsibility to preserve natural areas, and manage them wisely.

CHAPTER 3: OVERSEAS CONSERVATION

CHAPTER 3 OVERSEAS CONSERVATION

In order to gain a perspective of nature conservation in South Africa and to see how it has developed and progressed, it is useful to examine this development elsewhere in the world. The examples of America and Britain will be taken, as these two countries experienced the earliest movements in conservation. Britain and America are also useful examples to use because the two countries have slightly different approaches to a similar problem. Each country has a framework that is particular to its economic, social, political and cultural backgrounds, and this largely determines the approaches to conservation.

Each country's system will be briefly examined.

3.1 UNITED STATES OF AMERICA

(a) Development and Urbanization

Since the time when it was first colonized, the United States has developed and advanced rapidly. From the early exploration of pioneers, the natural environment of the States has experienced many varied impacts.

These impacts varied from early urbanization and industrialization, which resulted in the exploitation of the natural resources. Expansion West meant rail and road impact on the environment along with the Western movement of groups and civilization. These diverse processes and impacts resulted eventually in procedures to control urbanization, and so to protect the natural environment.

With the early settlements there occurred large scale clearance of natural vegetation and forests, which were replaced by farms and roads. Later the advent of railways opened up the mid-west and resulted in mushrooming new settlements, and lastly waves of immigration from Europe expanded towns to large cities. Once begun, urbanization occurred rapidly and the advent of the car led to sub-urbanization. America experienced a period

of rapid economic prosperity after World War II, and the affluence of the country was displayed in further sub-urbanization.

(b) Conservation Movements

Initial steps in conservation evolved from concern over large scale destruction of forests and wildlife, which began during the earliest pioneering days. At this time there was intensive exploitation of natural resources for production. Early attempts at conserving these aspects of the environment were by means of laws and regulations, a negative and relatively unsuccessful approach, but presumably the "obvious" first step.

With the growth of American affluence there developed interest in recreational values and this was one of the main forces that brought about the first reservation of extensive areas of wild land for the public benefit. The first large areas reserved were Yosemite Grant 1864, Yellowstone National Park 1872, Nagara Falls Reserve 1885 .

The attitude of the Indians to the environment cannot be forgotten, for it may have had some influence in the first conservation of large areas, their profound respect for nature and the earth, and their living close to nature might have had some effect on the European attitudes.

These events marked the beginning of the Conservation Movement, borne out of the actions of dynamic individuals who were concerned about the furture of America's natural environment. A notable event was the birth of the National Park Concept, which developed with the addition of large tracts of land that were set aside as National Parks.

Some years later saw the establishment of the National Parks Service, which co-ordinates the administration of national parks and controls their management and use, giving lawful recognition to

the parks in the country's legislation.

(c) The U.S. Nature Conservation System

It is not clear in American Conservation how the overall system was developed, for the establishment of different types of protected areas. Though repeated reference is made (Brockman, 1973) to the use of the ORRRC classification system, there is no indication as to how it was used, or even how it was developed. Control and management of protected areas is said to also be based on the classification approach.

Anyway, bearing in mind that American conservation is based on some fundamental criteria, the actual American approach will be discussed.

(i) The National Park System

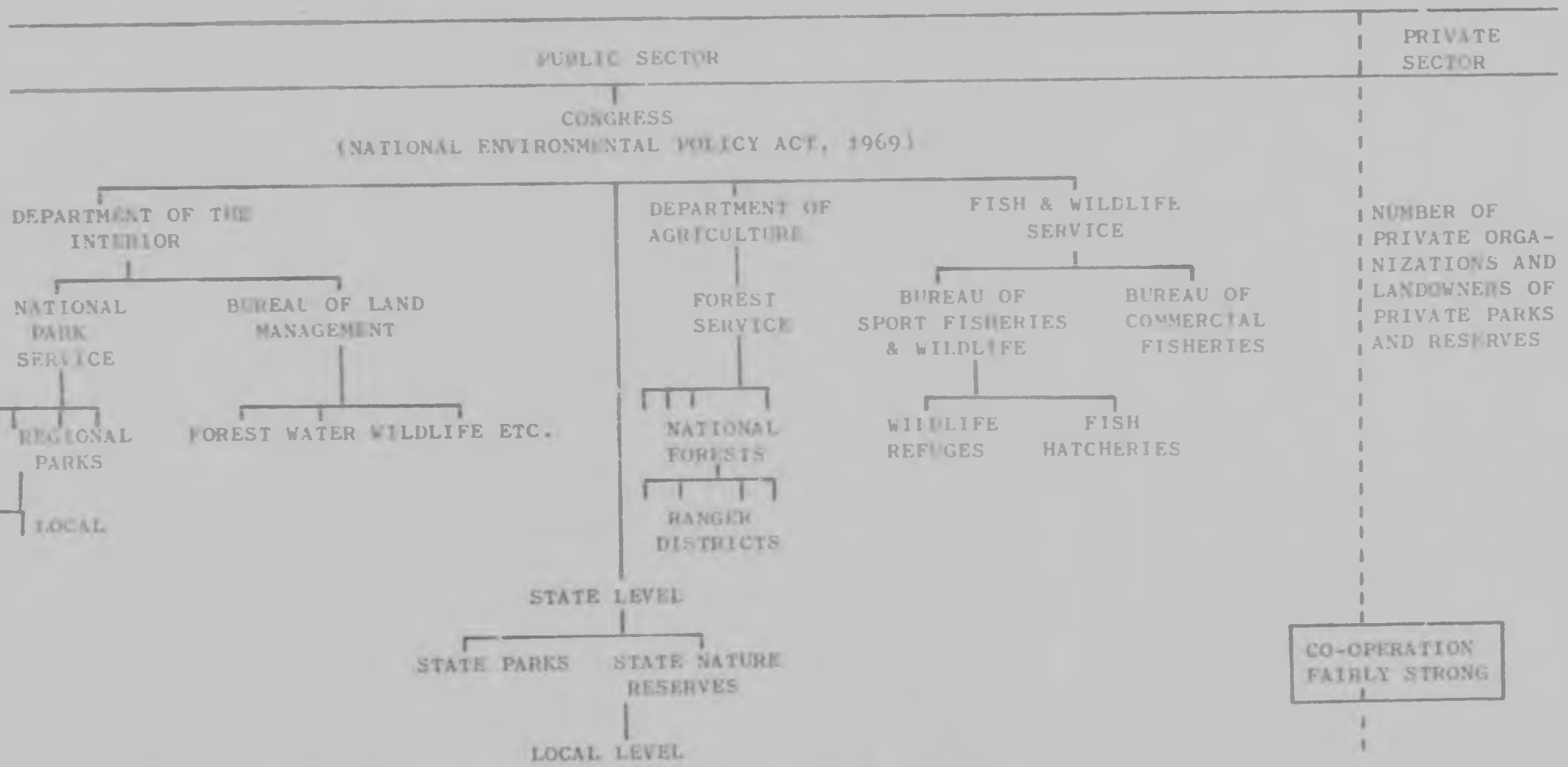
The National Park System is a semi-autonomous body that has been adapted to manage three types of areas in the system.

(1) Natural areas.
(2) Historical areas.
(3) Recreational areas.

Natural areas include lakeshores, seashores as well as different types of inland parks, and so cover a large diversity of types of areas, as well as very extensive amounts of land geographically.

The National Park Service consists of a National Headquarters, Regional offices, several Field Offices as well as a Planning and Service centre. Activities of the Service are greatly diversified covering such categories as legislation, administration, operations and professional service. Figure 1. shows where the National Park System fits into the overall organization of conservation bodies in the United States.

FIGURE 1 STRUCTURING OF ORGANIZATIONS CONCERNED WITH THE NATURAL ENVIRONMENT IN THE UNITED STATES



National Park Policies

Broadly, those established in 1918 state that National Parks must be:

1. "Maintained in as unimpaired form as possible for the use of future generations as well as those of our own time".

2. "They are set apart for the use, observation, health and pleasure of the people".

3. "National interests must dictate all decisions affecting public or private enterprise in the parks".

These policy statements were later, (1932) further detailed and expanded, and so the Services responsibilities were expanded. Primary emphasis on preservation of natural conditions became less relevant in some areas because of their nature and purpose, and so other important values were emphasised, eg. recreational. Public interest in the use of these areas was reflected in the provision of facilities and developments which caused much environmental modification. New and developing technological innovations had also to be reflected in changes in management of areas. This also applied to changes in social and economic conditions.

Current National Park Service policies are similar to those defined in 1918 and 1932, and they emphasise the necessity of continuing to maintain large sections of wilderness in natural areas. The policy also notes that planned, orderly and harmonious development will be based on minimum needs, and at the same time great emphasis is placed on public understanding of the different interests in the parks. This is believed to be a basic principle in the enjoyment of the National Park System.

The United States were characterised by another

important conservation movement - that is forest conservation and the establishment of the United States Forest Service in the Department of Agriculture, 1905. This important happening was the result of action by strong dominant leaders who, as early as 1867, initiated programmes and long range policy directions. Their concern arose from the increased pressure that was being exerted on the national forests for commercial use.

(ii) National Forests

The Forest Service administers most of the National Forests, and some National Grasslands on a multi-purpose management basis. It is especially concerned with the commercial production of timber, and recreational management. Because of the fragmentary ownership pattern of the forest lands, (stemming from early homestead and mining laws), the Forest Service does not control all lands within National Forests, and so it attempts to consolidate its control through a land exchange and purchase programme. The Forest Service is organized in a regional, decentralized form, though there is a National Headquarters concerned with aspects on a National level. (figure 1).

Forest Service Policy

A policy of multiple use and sustained yield for maximum long-term public benefit is fundamental to the Forest Service in protection, management and development of National Forest resources. Emphasis is placed on productive use for the permanent good of all the people, not temporary benefits for individuals or firms. It was decided also that where conflicting interests were to be reconciled, the decision would be decided from the standpoint of the greatest good for the greatest number in the long run. This refers in particular to recreational use

[illegible], the Forest Service established a set of recreational policies for the use of their forests. These policies emphasise integration of recreation with other forestry uses, and stress the maintenance and perpetuation of the quality of the environment. Provision of facilities in forest areas will only be permitted where they are of a type appropriate to the forest. Provision of such facilities, of developments and Federal funds for these, it is emphasised, are geared towards opportunities for relatively large numbers of users and not for individuals.

Many of the problems from early days of conservation still exist today. Difficulties in co-ordination and administration of National Parks and National Forests, and the control of activities within parks and forests prevail. (eg. hunting - as people fail to understand Forest and Park policies) Existing conflicts persist from early times, as a result of these two separate bodies - the Forest Service and the National Park Service. Definitions of their resources and functions, as well as their approach to management are results in this conflict.

The Forest Service and the National Park Service form the two main Federal bodies concerned with nature conservation. Of some importance as well, is the Bureau of Sport Fisheries and Wildlife, within the Fish and Wildlife Service, and the Bureau of Land Management within the Department of the Interior.

The activities of the former are related to the recreational use of wild lands, on a multiple use basis, consistant with suitability of the capacity of the various land uses.

The Bureau of Land Management is responsible for the administration of public lands under its

jurisdiction. These lands contain natural resources of such character and quality, that retention in Federal ownership is in the public interests. Such resources include forests, minerals, water, fish and wildlife.

v) State Parks play a part midway between the more remote Federal lands and the readily accessible Municipal areas. These areas are found often in more natural settings than local areas, but not as primitive and unmodified as most of the remote Federal lands. These areas include parks, forest, fish and wildlife areas. They experience greater pressure than Federal lands, and so require more planning and management to protect interests, appearance and environmental quality. State parks and National Parks are both represented in the ORRRC classification system, the greatest percentage of them, (87%) are included in Group III, the Natural Environment Area Group. State Parks are administered on a State level within the bounds of well defined policies, similar to those of the National Park Service. Development of the parks is carried out under policy plans ensuring preservation of inherent interests, and preventing any incompatible uses. Accessibility to different types of State Parks is given adequate consideration, especially in the case of the densely used areas.

(v) Conservation in America also includes the National Wilderness Preservation System that began in the 1920's with the setting aside of the Gild Primitive area. The concept of Wilderness and primitive areas originated with this event. Though many of these areas are found within National Parks and Forests, a need was seen to manage them separately, and establish separate policies. Policies included the local exclusion of all forms of motorized

equipment, of roads and all str res, and to preserve the area in as unspoiled a condition as possible. This system became law with the passage of the Wilderness Act (1964). Any modification to these areas can only occur with the consent of Congress. The greatest threat to these areas results from demand, since large numbers of people visit them making retention of their desired condition very difficult.

(vi) Approximately 60% of American land is privately owned, and large portions are more readily accessible to the population centres than some National Parks and Forests. Much of this land is of high environmental quality and interest, and needs careful protection and management. Fortunately many landowners are interested in developing their lands for recreational use or as philanthropic programmes of protection and management, and other uses related to the public interest. Landowners desire to earn a profit, and are therefore encouraged to make use of their land by emphasising environmental values. Co-ordination between public and private lands in planning is essential to avoid misunderstanding because of the large part played by the private sector in the United States. Development by private landowners may occur where the owners hope to make great profits, and the public may want to avoid this.

This is the basic makeup of the United States Conservation framework, though there is much detail written into acts of Congress and departmental regulations that strengthen the whole system. An example is the National Environmental Policy Act, 1969, which is a general National policy concerning productive and enjoyable harmony between man and his environment, protection of environmental damage and better understanding of natural resource ecology. This act established the Council on Environmental Quality, who study and report on environmental

matters.

Overall the system appears a complex and frequently confusing assemblage of agencies and organizations, each with their own special interest, rules and often their own bureaucracy. This may account for some of the problems that exist in terms of co-ordination and administration of different areas, and concensus in values, though the ORRRC classification does act as a basis for some clarification and is used by most of the organizations concerned with planning and managing Natural areas.

3.2 BRITAIN

(a) Industrialization and Urbanization

In the 19th century the United Kingdom was the first country to experience mass industrialization and urbanization, and to experience the problems of so many people in such concentrated areas. The city offered opportunities, but it also created an unhealthy environment of smoke-laden skies, unemployment, crime and alcoholism. Meanwhile, the rural countryside remained a superior environment. The new and developing forms of transport, such as trains and streetcars, began to allow the cities to spread out into suburbs. Between the wars Britain urbanized rapidly and because land was not subject to comprehensive development powers, much of this development occurred on farm lands.

(b) Conservation Movements

In 1920 farmers and conservationists, concerned about the threats to areas of rare and scenic value, created the Council for the Preservation of Rural England (1926). By the 1930's conservation became an active policy gaining more and more support.

However, after the war Britain experienced more

problems. Population increased and spread more into the rural areas; densities of cities increased and pressures on the rural countryside grew. Societies published reports making recommendations for preservation of sensitive and attractive areas. One such group was the Scott Committee (1942) who re ommended to the Central Planning Authority the setting aside of regional parks and other open spaces to include farming, and the setting aside of nature reserves in National Parks with prohibited access. Environmental concern had been strengthened by Ebenezer Howards Garden City concept, and Abercombies Greenbelt in the Greater London Plan (1944). The New Town Concept too, developed along environmental lines, providing housing and a better environment after the war's destruction. It was also part of a regional plan.

(c) The British Nature Conservation System

(i) National Parks

In 1949 the National Parks and Access to the Countryside Act established the National Parks Commission. Its duties included the preservation and enhancement of natural beauty, and the provision of opportunities for open air recreation and the study of nature through the establishment of National Parks. National Parks include some coastal areas, some inland lakes and shores, but are predominantly upland areas. The nature of the "National Parks" is different to that of America. In the first place little of the land is public domain, and secondly the parks support a population of some 260 000 in normal pursuit of rural life, unlike the unpopulated American National Parks. The parks are scarcely "National" in concept, their planning control remaining in the hands of local authorities.

(ii) Nature Reserves

The Scott Committee also recommended areas for which "prohibition of access shall be a first consideration". 1949 saw the foundation of the Nature Conservancy, whose function it was to "establish, maintain and manage nature reserves in Great Britain, including the maintenance of physical features of scientific interest".

In areas acquired by the Nature Conservancy for the protection of landforms, habitats, etc., the emphasis is on conservation with recreation as incidental, though the two do co-exist in many areas. Many reserves acquired by the Nature Conservancy were created to protect areas in danger of physical deterioration from over intensive use (such as some reserves created on the coast). Access is restricted in many of these areas to existing rights of way, or marked trails. Not all reserve land is owned by the Nature Conservancy, but agreements exist with landowners for the Nature Conservancy, to manage areas it does not actually own. Nature reserves have strong protection in the planning system.

(iii) Areas of Outstanding Natural Beauty

These areas are selected and designated by the National Parks Commission. They are smaller than the National Parks and include less open land and more agricultural land. They are also closer to major centres of population and are subject to much pressure. Local Authorities are responsible for protecting and improving them.

(iv) Areas of Great Landscape, Historic or Scientific Value

Selection and designation is the perogative of the local planning authority. In all, these areas had little value as a conservation measure.

(v) Places of Historic Interest and Natural Beauty

The National Trust was founded in 1895 because at the time there was no mechanism for positive preservation. It was established as a corporate body capable of holding land and representing National institutional interests. It became registered as the National Trust for Places of Historic Interest and Natural Beauty. The objective of the Trust is one of conservation, not a tourist industry, and it bought up land of environmental value that was under some sort of development pressure, in order to preserve it from further damage. Typical areas are lakeshores and coastal areas. The National Trust owns and controls land on a dispersed basis throughout the country, and is the largest single land owner after the Crown and State.

(vi) The Coast

The coast is in many ways Britain's most important resource, because it is easily accessible to the whole country, and satisfies part of a large demand for recreation and other uses.

The coast has been subject to increasing pressures of rapid development and urbanization, of port facilities, and power stations, as well as from recreational facilities. It is at present in a critical situation which is becoming worse. The National Trust was one of the first bodies to take any action, and acquired property subject to pressure and at the same time attempted to focus public attention on the problem of the coast.

Extensive studies were done by the National Parks Commission to clarify problems and identify principles to guide planning. They also included proposals for the creation of parks and protection of areas of fine scenery. Numerous

areas were suggested for inclusion in the protection category. About 3/5 of the coast is covered by a declaration of intent. As yet no National policy has been formulated for the coast, but some measure of protection exists through policies written into development plans, and where the intention is "substantially to prohibit development".

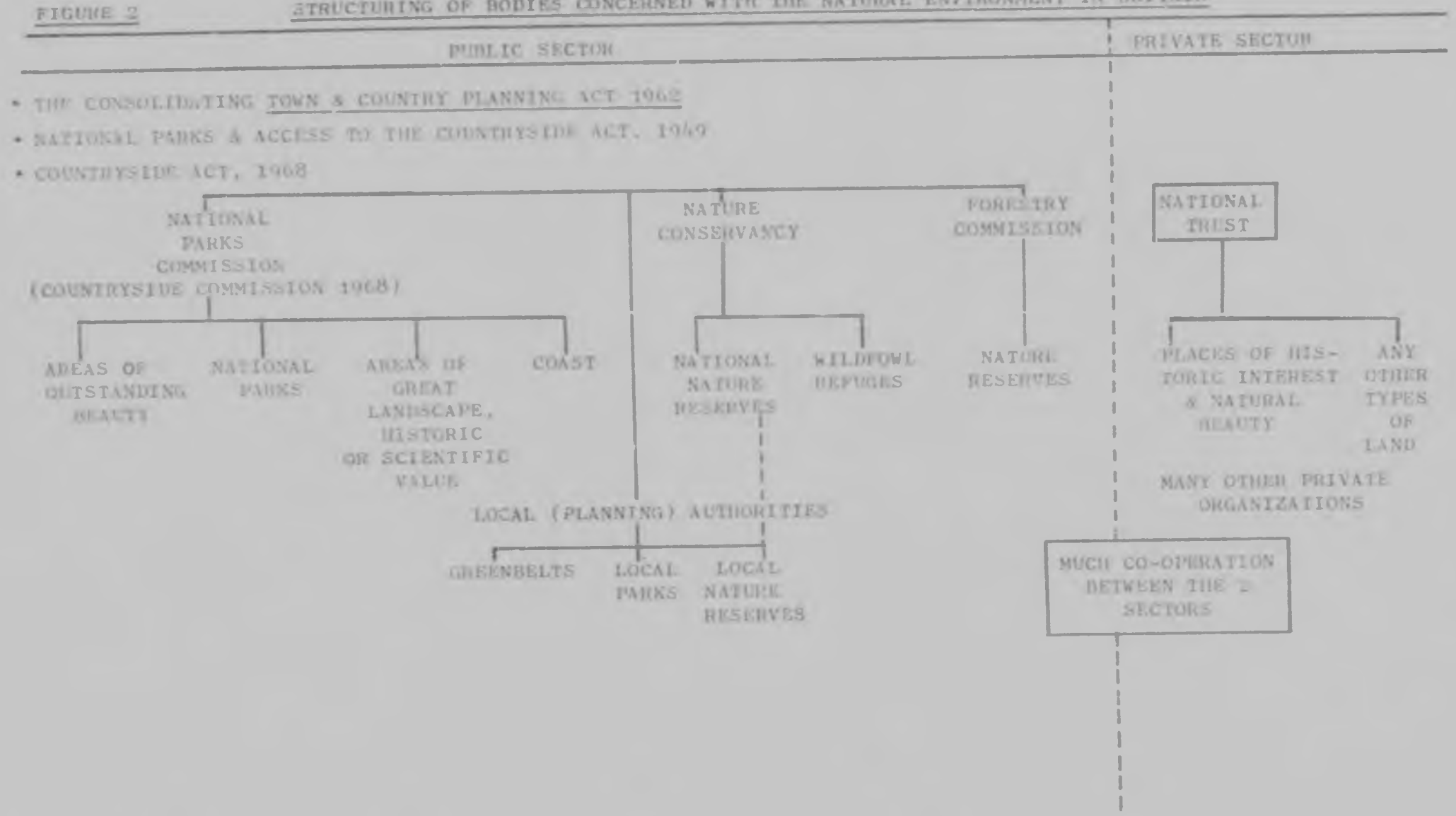
(vii) Conservation in Britain over the last 20 years has been pursued through development control in the planning process. This approach is inevitably negative and though it can prevent despoilation, has limited powers to stimulate more positive action.

In recognition of this failure, in 1968 the National Parks Commission became the Countryside Commission through the Countryside Act, giving it a much wider area of responsibility. The Countryside Act made clear that conservation and preservation of the natural beauty and amenity of the countryside had become a national concern. The Act emphasised positive measures and dealt with measures relating to provision and improvement of facilities, the conservation and preservation of the countryside, and it secured public access to the countryside. The Act also conferred new powers on local authorities. This Act showed evidence of the changing climate of opinions towards the natural landscape. (Figure 2 briefly outlines the more relevant sections of the organization of nature conservation bodies in Britain).

3.3 [illegible]

Arising out of the brief discussion of the American and British Conservation systems as they presently exist, certain factors are identified as common to both Britain and America. It would appear that these factors have

FIGURE 2 STRUCTURING OF BODIES CONCERNED WITH THE NATURAL ENVIRONMENT IN BRITAIN



influenced the particular approach adopted by each country. Problems of the individual country, too, have influenced their approaches.

1 a) The manner in which each country developed and advanced. Early attitudes to progress and urbanization had little place for environmental values and the natural environment suffered neglect.

Britain experienced heavy industrialization and urbanization, and is recently concerned over the urban fringe and loss of agricultural land.

America suffered under gross exploitation of the wealth of natural resources as well as urbanization.

b) Responses in both countries to prevent further damage at that time was by perceptive individuals who brought an awareness of the need for conservation to the broader public. Early movements were thus related to the state of environmental destruction at the time, in each country.

2 a) Functions of social, economic and political systems prevailing in each country affect nature conservation.

Britain being a Socialist country developed a system of conservation almost entirely State controlled.

America being a mixed Capitalistic - Socialistic country is rather more private enterprise orientated.

b) The response by Britain was to establish a centralized co-ordinated and controlled framework, operated through a central planning authority. American conservation is a concern of the private landowners as well as Federal and State agencies, and many problems manifest themselves in co-ordination between these different bodies.

3 a) Physical characteristics of the country itself influence the approach to policy formulation.

1. size of the country
2. nature of the natural environment.

b) Britain's conserved areas are relatively small and few of them are totally natural, as most conservation areas consist of good agricultural land important for cultivation and nearly all these areas have a fairly high population within them.

America's conserved areas consist of huge tracts of unpopulated land where there exist expanses of natural forests, mountains, lakes, rivers, seashores, etc.

4 a) Pressures and forces on natural and sensitive areas influence the approach to conservation.

1. social eg. population number and density, affluence
2. commercial
3. economic, etc.

b) Britain experiences a large population with very high densities demanding area for leisure etc., creating a very acute situation for natural areas, and making conservation a critical issue.

America, though it too has experienced population increases and the spread of affluence, the same pressure has not been felt on natural areas, because of the size of the country relative to its population.

Both countries have felt the increase and a far wider spread of demand for natural areas for recreation and other uses, especially economic in the form of natural resources. This has increased since the spread of affluence and since tastes have become more varied and sophisticated. America especially, being a more affluent country has been exposed to greater mobility, and though the problem

of pressures is not as intense as in Britain, the area of concern is far more widespread.

5. Attempts in both countries have been made to plan for conservation through the use of a classification system. The ORRRC approach, though formulated in America, has broader application than simply for that country, and has been applied in Britain, but has two major limitations:

i) the system was designed for a country where pressure on land resources was less acute, and where extensive tracts can be developed for recreation or conservation alone. This is not possible in Britain because of population numbers and density, and the size of the country.

ii) the system excludes all land "not suitable or available for recreation". In Britain much land that contributes to visual pleasure and amenity is rurally farmed or forested land.

6 The attitudes of the population towards the natural environment as well as their behaviour in it, largely determines conservation measures. It is extremely difficult to assess the difference in attitude between different culture groups in one country, but it can be assumed they differ because of the varying backgrounds and ways of life each culture group is exposed to (eg. Negroes, Indians and Whites in America).

CHAPTER 4. IMPLICATIONS FOR CONSERVATION PLANNING IN SOUTH AFRICA

CHAPTER 4 IMPLICATIONS FOR CONSERVATION IN SOUTH AFRICA

Those factors identified at the end of the last chapter, imply basic principles upon which a nature conservation framework might depend. These factors have been derived from comparisons and similarities of the British and American approaches and which might be useful in developing a nature conservation framework in another country, such as South Africa. These factors can be interpreted as a number of criteria upon which a framework can be based. These criteria are as follows:

4.1 A framework is based on a classification of the characteristics of natural and wilderness areas of the particular country concerned. The country should develop its own classification categories derived from an identification of different ecosystems around the country that need to be protected.

4.2 General characteristics of the country itself, such as its area and size, relative to population size, greatly affect the approach to nature conservation. Small countries such as Britain and the Netherlands have a more acute problem in dealing with unusually high population densities, and consequent pressure on sensitive areas, than do large countries with plenty of space, such as America and Canada, and their response is modified accordingly.

4.3 The approach to conserving natural areas and the motivation to do so, depends on the history of the country, the way it has developed and the extent to which resources have been exploited.

4.4 Another factor that influences the approach to nature conservation is the nature of the pressure borne on these areas. The different pressures as experienced in Britain and America are:-

(a) population pressure in terms of numbers and density that demand the use and need for these areas.

(b) the affluence of the population determines the demand for these areas. Affluence determines a population's leisure time, and so the frequency of use of natural areas, the intensity of its use, and the manner in which it is used. Also the demand for natural resources used in commerce and industry is determined by the standard of living and the general affluence of the country.

(c) mobility depends on affluence. The mobility of a population also affects the pressure on sensitive areas, more especially those far removed from high population intensities. These areas become more accessible as mobility increases, and so become more susceptible to human influence.

4.5 The attitude of the population towards the natural environment, and so their behaviour in it, determines the approach to nature conservation. Different culture groups within a nation may have different environmental values, and this could influence the shape of the national nature conservation policy. It might also influence different ways that the environment is used or preserved.

4.6 The social, economic and political systems that prevail in a country will also determine the system of nature conservation adopted for that country. Whether the country is socialist or mixed - capitalistic, this influences the involvement of the State and/or, the private sector.

4.7 The extent to which nature conservation is carried out in a country is influenced by the priorities of the government. Third world countries are more concerned with food production than Western industrialized countries,

who are generally more scientifically orientated. Progress seems to have developed environmental values because of the increasing awareness of the effects of modern technology on the natural environment.

These criteria will be used to analyse the existing state of nature conservation in South Africa. Whether or not these criteria can be totally applied to South Africa, or only partially, will be seen. Many of them may have to be modified to apply to particular situations in a different country.

CHAPTER 5: THE SOUTH AFRICAN NATURAL ENVIRONMENT

CHAPTER 5 SOUTH AFRICAN NATURAL ENVIRONMENT

5.1 Criteria

From the criteria and implications arising from the American and British examples, the approach to understanding the South African situation is clear. The overseas countries, though older, more industrialized and more advanced that South Africa, are still able to indicate some general principles by which a nature conservation framework should be goverred. South Africa, being in the intermediate stages of industrialization and urbanization, has no systematic framework within which conservation is guided and so first steps can be followed from the more advanced countries. In order to establish some sort of strategy for nature conservation in the country, an understanding of environmental, human factors and influences is necessary, based on the pre-identified criteria.

These factors briefly include:

1) An identification of natural environmental regions that are characterized by particular biological and physiographic features. It is necessary to know the status of conservation of these areas as well as their deficiencies.

2) An analysis of human influences and activities that have some bearing on the landscape, and these may include such items as:-

   (i) the development of urbanization in South Africa,

   (ii) The population distribution and density,

   (iii) economic activities,

   (iv) socio-economic factors.

3) An examination of the development of nature conservation in the country as well as a look at the existing public and private systems of conservation, and

4) an examination of the existing state of South African Environmental Legislation.

A conclusion will be reached that should identify the dominant pressures on, and the deficiencies in nature conservation in South Africa, and so indicate areas that require attention to rectify these problems.

5.2 The Natural Environment

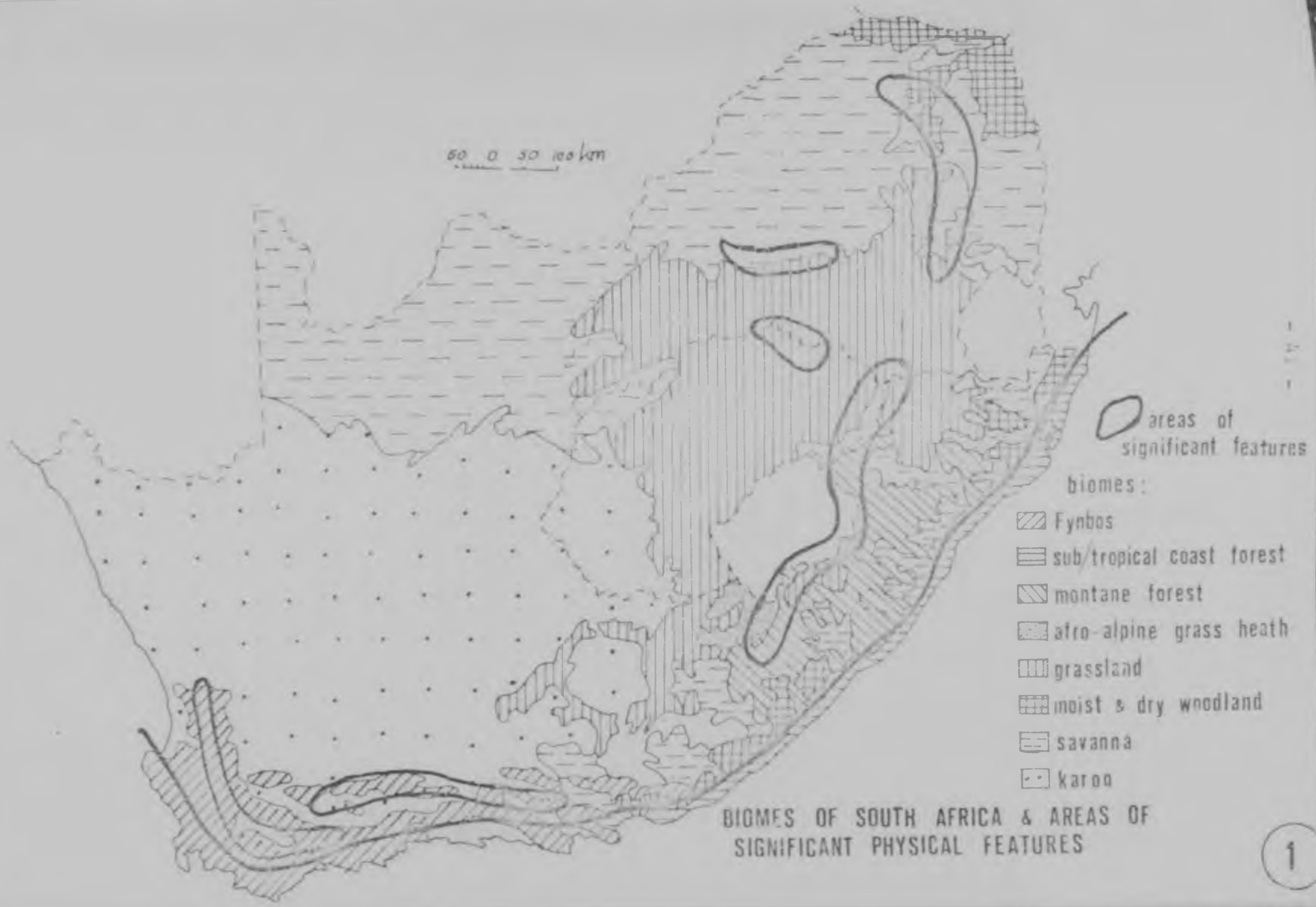
Broadly, South Africa can be divided into a number of biomes (see Map 1) defined as : major biotic communities composed of all plant, animal and all other communities concerned, including the processes carried out in these areas. The communities possess certain similarities in physiognomy and environmental conditions. In all a biome is the largest land community that it is convenient to recognize as a unit.

Each biome can generally be characterized by a few broad features that make it particular and unique from any other biome (see Table 5). Each biome is made up of innumerable communities of vegetation and plant communities scattered about the biome, many in unidentified locations.

South Africa too, is made up of some outstanding physical features and unique landscapes, outlined in any book on South Africa (King, 1942, Wellington, 1955). Each of these can be located within the biomes covering the country and Map 1. indicates areas within which some of the most important and valuable of these features are located.

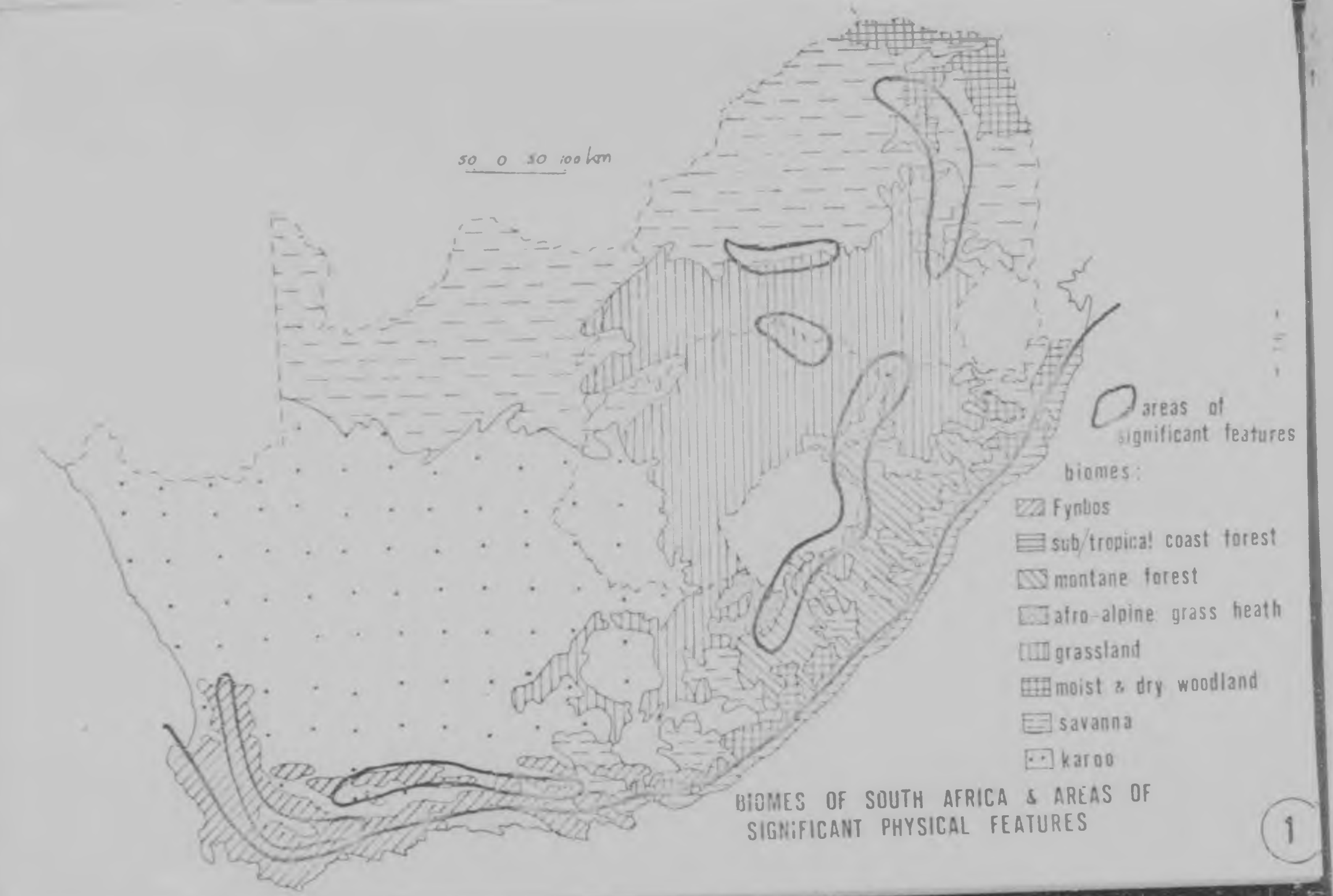
5.3 Status of Conservation

Surveys and studies in South Africa have been carried out for the International Biological Programme (IBP) to cover all features of the natural environment, in order to assess the conservation status of each (vegetation, fauna, aquatic biotopes, (KOEDOE, 1974)) Map 2. shows the distribution and percentage of veld types conserved throughout the country, indicating



BIOMES OF SOUTH AFRICA & AREAS OF SIGNIFICANT PHYSICAL FEATURES

1



BIOMES OF SOUTH AFRICA & AREAS OF SIGNIFICANT PHYSICAL FEATURES

1



DISTRIBUTION OF VELD TYPES
ACCORDING TO % CONSERVED

2

TABLE - BIOMES AND AREAS OF MOST OUTSTANDING BIOTICAL FEATURES OF SOUTH AFRICA, THEIR STATUS AS CONSERVATION AND THEIR DEGREE OF CRITICALITY

BIOME	CHARACTERISTICS OF BIOME	% OF BIOME IN SOUTH AFRICA	MOST OUTSTANDING BIOTICAL FEATURES (OTHER BIOME TYPES, WILDERNESS AREAS AND AUTOMOBILE AREAS)	% USED OF BIOME CONSERVED	SIGNIFICANT PROBLEMS/AREAS OF CRITICALITY
FYNBOS BIOME	One of the richest areas of flowering plants in the world. Totally unique vegetation with high variety of species in plant and animal communities. Very vulnerable vegetation on steep mountains and coast.	[illegible]	Coast and foothills. Inland mountains eg. Witteberg series. Long valleys eg. Gamtoos River valley.	1.1	Mountain fynbos fairly well protected, but certain amount of recreational and tourist pressure. Coastal fynbos in a critical situation from urban development, agriculture and grazing. 81% of entire coastal fynbos vegetation totally destroyed, with 20% of what is left in immediate danger. Biome threatened by high population and economic growth. Encroachment of overpowering development on coastal areas and mountain ranges - holiday resorts, suburbs etc.
TROPICAL & SUBTROPICAL COAST FOREST BIOME	Very extensive, expansion of dense lines with some unique communities e.g. mangroves of rare and endemic value. Vegetation harbours bird-rare plants and animals.	[illegible]	Long beaches. Sand dunes and rock units. Estuaries eg. St. Lucia Lagoons. Gorges eg. Oribi Gorge.	[illegible]	Subtropical forest almost totally lost to major alterations. Little that is left between reproclamations is conserved (Oribi Gorge) pressure from development and very high recreational demands. Original forest further north less severely, but is increasing. Coastal resources exposed by increasing building development and expanding communication and service networks. Any undisturbed land everywhere in a very critical situation.
MONTANE FOREST BIOME	Outstanding natural terrain of great value and extreme appeal. Contain relicts of enormous variety of trees and flora eg. Knysna.	0.9	Cycle of plants between the forest, mountains, Cliffs and rivers.	2.7	Local losses due to timber exploitation, urban development, agriculture and grazing. Though a certain amount is conserved, much is under pressure for infrastructure, building of dams and pipelines in natal. In the Transvaal this closes and the coastal natal. In the Transvaal this closes and the coastal enterprise is under deforestation pressure and pressure due to demand for tourist facilities and possibilities.
AFRO-ALPINE GRASS HEATH BIOME	Areas found on lower parts of mountains, interspersed with forest. Some found as higher areas, eg. Drakensberg. Have endemic value. Rare plants.	3.7	High peaks eg. Mont-aux-Sources, Cathedral Peak, Giants and Tabletop. Rolling mountains of Drakensberg.	[illegible]	Some pressure for recreational and tourist facility demands, but general is generally rationally controlled. Certain grazing areas of overgrazing, deforestation and encroachment of vegetation zones where Bushland areas overlap this biome. Physical disturbance is unsure, if successfully increased.
SCRUB & DRY WOODLAND BIOME	Marsh and grass areas with considerable tree cover. Extremely areas of good water supply and fertile soil. Includes lower plains and mountain foothills. Also a very vulnerable vegetation.	1.5	Spring bulb areas. Lower slopes and foothills of mountains. Part of the escarpment in Natal.	Total land: 5.7 [illegible]	Continually exploited by afforestation in the Eastern Transvaal, also from timber farming and tourist facilities. In the Eastern Cape under afforestation. In Natal in danger from dams and irrigation. Karoo Eastern Cape, a pressure from overgrazing and agriculture, also expanding urban areas. This biome is a critical waste and wilderness, but under pressure. Tourist trail concerned.

GRASSLAND BIOME	A necessary vegetation has always existed. Used to keep grazing down to manageable levels. A rare species like [illegible] now reduced to scattered trees & grass. Area originally occupied large [illegible]	[illegible]	Hilly rolling plains of [illegible] Some low rocky hills. Many [illegible]	[illegible]	Plains initially developed & explored first & there. Commercial, urban development, agriculture & communication networks, and existing vegetation, wildlife, etc., now protected in or adjoin from expansion and spread. Residual landscape is being altered by concrete structures, powerlines, mining activities and road building. Untouched landscapes presently encountered are exposed to future development, tourism and recreational values. A very vulnerable biome.
[illegible] BIOME	Major areas of land not cultivated areas. Grass almost non-existent in areas least vulnerable to degradation & habitats of large game originally.	[illegible]	Rolling plains of [illegible] The rocky hills, [illegible]	[illegible]	Certain areas well preserved, others such a [illegible] critical state [illegible] as a result of overgrazing, [illegible] & agriculture. Economic exploitation [illegible] Pressure for [illegible] some areas extensive modification of terrain and ecosystem, mining & the [illegible]
KAROO BIOME	Low, scrubby, semi-desert [illegible] vegetation. Adverse [illegible] of large flowers and [illegible] Rapidly spreading [illegible]	[illegible]	Huge rolling plateau. Few rocky [illegible]	[illegible]	Invaluable ecological [illegible] that very small percentage of the land. Much [illegible] large areas of the karoo. The [illegible] ion and [illegible] some of the karoo as a natural attraction in need of [illegible]
				*All conservation [illegible]	

the relative status of conservation. Many small reserves have not been included in this map and [illegible] of these smaller conserved areas. [illegible] lists the reserves. Besides these, rivately owned nature reserves, too have not been ncluded, which is not surprising as there is no ccurately known or published data on these reserves. able 5 gives approximate statistical data of this onservation statu in South frica. These figures subject to error, and no accurate information in fie'd is readily available.

The status of conservation of physical features and dscapes can be roughly assessed from map 4. But because of the lack of a platform system to identify these areas, no data exists on the status of conservation physical features in isolation. Few studies have been made on any particular features although Noble (Noble 1974) has written of the present protection of [illegible] biotopes in South Africa.

Generally, the overall status of conservation in South Africa can be evaluated from the "Register of [illegible] Conservation Areas in South Africa" (KOEDOE, 974) which gives the total area conserved, amounting about 3.4% of the whole country. Over half of this amount is found in two reserves (Kalahari Gemsbok National Park and Kruger National Park).

Most of the reserves in South Africa (84%) are less than 10 000 ha in size, which is really quite small (Edwards, 1974) (shown on Map 3). This is another problem in nature conservation, based on ecological and genetic reasons. Although there is a high percentage of them, which suggests attempts to satisfy [illegible] conservation requirements, small reserves are a weakness in the present conservation structure. They are highly susceptible to our expanding land use pressures and threaten the survival of ecosystems, and environmental changes that threaten the existence of the eco- [illegible] in the reserves.


50 0 50 100km
< 100 ha
100 - 1000 ha
1000 - 10 000 ha
10 000 - 100 000 ha
> 100 000 ha
NATIONIAL & PROVINCIAL
NATURE RESERVES
3

However, these small reserves, many of them private, do help to satisfy visitor demand and needs, and are suited to the simplest forms of control and management. Therefore the advantages of their existence cannot be denied.

5.4 Deficiencies in Conservation

Studies, surveys and data on the criticality of the natural environment in South Africa are sadly lacking. Edwards (EDWARDS, 1974) is one such reference that does discuss the poor coverage of our nature reserves. The coverage, apart from the large Kruger Park and Kalahari Gemsbok, consists of a clustering of reserves along the Natal, Southern and South Eastern Cape Province, and along the mountainous areas of South Western, Southern and South Eastern Cape Province, and the Natal and Eastern Transvaal Drakensberg (Map 2). Edwards and others (HEDBERG and authors therein, 1976) consider that because of this unequal spread of areas over the country, some vegetation types are not adequately represented by conservation areas.

Those botanists concerned about the conservation of veld types and plant communities, say it is necessary to conserve at least a representative of each vegetation type, and that at least one or a couple of reserves are established within areas of these species. For some vegetation types (especially the significant fynbos), there should be as much protection as possible, without withdrawing land unnecessarily from economic production. Edwards discusses, in his paper, the deficiencies in the conservation of veld types, of communities that have not a good status, that have elements missing, and those that have no status at all. He concludes that major deficiencies lie in the Karoo and Grassland types of vegetation. Many of the others lack sufficient conservation.

These areas have significance for conservation because they are in a critical state and hovering on the verge of destruction. In other areas, what little has not already been destroyed by man, is already covered by as much protection as possible. Table 5 briefly covers areas of deficit and criticality in each biome. Physical features and landscapes, on the other hand cannot merely be protected by conserving a representative of each type of feature, because of the uniqueness and diversity of each feature. They should be protected for their individual uniqueness, aesthetic, cultural and scientific value in each case. Once a physical feature has been destroyed, a representative of the same form is unlikely to be exactly reproduced elsewhere.

There is a lack of information on physical features already destroyed, as well as those in danger of being modified and destroyed, but from the analysis in Chapter 6, areas most likely to be affected and to experience impacts, can be identified.

Conservation and protection of wild bird and animal life is based on a similar theory to that of vegetation types. Adequate representatives of each species are stressed, with emphasis on those species which are either endangered or rare. Protection of communities is carried out through reservation of their habitats and hunting grounds, and so location of reserves in size and number is important, (as it is for conservation of vegetation types). Von Richter (Von Richter, 1974) discusses the adequacy of existing conservation areas in relation to wild animal species, whether rare, endangered or secure. He briefly outlines areas where those species are in an endangered state of protection, with reference to specific species.

However, few surveys have been carried out on this aspect, and little information exists presently, and so the true nature of the criticality of wildlife cannot be assessed.

CHAPTER 6: HUMAN INFLUENCES

CHAPTER 6 HUMAN INFLUENCES

A number of factors and influences from the human population are extremely significant in assessing the present impacts on the natural environment, and so to help identify the adequacies of the existing status of nature conservation.

Human impacts can be divided into their different activities in order to view the individual effect of each activity, and then finally examined in their totality for an assessment of the overall human impact.

6.1 The Urbanisation Process

The man-made environment has had some of the most critical and alarming impacts on the natural landscape. Because of the growth of technology and scientific methods, man has acquired greater and greater powers to modify the landscape. Through time the impact of his actions has increased, and become wider spread and more critical.

(i) Since the arrival of Europeans to settle in South Africa at Table Bay (1652), communities have spread and settled through the land. Development began within the encircling range of fold mountains in the Cape, but soon expanded beyond.

Policies of immigration (1685) and (1820) meant further expansion, beyond the Cape mountains and into the Eastern Cape (Port Elizabeth).

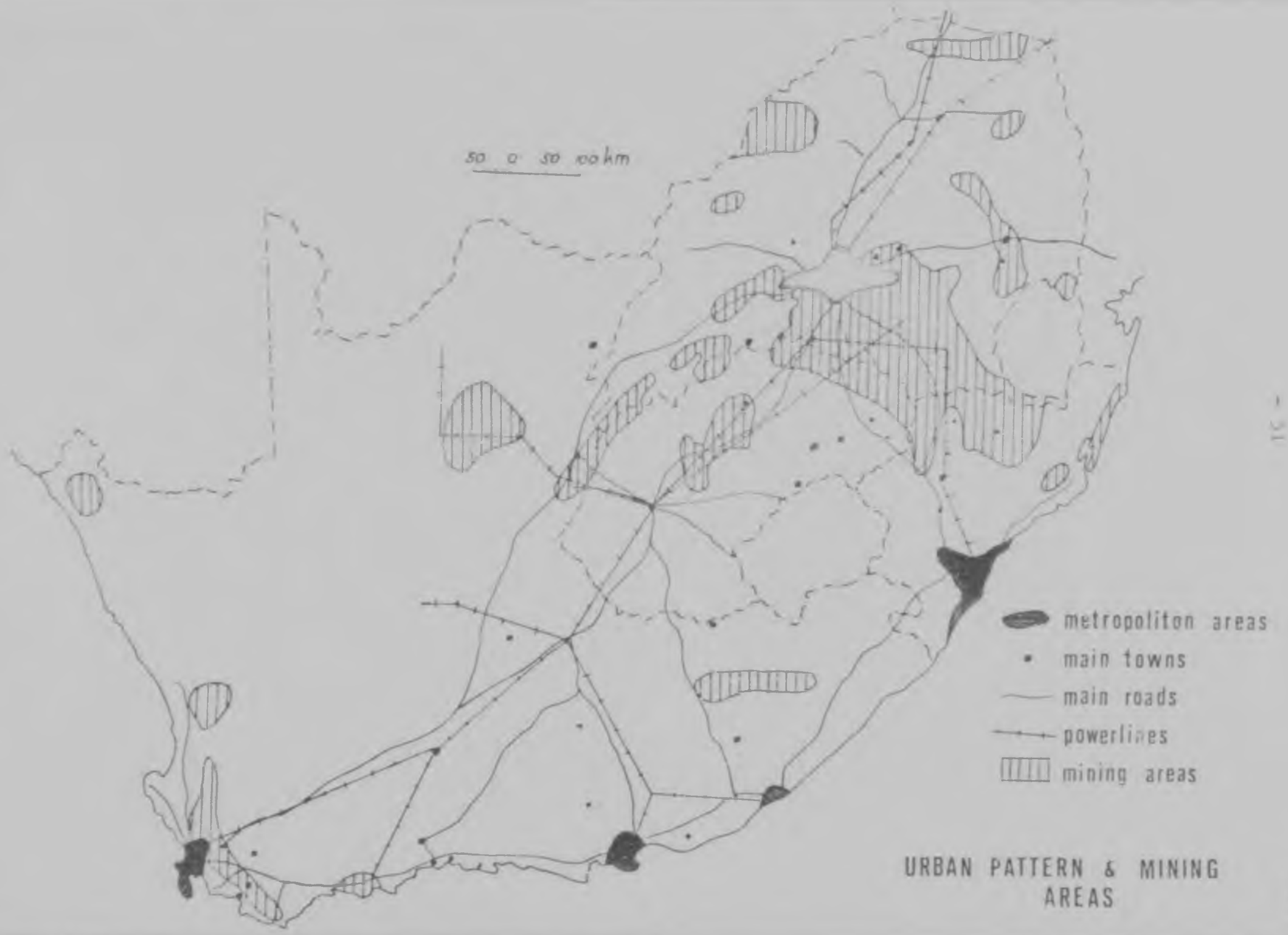
(ii) The settlements along the east coast developed rapidly because of their advantageous access by sea. Passing ships and the progress in trading encouraged this development. Nevertheless, there did occur expansion inland. The Great Trek of 1835 led to the first settlements across the Orange River, into Natal and the Transvaal. When Natal was annexed by Britain in 1843 more settlement occurred across the Drakensberg from the Cape and north of the Buffalo River.

(iii) The discovery of diamonds in 1869 laid the foundation for further urban and economic development in South Africa. This brought about the establishment of mining towns in the Western Orange Free State and North East Cape (Kimberley). The discovery of gold too resulted in a fantastic explosion of development and settlement, initially on the Witwatersrand, and then South into the Orange Free State. Earlier discoveries in the Eastern Transvaal (Barberton) initiated settlement there.

These three areas of settlement (i), (ii), (iii), the South West Cape, South East Coast and the inland mining towns, developed rapidly once secondary and tertiary activities (manufacturing, services, commerce) became established. Soon a general rural-urban movement began. Suburban housing sprawled out from the core towns and small villages developed in the rural areas. This pattern more or less reflects the urban pattern today (Map 4 shows this broadly). That is, a few very large urban centres, with increasing numbers of smaller towns.

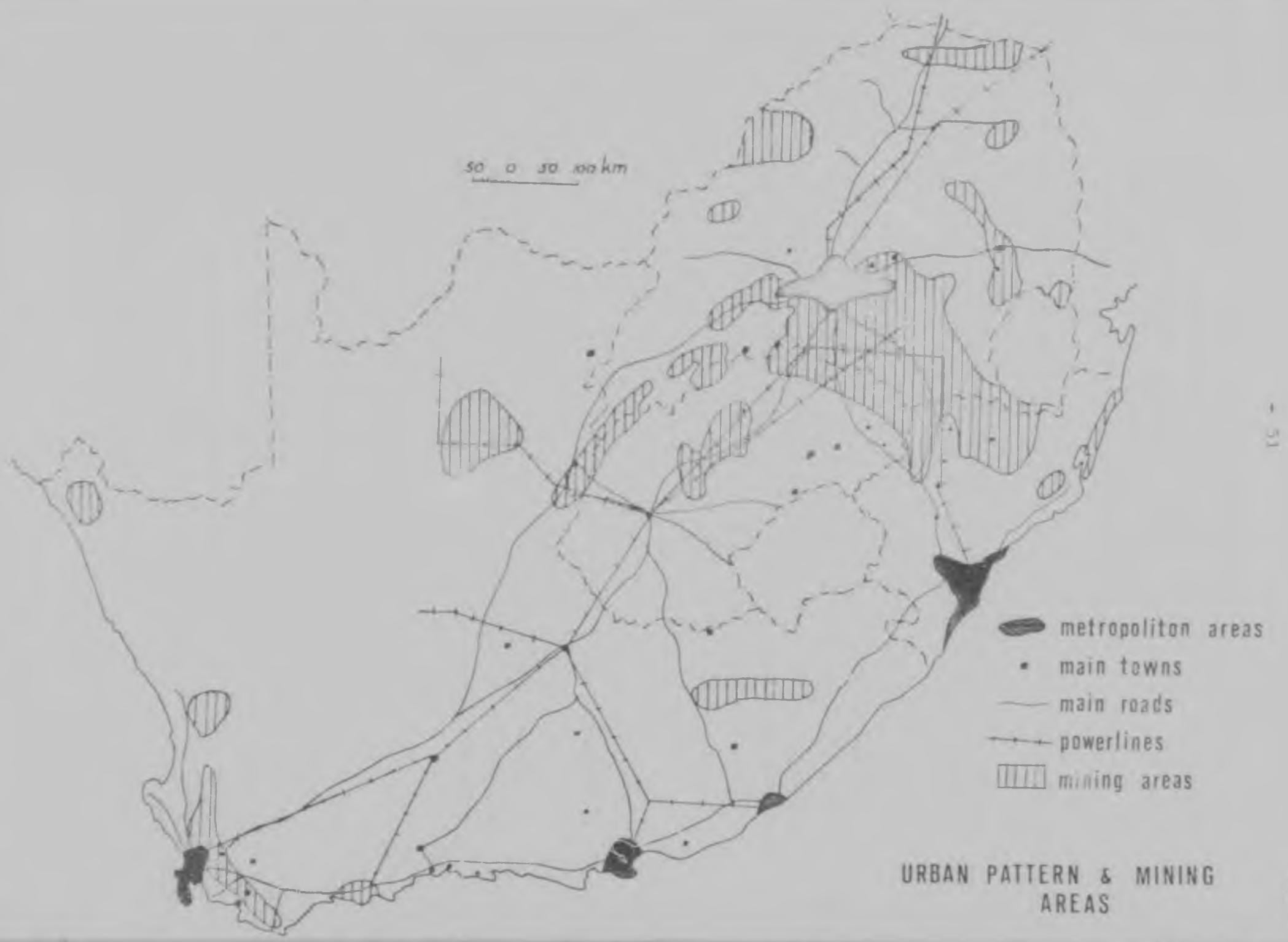
The communities that have developed along the coast have continued to expand and new settlements developed for another purpose - leisure. The coast is one of the country's most outstanding resources and attracts thousands from all over the country - especially from inland, to spend holidays and to live here.

Continual conflicts with the Bantu have arisen throughout history, especially in the period of colonization, but it was only with the discovery of minerals (187 - 1942) that the Bantu formed any sort or urban settlement. Blacks moved from truly rural areas to concentrations of capital and large labour demands. They formed squatter-like settlements, peripheral to the White settlements.



URBAN PATTERN & MINING AREAS

4



URBAN PATTERN & MINING AREAS

4

1923 - 1950 saw the beginnings of influx controls and the establishment of group areas and the locating of Blacks in restricted areas (native reserves) on the fringes of the developing metropolitan areas. Conditions were sub-standard and became increasingly worse.

From 1960 onwards saw the period of homeland development and large scale resettling of urban dwellers in the homelands. This continues today. Urbanization in the homelands is small and very slow, despite a deliberate stimulation policy.

Besides this present pattern of urbanization, the government policy of future development should not be forgotten. As laid out in the NPDP (National Physical Development Plan) proposals for growth poles and growth points have been made to be distributed about the country in an attempt to balance regional growth and lessen inequality. This deliberate government intervention has many implications for future patterns of urban development.

6.1.1 Implications of Urbanization on the Natural Environment

The spread of urbanization could mean a spread in the deterioration of the countryside. Areas of longest urban development experience the worst and most critical problems, while newer areas have less problems and of a less serious nature.

Large concentrations of people demand proximate areas for leisure and recreation and this may have serious consequences for sensitive and outstanding areas in the vicinity. The case of Cape Town demonstrates this, where the surrounding coasts and mountains and kloofs are extensively used by the metropolitan population and are being rapidly developed for recreation. On the Witwatersrand, the Vaaldam area and Magaliesberg Mountain Ranges are the popular recreation areas for the population of this metropolitan area. Existing nature reserves and National Parks, too, experience large

population influxes from nearby urban areas. Also developments for the benefit of visitors to these areas are destructive - facilities and services, access and parking.

Other necessary urban land uses, too have their consequences on the environment and there is nothing more destructive than communication systems. The case of the proposed National Freeway through the Knysna forests is a good example of some of the more sensitive areas these roads may go through and the type of destruction likely. The PWV road system too has its problems with the proposed routes across the Magaliesberg. Freeways and roads may appear hard and harsh against the undisturbed countryside. Obviously much destruction can be avoided when special design principles are adopted.

The mere existence of and the sprawl of urban land uses has irreversible impacts in disrupting nature and natural processes. Entire areas of wildlife and natural vegetation may completely disappear as has happened on the Witwatersrand, where large game used to roam and where bushveld and sour grassveld used to grow. Often new and alien vegetation may appear to take its place.

The drift of effluents and pollutants from urban landuses disturbs the natural environmental equilibrium and the impact may be far and widely spread, carried by air, water or human conveyance.

Urban services create another blot on the landscape in the form of powerlines and powerstations, that often cause unsightly visual impacts where they dominate the country and where powerlines march across the Highveld, over the mountains and along the coast. Water pipelines, too, criss-cross the country and even the beautiful, outstanding Drakensberg, causing ugly scars and soil erosion. Much of these effects are avoidable when remedial measures are taken.

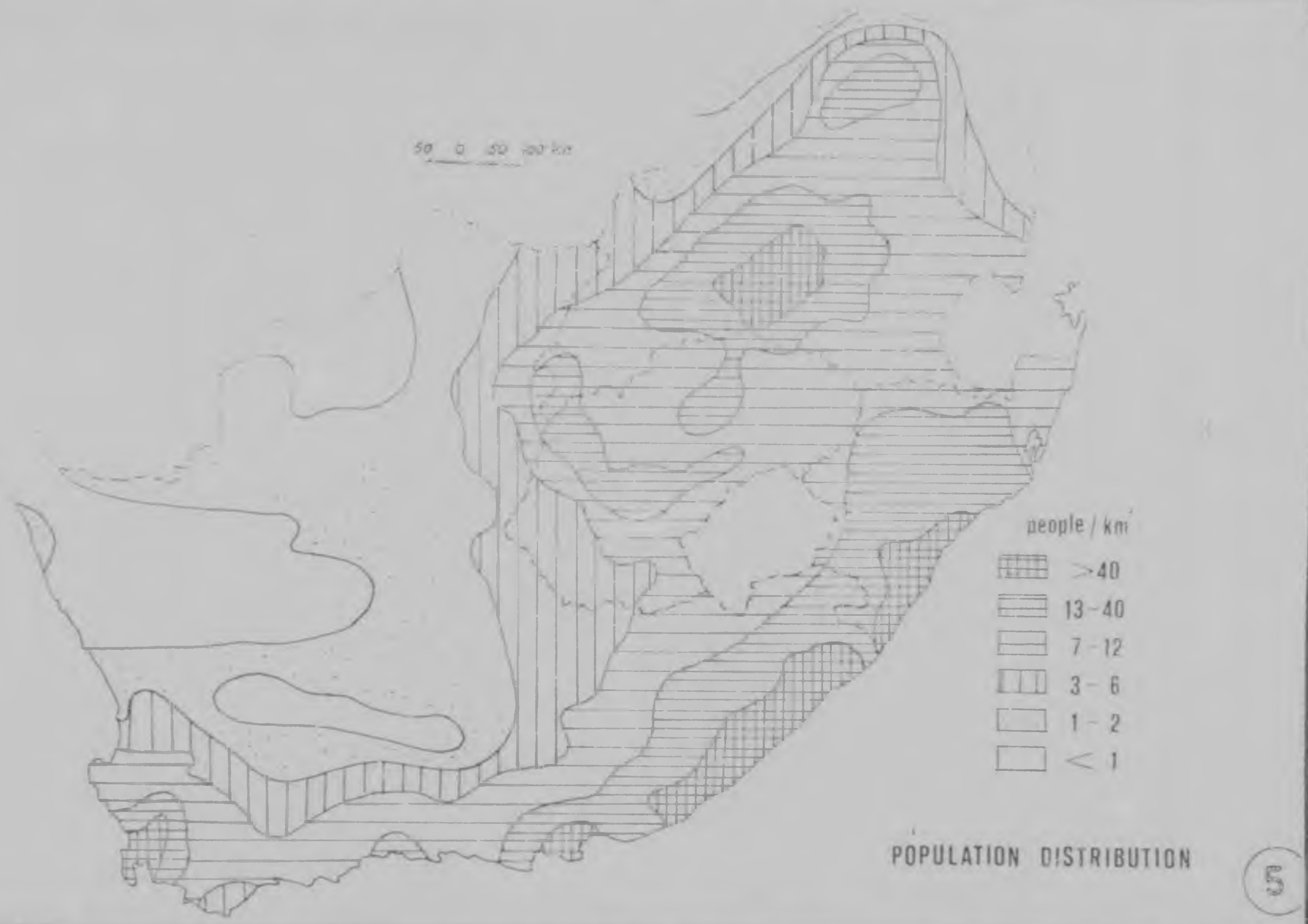
Thus, the problem of urban landuses and their impacts

on the natural landscape depends on their planned locations and the design principles used. Besides, there can be a reasonable balance established between human developments and conservation, so that some sort of equilibrium is maintained. Nevertheless, areas of greatest problems exist where urban concentrations are greatest, as shown on Map 4.

6.2 Population Distribution and Density

South African population is made up of a considerable number of ethnic groups. These are distributed geographically about the country in varying concentrations. South Africa has, in fact, an irrational distribution of population in relation to land quantity and quality. Pockets exist of overcrowding and degredation and unproductiveness (the African Homelands) while there are large virtually unpopulated areas at the opposite extreme (Karoo).

The largest concentrations of urban population are found within the four major metropolitan areas. This population is made up of all ethnic groups. More than a third of the population is found within these four areas, covering about ~ of the Republic's land. Map 5 shows the geographic distribution and density of the total population. These metropolitan areas contain the wealth of the country, have most of the employment opportunities and have the highest average incomes compared to the rest of the country. (FOCUS, 1975).



POPULATION DISTRIBUTION

5

TABLE 6 GEOGRAPHIC DISTRIBUTION OF VARIOUS NATIONAL GROUPS 1970
(National Physical Development Plan)

	WHITE	COLOUREDS	ASIANS	BANTU	TOTAL
METROPOLITAN AREAS	65.4	52	87.7	22.5	34.5
OTHER URBAN AREAS	23.8	25.9	10	10.6	14.4
TOTAL NON-RURAL	89.2	77.9	97.7	32.9	49.0
RURAL	10.7	22.1	2.2	20.5	18.2
TOTAL	100	100	100	*53.5	**67.2

*Means that 46.5% Bantu in Homelands.
**32.7% of total population in Homelands.

Table 6 shows the percentage of each ethnic group in their geographic distribution, excluding homelands, but indicates that less than half the Bantu were resident in the Homelands in 1970, but were in the metropolitan and urban areas. All these metropolitan areas are on the coast, except the largest, the Witwatersrand.

The homelands experience a very high rural population on a very small percentage of the Republic's land (13%). Government policy has brought about this phenomena. Large numbers live by subsistence farming with few, small urban settlements amongst them. Some of these overpopulated areas are along the coast and the others apparently randomly located around the Republic.

The population is concentrated mainly in the eastern part of the country where rainfall and other resources are wealthiest. This part of the country, too, experiences some of the country's most outstanding features and scenery and so there is considerable conflict here.

6.2.1 Implications of Population Distribution on the Rural Environment

Large concentrations of people in urban environments have an incredible impact on the natural environment in forms of pollution, waste, dumping, suburban housing, city sprawl, etc. Natural areas are exposed to exploi-

tation for their resources for modern day living.

Natural areas close to large population concentrations are sought for leisure and recreation. The South African coast is an outstanding example exploited by inland populations during holiday periods. The natural equilibrium of these areas is in danger of being disrupted by these migrations.

Large concentrations of people in urban areas demand high standards of living and nearby and surrounding areas are exploited for resources. Large quantities of land are consumed for this high population to live on, for housing, industries, for services and communications.

The large numbers in rural areas (homelands) especially, may have an equally crucial impact on the countryside. These areas are fairly limited in relation to the number of people living in them and therefore population density per hectare is fairly high for a non-urban situation. Exploitation of ecosystems is immense because the population is focussed directly on the resource base (the natural environment). This is being exploited because of the general lack of alternative resource bases available in these homelands.

The problem of population is that in large numbers, either rural or urban, it has an immense impact on the natural landscape because this population must be accommodated and must extract resources for purposes of living. What is more the population increases naturally and so there is an increased demand on the land.

6.3 Economic Activities

South African urbanization developed basically from the discovery of minerals and even today its economy rests on the continued abundance of these resources. South Africa is not a totally developed country, but is still developing, and higher rates of economic growth still need to be pursued. The increasing world demands for steel, iron and other minerals can be supplied from the wealth of South Africa's resources. Gold mining in

South Africa has been intensively carried out on the Witwatersrand and south into the Orange Free State. Coal mining, too, plays an important role amongst South Africa's minerals and large mining areas stretch across the Eastern Transvaal and south into Natal. Many other minerals are mined throughout the country, either opencast or underground. Many of these mines are some of the world's most important suppliers of these minerals. Map 4 shows these mining areas in the Republic.

Agriculture is one of the largest users of soil throughout the world and in South Africa approximately 84% of the total soil surface in the country is devoted to agricultural purposes (VERBEEK, 1973). South Africa has, in the past, provided its own population with sufficient requirements and has had a growing amount of surplus for export. However, the country's own requirements are increasing. Despite having 84% of the country for agricultural purposes, only 15% can be used for cultivation. The rest is used mainly for pastures.

Agricultural production in South Africa is carried out intensively, different products in different areas - sugar cane on Natal Coast, fruit in the South West Cape, and wheat and maize grains on the Highveld of the Transvaal and Orange Free State (Map 6). Increased demands are being made on South African agriculture for greater production and this could have and is having in some places serious consequences for the natural environment.

The farming of sheep and cattle is another important farming concern and is carried out over large regions of the country (Map 6). Sheep farming is intensively practised in the Karoo and cattle farming in the northern Cape and northern Transvaal as well as very intensively along parts of the coast.

Afforestation has increased in importance in South Africa because of the extremely poor endowment of natural forests in the country. Present indigenous forests



AGRICULTURAL ACTIVITIES

6

cover about 0,25% of South Africa's land (MALHERBE, 1973). The forest industry can boast today of an area of 0,85% of the country of man-made forests. However, because of the steadily increasing demands made upon forest resources, South Africa is nowhere near self-sufficient.

6.3.1 Implications of Economic Activities with Respect to the Natural Environment

Mining activities have a profound impact on the natural environment. Physical changes in the landscape occur and large and unsightly scars remain. New and artificial physical landscape features may result totally changing the original features - one need think of the dumps and slimes dams on the Witwatersrand and Orange Free State. Indigenous fauna and flora may be totally destroyed, as has happened on the Reef and outstanding physical features disfigured as has happened with quarrying in the Magaliesberg. Often large quantities of topsoil are removed and destroyed. With the initiation of mining activities, arose the establishment of mining villages and other secondary activities, which consequently increased the size of these towns, and so has spread and increased human influence in an area. The recent proposal to mine in Kruger Park has caused a tremendous outcry from the public who are concerned about the impacts it will be likely to have on one of the few totally undisturbed wild areas left in the country.

Agriculture, especially with intensification, creates an increasing pressure on the ecosystems and has marked effects on the natural environment eg. as in Britain. Additional land that is taken over for agriculture, because of optimum conditions offered for cultivating, reduces the natural vegetation and may modify physical features. Clearing of land as well as harvesting and so reduction of plant cover causes erosion and washing away or blowing away of topsoil. The practice of agriculture necessarily effects and changes the original

ecosystems and the intensity of cultivation determines the nature of the physical and biological environment. Pesticides and fertilizers used in agriculture, too, have widespread effects on nearby natural areas. Many of these effects on the environment are not inevitable, depending on agricultural management and its balance with natural ecosystems.

Animal farming may affect varieties and availability of natural vegetation. Diseases they carry may affect and kill wildlife they come into contact with. Over-use of grazing lands results in overgrazing and damaging the ecosystems.

Afforestation implies, as with agriculture, disruption of the natural environment as land is cleared for planting, and so the disappearance of original ecosystems. Further, there is intense use of the already diminishing water resources in South Africa. However, the advantages of afforestation outweigh the disadvantages.

Forests can be regarded as natural recreation areas and are usually scenically appealing. Man-made forests besides indigenous forests, offer sanctuary, for wildlife. The practice of forestry has, which is the most important fact, succeeded in the prevention of exploitation of indigenous forests.

Generally most economic activities in South Africa rely on resources in the natural environment and therefore, any form of economic development in any field, whether for mining, agriculture, afforestation or animal farming, is likely to involve some disturbance of natural ecosystems. Most economic activities are long-term in nature and this means an even longer period of effect on the landscape, if not irreversible, certainly such that the ecosystems may never return to their original state.

6.4 Socio-Economic Factors

Different culture groups as well as rural and urban communities may often be expected to have different

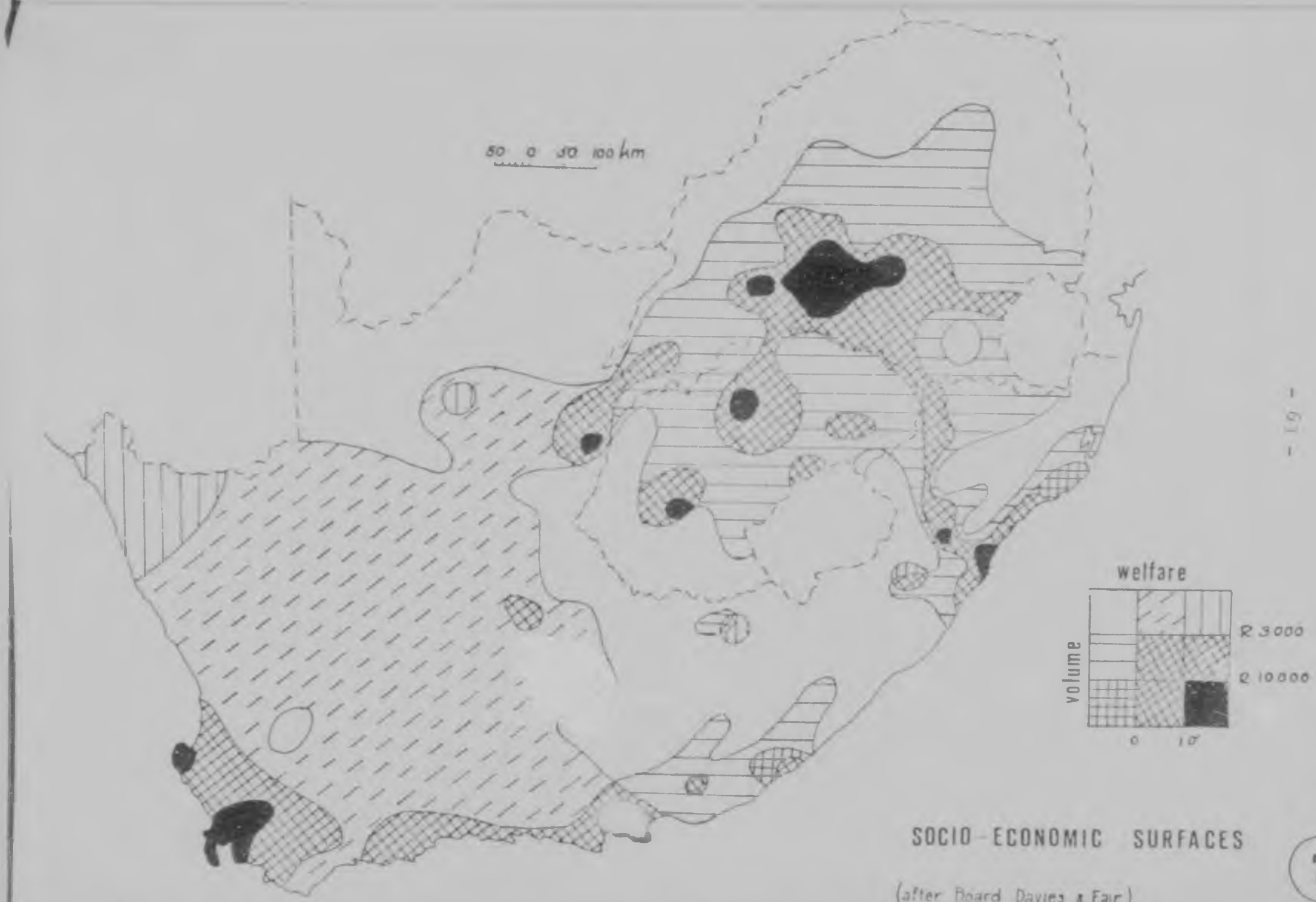
levels of welfare and attitudes towards the natural environment. Urban communities are generally characterized by an attitude to life of priorities of high economic value and a striving for higher material standards of living. Rural communities and farmers expect more basic needs in life and may live in greater harmony with nature. This may not necessarily be true - considering the Homelands.

Board et al (BOARD, DAVIES & FAIR, 1970) did a survey of the Structure of the South African Space Economy and showed a number of surfaces, one particularly of socio-economic levels of welfare in South Africa. The variables include gross domestic product, income, education and employment characteristics. Map 7, reproduced from the article, indicates levels of high welfare correlating with the major metropolitan and urban areas in the north and east and a few places on the plateau and on the coast. These contrast with homeland areas that display low economic activity and poor qualities of social welfare. Ethnic group attitudes to the natural environment are often reflected in their behaviour in it. Urban communities characterised by all groups rely on the man-made environment for their needs in life and the natural environment may often suffer as a consequence - through the exploitation and degradation of resources. African groups settled in the homelands live by subsistence farming and have caused overgrazing and burning of large tracts of land and erosion of the landscape.

Coloured and Asian groups, being nearly all urbanized share similar values to white urban communities and groups (in the Urban Areas).

6.4.1 Implications of socio-economic factors on the natural environment

The implications of large concentrations of relatively affluent and educated people are important for the impact their behaviour and attitudes may have in the environment. Affluent groups now experience greater amounts of leisure and recreation time than ever before.



SOCIO-ECONOMIC SURFACES

(after Board Davies & Fair)

7

This means more and more people have the opportunity and ability, with the increase in mobility, to visit open spaces and the open countryside. Mobility means large numbers are likely to have impacts on the remotest places, further and further from the urban areas. Affluence too means more sophisticated and a greater range of facilities and services demanded in holiday and recreation areas. This defeats the requirements people desire, of a chance to temporarily "return to nature" because of the increasing modifications of the natural environment, and yet their refusal to be without their luxuries.

Generally the greater the rise in the material standard of living, the greater must be the modification of nature, because of the increasing demands on the natural resources. South African population is experiencing these higher and higher standards and so demands and consequent impacts are also increasing.

The effects of areas of low socio-economic welfare (as in the Homelands) are equally disrupting. Inefficient and traditional farming methods and lack of education about resource utilization is reflected in the treatment of the natural environment. Though the standard of living is much lower in non-urban areas, lowest especially in the Homelands, it is the sheer weight of numbers on the land that, along with the way of life that exceeds the environment's ability to survive. Also their way of life focussed directly on the resource base means immediate harm to the land.

In all, socio-economic factors as they affect the treatment of the landscape, depend much on group values as well as education. A community's attitude to its standard of living is reflected in the consequences in nature. In order for the natural environment to survive, there is a need for an environmental consciousness, regardless of whether people are affluent or not, or of their standard of living.

CHAPTER 7: SYSTEM OF CONTROL

CHAPTER 7 SYSTEM OF CONTROL

The final section for analysis is that of the system of control over the natural environment. This covers the state provincial and private sectors involved, as well as the legislative framework.

7.1 Brief History

Since the time of the first settlement in South Africa, pioneers have destroyed plant and animal life as they moved inland. African tribes moving south at the same time also destroyed wildlife and flora. The Anglo-Boer war was a period that also caused great losses. Animal diseases of the cattle killed off wildlife. The establishment of settlements meant the clearing of forests and of natural vegetation for agriculture and building. Burning and overgrazing added to the destruction.

However those in authority were not oblivious to what was happening. Governors attempted some measures of control over hunting with permit systems, that dated back as early as 1669. It was not until 1894 that President Kruger realized that permit restrictions alone were inadequate, and so he established a game reserve - which formed the basis of the Kruger National Park. In Natal governors followed Kruger's example and the Umfolozi and Hluhluwe Game Reserves were established in 1897.

After the Anglo-Boer war the provinces were allocated the responsibility for nature conservation but were initially purely administrative in functions. During this time the National Parks Act of 1926 was promulgated, setting up the National Parks Board - the only body concerned with conservation on a nation-wide basis.

7.2 The State System

The 4 provinces have the primary responsibility for nature conservation, although they fit into a system

...ural that includes the whole nation. Figure 3 ... this structure.

...nt of Planning and the Environment

... responsible for a co-ordinated long-term National plan of physical development as manifested in the National Physical Development Plan (NPDP)

... also broadly co-ordinates aspects involved in environmental conservation through the Council ... the Environment (igure 3) but lays down no policy or strategy for nature conservation. The ...tional Committee for Nature Conservation (N.COR) ... presently inv... in drawing up a national conservation plan ... co-ordinated with the N.P.D.P., so that physical development and the natural environment may be perceived and treated together. This ... been initiated at the request of the Department of Planning and the Environment. Presently only surveys are being carried out and beyond this stage little work has been done.

... Department of Forestry

... is concerned with the management of all indigenous forests in the country and the acquisition of land for afforestation, for protection and management. The Forestry Department is the largest single owner of state land in South Africa and adequately protects most of its lands through the Mountain Catchment ... Act and Forest Act.

... Department is concerned with the multiple ... of State lands for the

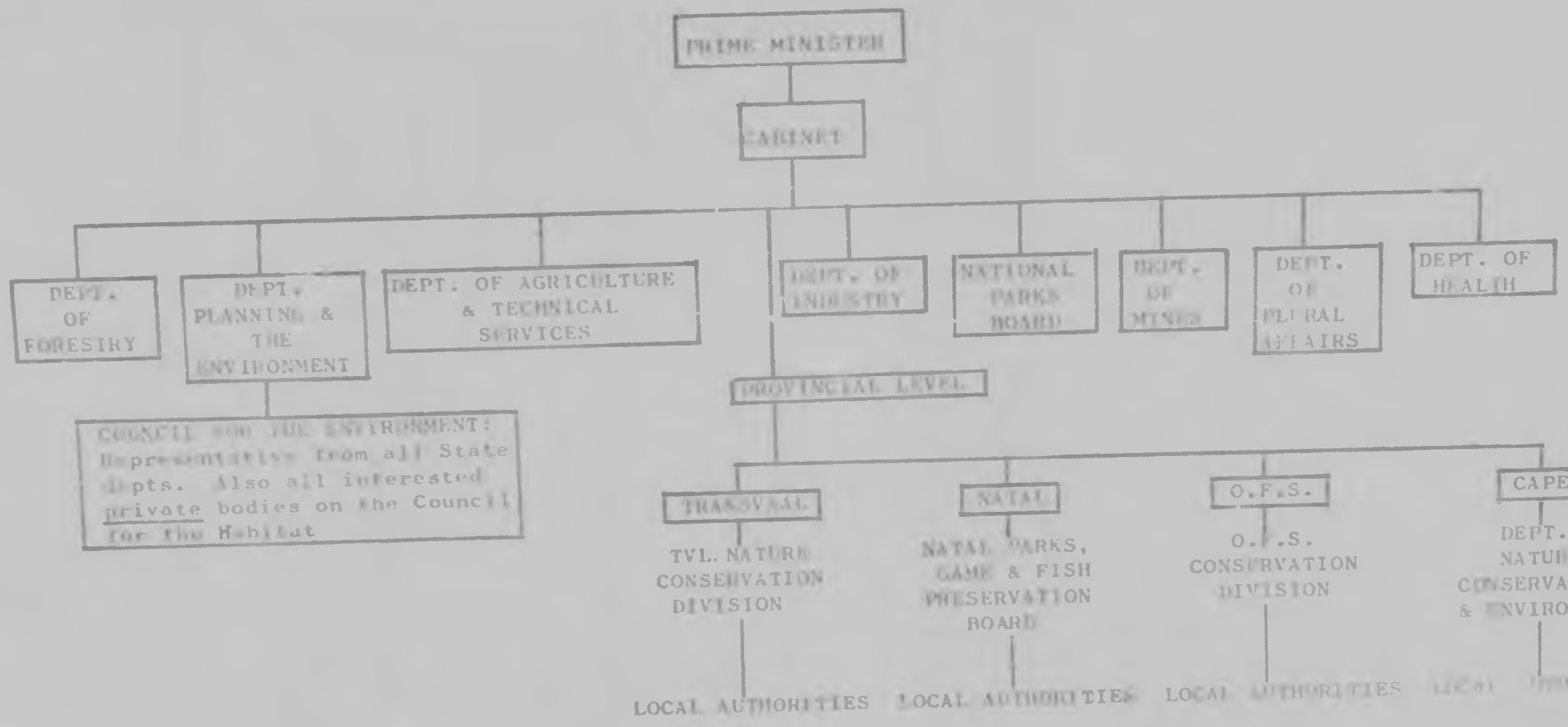
... establishment of wilderness areas, nature reserves and protection of forests.

... the promotion of outdoor recreation

... the protection of mountain catchment areas ... the conservation of soil, water, etc.

FIGURE 1

STRUCTURE OF THE CONTROL SYSTEM FOR NATURE CONSERVATION IN SOUTH AFRICA



(iv) the reclamation of driftsand areas, and

(v) for the production of wood and related activities.

7.2.3 Department of Agriculture Technical Services

(a) concerned with soil and water conservation

(b) the Botanical Research Institute is concerned with surveys and research.

(c) the Botanical Society established the Botanical Gardens Society for the protection of indigenous flowers and the control of alien vegetation.

7.2.4 Department of Industries

(a) it conserves and controls marine fishing resources

(b) controls industrial waste and effluent originating from fishing industries.

7.2.5 Department of Mines

(a) the control of dust and mine effluents

(b) the grassing of dumps for control of air pollution.

7.2.6 Department of Health

research and control of pollutants affecting health.

7.2.7 National Parks Board

manages national parks.

7.2.8 Department of Plural Relations

(a) promotes and establishes nature reserves in the homelands

(b) carries out a program of wildlife management.

7.3 Provincial System

The Transvaal Provincial Administration was the first province to establish a Division of Nature Conservation

in 1947, using a multi-disciplinary staff. Responsibilities of the division expanded from fauna and flora to include fishing concerns.

The Cape Conservation Division as a separate division, was not established until 1952 and until then fauna and flora was a provincial administration concern. With the change, responsibilities also expanded and became more varied and diversified. In 1974 the Department became the Department of Nature and Environmental Conservation.

The Orange Free State followed much the same path as the former two provinces but a Division of Nature Conservation was only established in 1965.

In Natal the Natal Parks, Game and Fish Preservation Board was established in 1947 with the responsibility of managing reserves and advising on coastal and fishing concerns. In 1968 the Board took over all responsibilities for Nature Conservation and the development of areas for recreation.

To date these 4 provinces still have the major responsibilities in nature conservation, although methods of operation and administration have changed over time. Each province fulfills a number of common functions, that, although they are similar, vary in their different applications:-

(a) legislation - provincial ordinances aim at the conservation of fauna and flora by means of wise management, rational utilization and establishment of reserves etc. This objective was proclaimed when mere "protection" was found insuffucient. Problems arise out of the inability of legislation to protect habitats on private land and to police adequately.

(b) propagation - to reintroduce plants and animals.

(c) research - biological, scientific, ecological etc. important for providing data for management.

(d) Wildlife Improvement - especially of food, water and habitats

(e) Problem Animal Control - authorities control these and assist farmers in controlling them on their properties. They attempt to avoid having to kill. Such problem animals include monkeys, rabbits, rodents, and other animals that disturb cattle etc.

(f) Alien Fauna and Flora - attempt to control it and carry out research in the same direction

(g) Establishment of Reserves - must be large enough for provision of habitats of many forms of wildlife, threatened by encroaching pressures.

(h) Education and Information - all departments are involved in educating the public through the media, lectures, exhibitions, addresses, etc.

7.4 Private Organizations

These voluntary bodies are established by the public who are concerned for the future of wildlife, for the protection of fauna and flora and for the wise utilization and development of the country's resources. Some of the more prominant organizations are :

(1) S. A. Nature Foundation
is affiliated to the World Wildlife Fund.

(a) assist in the protection and conservation of nature, co-operating with 46 other countries

(b) raise funds for use in conservation.

(2) Wildlife Society of Southern Africa

(a) they have assisted in the drafting of the National Parks Act as well as Game Ordinances in Transvaal and Natal.

(b) This Society also acts as a pressure group in their promotion of nature conservation in the Republic.

(3) S.A. Wildlife Management Association 1960

acts as a forum for the interchange of ideas on Wildlife Management through symposiums, etc.

(4) National Veld Trust

(a) their non-profit objective is the promotion of conservation development and improvement of natural resources in South Africa

(b) encourage preservation of soil, veld, vegetation and water.

(c) involved in nature and environmental conservation and support conservation projects - Green Heritage and Water Year.

(5) Society for the Protection of the Environment

informs and promotes public sensitivity.

(6) There are a number of scientific societies, who through their different activities also promote conservation and assist in surveys and research eg. S.A. Mountain Club, S.A. Association of Botanists.

7.5 Private Landowners

Private landowners interested in nature and enthusiastic conservers could proclaim their farms as private nature reserves and thus their game and flora are afforded protection by the Provincial Nature Conservation Act. This system at present applies only to the Transvaal and the Cape and is a purely voluntary movement. Examples of private reserves are the Timbavati Private Nature Reserve and Sabi Sands Game Reserve.

From this brief outline of the organizational structure in South Africa, it can be seen that the whole system appears uncoordinated, both in function and structure. Each body, either public, private or quazi-public, pursues its own objectives, from its own goals and implements its own actions in an ad hoc fashion.

Liaison between bodies of similar and complementing functions is little, if at all existent.

7.6 South African Environmental Legislation

Law is a tool for man to use and is a basis for some kind of action, essentially to minimize and channel conflict. Man uses law to combat his own short-sightedness. The ultimate aim of law in nature conservation is not only the protection of the environment for its own sake, but also for the protection of human interests. Man uses environmental law for a number of reasons:-

(i) physical considerations

(ii) aesthetic reasons (reserves, wildlife conservation, etc.)

(iii) to conserve nature for its own sake ie. to accord nature an independent right to an undisturbed existence.

(iv) man's moral obligations eg. protection of animals

Environmental law is an open ended definition, for it really covers all rules and regulations that conserve or protects the earth's natural resources. But in South Africa environmental law basically includes:

(1) pollution control

(2) the conservation of natural resources (RABIE, 1976)

Thus the objective of (1) and (2) is to ensure that the environment will remain habitable for man so he can fulfill both his physical and spiritual needs.

7.6.1 Pollution Control

Pollution control in environmental law is carried out by means of a number of acts of parliament such as "South African Water Act of 1936" and air pollution control by means of the "Atmospheric Pollution Prevention Act 1965" pollution control in South Africa covers mainly

6 different aspects:

1. air pollution
2. water pollution
3. noise pollution
4. pesticides
5. ionizing radiation control
6. solid waste management.

Pollution control, together with the conservation of natural resources are the major means of protecting, preserving and caring for the natural environment.

7.6.2 The Conservation of Natural Resources

This is the older form of environmental concern, brought about by farsighted individuals and groups who first awakened a consciousness of the need to conserve environment. This early concern resulted in acts such as the National Parks Act (1926) and the Veld and Forest Conservation Act (1941) and the Soil Conservation Act (1946).

Recently it has been recognized that environmental concerns are land use oriented where environmental conservation and planning are intricately connected. It has been recognized that adequate land use planning is therefore a necessary condition of potentially successful pollution control and the conservation of natural resources.

This was no doubt the objective with the promulgation of the Physical Planning and Utilization of Resources Act, 88 of 1967 (which suggests by its name an all embracing physical planning and resource control). However, this act, in fact, deals basically with the establishment of industry and related matters and the establishment of controlled areas for such uses as exploitation, development or utilization of the resources. No land may be used for any purpose, other than that purpose specified on the date of the notice.

However, the amendment to this act in 1975 provided

specially for the preservation of land for use for specific purposes. Within the Act provision is made for "natural areas" that can be used in "the interests of and for the benefit and enjoyment of the public in general and for the reproduction, protection and preservation of wild animal life, wild vegetation or objects of geological, ethnological, historic or other scientific interest".

Besides this provision, the Act regulates planning on a national scale and integrates all land use into a guide plan (ppendix B contains extracts of this Act).

Of relevance to this discussion is the conservation of environmental resources. In South Africa this is dealt with mainly in two categories:

(1) soil conservation

(2) wildlife conservation

A. Soil Conservation

Conservation of soil and related matters are enforced by a number of acts. Some of the better known and more pertinent will be discussed.

(a) an important landmark in South African environmental legislation was the Soil Conservation Act, 45 of 1946. It dealt with problems of soil and erosion and also became a basis for co-operation between the state and farming communities. Conservation schemes were carried out in districts that were defined and established.

(b) the Mountain Catchment Areas Act, 63 of 1970 centralized the protection of mountain catchment areas through the Department of Forestry. This shows a more integrated approach to soil, vegetation and water conservation and as the conservation, use, management and control of entire ecosystems falls under one body.

(c) The Forest Act, 72 of 1968 protects land, vegetation and other produce and sets aside state forests for protection and conservation of

water supplies, the prevention of sanddrift and the establishment of nature reserves and wilderness areas.

These are probably the most important of the Acts of Parliament, but many others do exist together with numerous amendments.

B. Wildlife Conservation

There is an intimate relationship between soil conservation and wildlife conservation as they both depend on the re-establishment and maintenance of the vegetation. Therefore the aforementioned Acts are also relevant when discussing the protection of wildlife.

Since the earliest settlements in South Africa, wildlife hunting has been restricted. Eventually each province dealt with wildlife protection under separate provincial ordinances until 1967, when the four were combined into the Nature Conservation Ordinance, that dealt with the Conservation of indigenous plants as well as animal wildlife.

Increasing pressures of urban life lead to the realization of the necessity for wildlife sanctuaries as a cultural heritage and for recreational purposes. This is seen in the establishment of:-

a) National Parks - controlled by the National Parks Board and defined as mentioned earlier by the I.U.C.N. These parks are established and maintained by an Act of Parliament - the National Parks Act.

b) Nature Reserves - these are controlled and administered at different levels as well as by private landowners. They are set aside for the preservation and propagation of indigenous fauna and flora and for reasons of scientific and aesthetic interest.

c) Forestry Reserves - defined as areas in which indigenous flora, especially forests are controlled, managed and protected by the Department of Forestry.

d) Sea Reserves - their exclusive proposal is for the protection of crayfish. They fall under the control of the Division of Sea Fisheries.

e) Wilderness Areas - these areas fall under State control. They are identified by their primitive conditions of plant and animal life. All forms of development and communication systems are excluded.

Provincial reserves are protected by the Provincial Ordinances (which also make provision for reserves held in private ownership) Municipal reserves and parks protected by local authorities.

Besides reserves and parks, the natural environment is also protected by the National Monuments Act, 28 of 1969, that provides for the establishment of property of aesthetic, historical, archaeological and scientific value. Wildlife is therefore also included. National Monuments such as Table Mountain and the Modjadji Forest are offered protection under this Act.

Wildlife sanctuaries are not immune to interference from outside or deproclamation and this raises a large political question. Deproclaimed reserves include Dongola Wildlife Sanctuary and Etosha National Park. Part of Kruger National Park now awaits its fate as mining surveys are made and depending on the decision to mine, may result in a deproclamation of this particular area, or an amendment to the National Parks Act.

7.6.5 Implications of Environmental Legislation

The existing legislation at least offers some measure of protection to the natural landscape. It may be

considered an adequate system for one still in the early stages of growth, with some acts as excellent measures of control. However, one of the greatest problems is that the entire system is said to be ineffectively enacted (RABIE, 1976), particularly some of the Acts. The non-involvement of some of the private landowners, especially farmers, and a basic lack of environmental consciousness, is a major failure within the system. This lack of environmental education also widely exists amongst the positions of authority and power, which are concerned with nature conservation.

The South African environmental legislation lacks some overall framework to guide its evolution. For example, the United States has the National Environmental Policy Act, 1970, in which the harmonious relationship between man and his environment is stressed. Under this act, Federal Administration agencies are compelled to consider environmental values in the decision-making processes and to make public the likely impact of these actions. Environmental Impact Assessment too, has become a voluntary component in the planning process and in many states it is compulsory.

South Africa has only one national body concerned with conservation issues - the National Parks Board, which appears to be more involved in political issues and until recently profit motivated activities, more than conservation matters. The so-called "Department of Planning and the Environment" is not much more than a National Co-ordinator of bodies engaged in conservation, environmental issues as well as physical planning, despite its name. It directly enforces no controls nor actively conserves the landscape. The provincial system is a more effective one, with semi-autonomy in each province and a greater, active role in nature conservation. These bodies too, have a clearer idea of their duties as conservation bodies, than do the state bodies. Nevertheless, provinces do have problems

— [illegible] and co-operation between them in conserving ecosystems and landscapes that cross provincial boundaries.

Of considerable concern in environmental issues, is the apparently relative ease with which nature reserves and natural areas can be deproclaimed. This strong, political motivation is of concern to the existence of all such areas, that may have potential for some other use, necessary "in the national interest". This statement appears to have considerable influence in political circles, especially where the South African economy is at stake - consider areas as deproclaimed for mining (and the possibility in Kruger Park). It is unfortunate such issues are normally based on economic needs of the present and that a more long-term solution is not considered. For once the area has been exploited and degraded and all potential taken from it, often little future benefit can be gained from these derelict areas.

In general the situation of South African environmental legislation is one where the whole system is lagging behind the changes in growth and development. The growth of population, of the economy and of modernization is overtaking the system, which is not being changed to keep pace with this growth. Also there has been a very definite change in awareness and attitude to the environment and so a change in goals in environmental conservation has come about. The system of control has been slow to adapt to the changes in these goals - one may think of the earliest conservation, which was concerned merely with protecting game, whereas concern today has been extended to include their entire habitats. The control system is, however, slowly being changed to meet this objective. Nevertheless, the tempo of change in growth, education, the economy, etc. necessitates a speeding up in this adaptation process.

7.7 The Human Impact : Summary

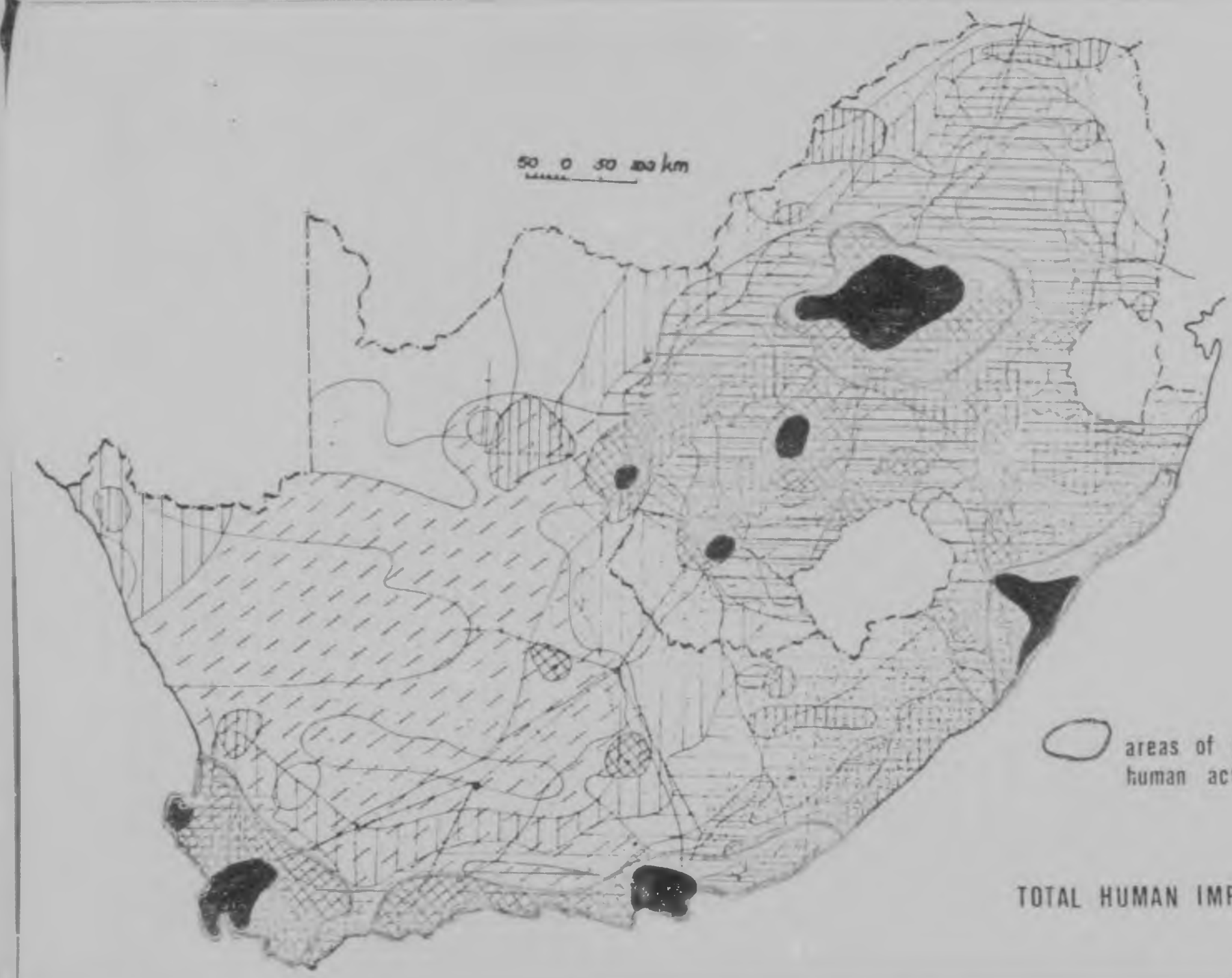
To gain an overall perspective of the intensity of

human influences on the landscape, map 8 shows the sum of all the aforementioned factors (Maps 1 - 7), as they affect South Africa. Where presented individually, each factor may not appear as acute, together the total situation may have a greater impact and establish a more serious problem situation. Areas of most intense pressures, shown by the darkest hatching (and outlined in red) indicates areas of the most serious problems likely. The areas reflecting this situation are predominantly the metropolitan areas.

The problem of human impacts can be analysed in degrees of intensity of the impact. Map 8 shows varying intensities where some areas range from 6 predominant activities found together, to only one or two together in other areas. These are found in combinations of different types and intensities of activities, that may have harmful consequences for the landscape.

These areas could be ranked in terms of the seriousness of the problem in that area, by a system of scoring and weighting, from the determination of the number of activities and of the intensity.

The most crucial areas which are the 4 major metropolitan regions, would be considered priority issues in policy formulation. Physical development, has in fact been considered, in isolation, in the National Physical Development Plan. This attempts to control imbalances of physical development.



TOTAL HUMAN IMPACT

8

CHAPTER 8: STATEMENT OF THE PROBLEM

CHAPTER 8 STATEMENT OF THE PROBLEM

Interpretation of the information gained from the analysis, confirms that there are problems with the process and structure of nature conservation in South Africa. The priority issues identified can be formed into an overall statement of the problem.

8.1 One of the main problems identified, is a general lack of data on features in the natural environment. Insufficient knowledge is held on nature and there is a lack of education that attempts to fill this gap. The overall situation regarding these items in danger of destruction and exploitation in the natural environment cannot be accurately assessed because of this lack of data covering these issues. The reason for this may be because there is no recognized procedure or set of parameters, against which environmental criteria can be measured or identified in order to assess the :

(a) importance of these natural areas (economically, commercially, aesthetically, recreationally) and

(b) their status on a scale of criticality, i.e. the rate at which they are in fact being destroyed.

8.2 At the same time, there is no standard system of control which states where, or at what point conservation ought to begin, or that states levels of criticality that can be permitted. In other words, there is no system that allows for planned amounts of environmental modification, exploitation, etc.

8.3 From the analysis it was observed that :

(a) while some features in the natural environment are well, to fairly well conserved, others experience gross inadequacies of conservation, i.e. there is an unequal distribution of conservation areas, in relation to their need, and an ad hoc approach to the actual conservation of the natural environment.

(b) there is an irrational distribution of human development and use of the country due to the suitability of these areas based on :

(i) resources (for cultivation, mining, grazing, etc.)
(ii) needs for urbanization that an area may provide.
(iii) recreational potential
(iv) government policy (with respect to the homelands, for large populations)

The situation discussed in (a) and (b) have resulted basically because there is no general plan or procedure to follow for either :

(1) conservation, or for
(2) development (though the National Physical Development plan does exist, supposedly to guide development, as will the proposed guide plans).

This means that conservation and developments are carried out on an ad hoc basis, generally separately from each other, resulting in conflicts between the two activities. It has always appeared that nature conservation has been on the losing end, with the priority given to urban development and human use.

8.4 The system of control and the legislative framework is not keeping pace with the tempo of growth and change in social, economic and technological spheres. Consequently the control system for conservation is incongruent with the needs of the current situation.

In summary, the overall problem can be stated as one where no framework or procedure exists within which there can be an identification of the needs of conservation and within which there is a set of guidelines and restrictions for controlling and directing human use and development in and around natural areas.

These problems indicate a need to find a method capable of coping with a diversity of problems.

CHAPTER 9: TOWARDS A CONSERVATION POLICY FOR SOUTH AFRICA

CHAPTER 9 TOWARDS A NATURE CONSERVATION POLICY FOR SOUTH AFRICA

The problems that have been identified require a strategy for solving them. At the same time a general framework is required in terms of which to develop a nature conservation policy that will cover the whole country. Only the priority issues can be dealt with at this stage, as it must be remembered that, because of the complexity of the problem, as well as resources available for this dissertation, only the base of the strategy can be established. This base will consist of a set of guidelines that lead to further broadening of the policy and of solving problems.

9.1 Conservation Policy

The policy should be to establish a classification system, that will categorize areas in the natural environment in terms of the extent to which they can be developed. This classification could then resolve priority issues by:-

(a) classifying areas in accordance with their inherent natural values and sensitivity to man-induced influences and to

(b) classify areas in accordance with their value for man and their capacity to provide for different uses, at different intensities.

Little planning and management can be carried out on a nature conservation strategy without this classification, for it forms the primary starting point. It should be stressed that this classification is by no means a final, inflexible solution, for once it has been derived, it MUST be put into practice and tested in the field and be modified. Nevertheless it does provide a point at which the entire process can begin.

Development of this classification begins with a set of classes of natural areas. These classes must allow for :

(a) increasing intensity of human use, and

(b) increasing diversity of uses by man.

These conditions will, however, be regulated by :

(a) the resources and value of the areas as related to human needs and desires, as well as upon

(b) the intrinsic worth and value the area has for itself (refer Table 4)

The classification system as a whole will be very broad in nature outlining :

(a) the general character of the area for each class,

(b) the optimal size of areas, that is suitable within each class,

(c) location of areas in each class

(d) restrictions and limitations on human development and use,

(e) management and control techniques suitable for each class, and

(f) the legal status desired for areas in each class, to ensure their secured protection.

Table 7 sets out the above described classification system and lays down guidelines for use, development and management of natural areas.

9.2 Organization Policy

This conservation policy, as previously mentioned, is the first necessary step in developing a framework, however, it will not have any effect, unless it is backed up by a legal and administrative structure. This organizational structure must have the power to enforce the acceptance of the conservation policy and have the ability to ensure its implementation. The organizational structure should be so formed as to include public, quasi-public and private bodies, each having some recognizable function. Steps towards structuring an organizational framework should involve :

TABLE 1 A CLASSIFICATION SYSTEM OF NATURAL AREA TYPES/CRITERIA GUIDELINES FOR THEIR PLANNING AND DEVELOPMENT, USE AND MANAGEMENT

	CHARACTER	SIZE	LOCATION	HUMAN DEVELOPMENT AND HUMAN USE	MANAGEMENT AND CONTROL	LEGAL STATUS
WILDERNESS AREAS I	1. Any natural area of outstanding and or unique character that should remain totally undisturbed by any form of human development. They should be wild in appearance and character. 2. These areas should be manageable to an undisturbed state as possible.	1. Large enough for a sense of "wilderness" to be achieved. 2. As large as possible to include any part of the undisturbed land as is feasibly possible. 3. Not less than 1000 ha for undisturbed regions (Northern, Arctic)	1. In areas of some variation and unique resource that is undisturbed. 2. Remote from urban areas 3. Generally either on provincial/regional reserves that have a buffer between them and encroachment of private developed land.	1. All human development will be totally excluded. 2. The only form of penetration of these areas will be on foot or canoe paths. 3. No personal development 4. No forms of motorized access 5. No forms of economic activity 6. Generally only classes 5 & 6 Human use should be limited to levels that do not erode nature	1. No commercial landowners (Dept of Forestry, National Parks Board etc. 2. Management should attempt to preserve regional characteristics. 3. Also by the regional conservation Act etc.) 4. Wildlife and flora should be managed on a natural and conservation principle	1. Such reserves should be established as "Wilderness Areas" under an Act of Parliament. 2. Legally must be accurately surveyed areas agreed and entrenched of any kind. 3. A requirement is necessary in the form of an EIS that does propose the various added to the forest but in fact, that are wild and ecologically significant areas is taken first and 4. It existing and established other areas under legal protection and management (Parliament, Provincial Parks, Provincial Forests, Provincial Wildlife Areas, Federal Conservation Areas, Wildlife Areas, National Research Acts) 5. Need the legal status of this entire category that is based enough to include the diversity of natural areas encompassed in this class. 6. These areas may be of a large size and include a diversity of landforms and as result a comprehensive legal 7. An legally instruct these areas, these criteria have considerations: a) Appearance b) Size of area c) restrictions or use of the area as well as adjacent development d) management of these areas i) Ecology ii) existing economic activities
SPECIAL AREAS II	This category would include a number of different types of natural areas of reasonable appearance. They include: a. Outstanding Natural Area features covers all unique geological, geomorphological and similar features of natural values. That require protection from exploitation, destruction and conditions. b. Forest landscapes These areas are more manipulated landscapes, many of them recreational areas. Many will already exist in private ownership and will still	1. Is related to the nature of area covered and the features concerned 2. Should be sufficiently large enough to protect the character of the special area 3. Also cost is decisive should be such that appropriate development is not viable to preserve could be changed for development at present.	1. Where these features or areas occur naturally 2. Also not enough park of a national park, reserve or forest	1. Development should be restricted to peripheral sites 2. Natural features should not be impaired by any form of structure 3. Access should only be on foot from restricted peripheral points. 4. No roads should encroach on the area/feature itself. 5. Provincial territorial parks, etc. should harmonize with the natural environment 6. Non activities	1. By the landowners 2. By the Provincial Nature Conservation Division Provincial Governments 3. Co-operation of private landowners is necessary 4. Tourist property needs and should be involved in visitor management. 5. Ecological principles should form the basis of these protective areas, eg: there might be a clearance of central trees.	

	- imagine water protection and control planning. • Aircraft and culverts noise - these are associated with highways, airports or railways at the country-			be restricted to short-term uses such as walking, hiking or for educational and scientific purposes. 7. Economic activities (mining, quarrying) could be reduced and stopped, if economically feasible. (3) Parts 1 - 5 will be slightly modified by areas of a large extent for		
Wildlife Habitat Areas III	1. Includes all areas of some importance which are included in I or II 2. Recreational purposes restricted to wildlife enhancement, but 3. Since it is a large and relatively remote of environmental applications, for human development 4. Important values to be taken for wildlife environment can be readily protected.	1. Use is restricted to those which include no major polluting, excepting, poor or primarily wooded lands. 2. Use should be such that adverse effects will not be discernible to the natural resources 3. Use should be such that it is unlikely to contaminate water, if not, should allow still	1) Adjacent to the country where the natural environment is the capacity to accept a certain amount of development 2. Industries should be such that their construction, also provide some multiple purpose 3. Include industries or activities, recreational and residential industries. 4. Include those industries/developments in proximity, such as steel	1. Result a policy people development in environment and the capacity to accept certain amount of development 2. All development must be planned & coordinated and be sensitive with the physical environment 3. Industries should be monitored on environmental impacts 4. Sewage and water facilities provide control standards 5. Restrictions should be taken that depend on the physical sensitive for areas)	1. Social and private sectors and institutions 2. Provincial bodies would co-operate all management and control 3. They also must be responsible for modifications and decisions made on these lands, and change of use 4. These areas are likely to meet many demands for personal recreation and should provide land & Recreation & Tourism bodies 5. All bodies must adopt suitable land planning and management procedures	1. Preserve Provincial landscapes and natural beauty of Saskatchewan. 2. Provision should be made to regulate development proposals. 3. Have some legal status for these areas as "Protected Natural Areas" which they can then protect. 4. In land protection, the following aspects must be considered: a) possible type of development, its location and character b) restrictions on access and parking facilities c) provision of adequate and number of people using land for this use d) the nature, scale and time period of economic activities

MULTIPLE USE ASPECT IV	a) Assessment & evaluation of economic resources; b) Human resource need and development to provide for economic activities and employment opportunities in the area. c) Human needs and the ways available to meet them d) Human activities and their effects on the environment	1. Identification of the scope of interrelationships depending on the demands of study (e.g. by eg. map) 2. Clear and accurate definition of the aims of the study. 3. Research on feasibility to maximize benefits and minimize adverse effects.	1. Integrate by grid land will be used to 2. Provide an inventory of existing resources and human activities and their locations 3. Consideration of alternatives	1. Report from economic consultant and primary contacts to economic data. 2. Environmental Consultant & short report on the human environmental implications. 3. Evaluation of alternatives and choice of preferred one. 4. Assessment (balance sheet) of costs and benefits of all the alternatives. 5. Economic activities include mining, forestry, afforestation, cultivation. Many may be found together in a few locations and require to. forests and water.	1. Public meetings of local, provincial and local levels 2. Correspondence of private interests 3. Investigations of governmental and national levels. 4. Other areas in will satisfy a large amount of relevant government and international policy and decisions. 5. Responsible consideration of the implications of the above economic activities will usually require to meet the objectives of this scheme.	1. Impact studies should ensure proposals can be taken for implementation and to include the environmental implications and alternatives. 2. Specifications should be drawn up for: a) Effects of environmental impacts within, beyond etc. b) Persons with special interests c) Effects of an activity related to balance transports and the needs of people (only to the extent) d) the scope, scale and characteristics of economic activities

(a) a definition of the duties, purposes and roles of all bodies concerned with environmental conservation, either in its management, its planning or its protection.

(b) Once this has been accomplished, they need to assess the adequacies of their roles in coping with modern pressures, problems and conservation needs in the environment, and

(c) accordingly their scope and responsibility should be revised to satisfy these needs.

d) their powers should expand to cope with the conservation policy.

The legislative framework, too requires assessment and modification and should be determined from looking at (a) to (d) above. The procedure for achieving the nature conservation policy, would operate within both the organizational and legislative frameworks as indicated in Figure 4. This should serve to ensure a well organized and well protected nature conservation system that is recognized in national and provincial plans, proposals and policies.

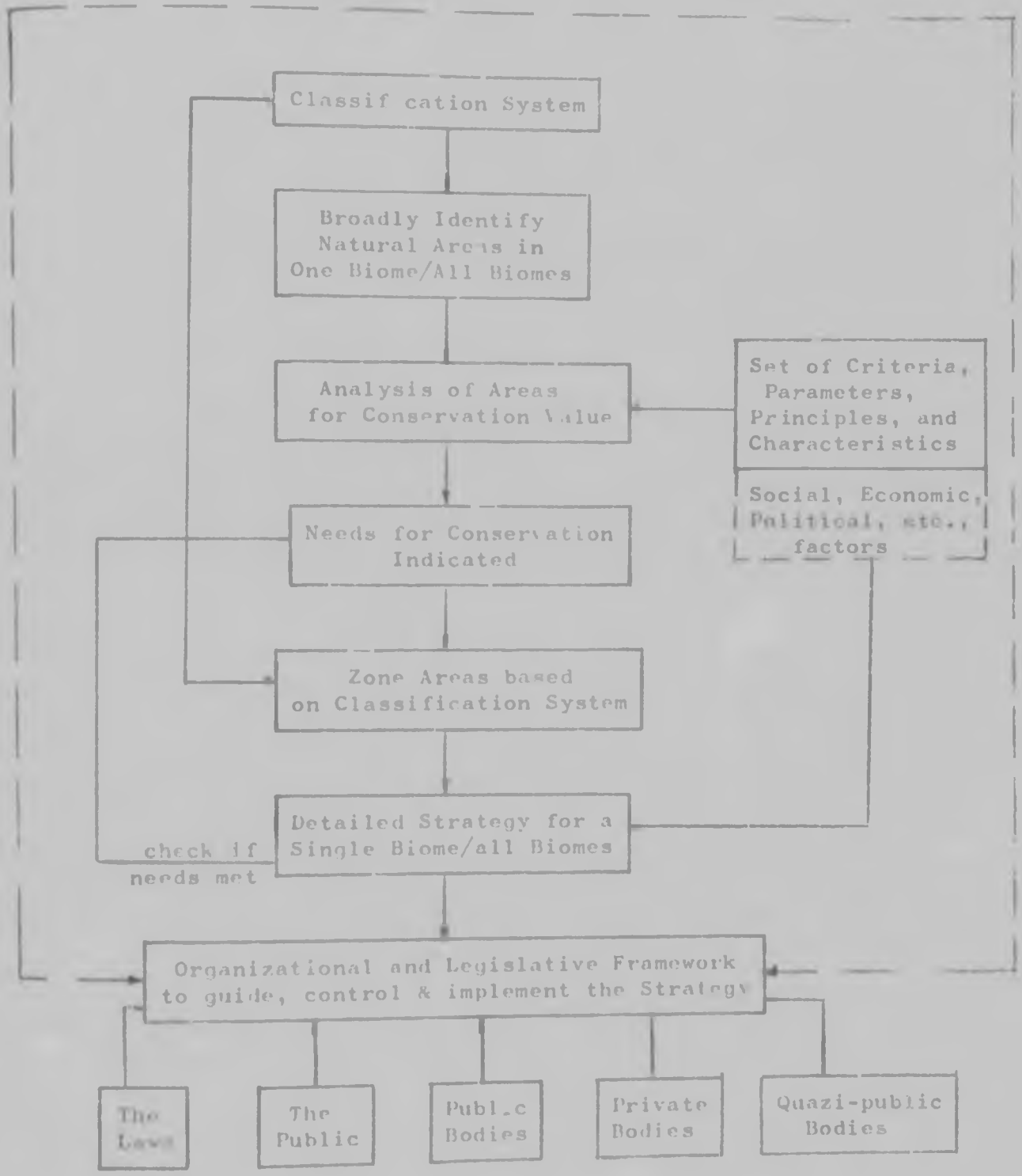
9.3 Implementation Policy

With the acceptance of a conservation policy, together with an organizational policy, it is now necessary to define a way of implementing the policy. This procedure will be necessary for the carrying out of policy and for the logical progression into the next stage of the approach. Figure 4 shows the structure of the possible implementation procedure to be followed in the development of a more detailed policy, with objectives for nature conservation.

a. the entire approach will be based on the classification system.

b. the four classes I, II, III, IV will be used to broadly identify [illegible] areas in a biome/all biomes.

FIGURE 1 STRUCTURE OF THE PROCEDURE REQUIRED TO IMPLEMENT A CONSERVATION POLICY



9.3.3 these areas should be analysed for their conservation value, based upon a set of standard parameters to :

(a) assess land potential for human use,

(b) evaluate the land with respect to its suitability for different uses based on economic, aesthetic and other combined considerations,

(c) assess the ecological characteristics and attributes of the area based on a set of ecological principles such as :

(i) endemism and rarity,
(ii) quality,
(iii) vulnerability,
(iv) diversity, etc.

(d) the status of the above criteria should be assessed with respect to their being :

(i) endangered,
(ii) secure,
(iii) near extinction,
(iv) critical, etc.

(e) the destructive forces impinging on an area. These include :

(i) human pressures : population, economic, etc.,
(ii) biological processes and change causing likely destruction.

9.3.4 arising out of the analysis should be the conservation needs and so the focus towards which a policy should lead.

9.3.5 after this detailed analysis, natural areas should be zoned into classes I - IV in accordance with their suitability for :-

(a) different human uses,
(b) varying intensities of human use,
(c) conservation and preservation

(these are the basic functions of the classification system)

9.3.6 hereafter a detailed policy and objectives, based on the broad guidelines of the classification, may be elaborated, depending on :-

(a) unique characteristics that demand specialized treatment,

(b) special requirements of that area,

(c) particular problems of that area.

At this point, it would be useful to check the proposed policy against the needs of conservation of that biome/those biomes, to see if these needs have been satisfied and that identified problems have been solved or partially solved.

9.4 General

A policy for nature conservation cannot be developed in isolation without consideration of the interrelation between the natural environment and human development and uses. A policy combining these two aspects should be followed in such a way as to achieve the best possible advantages for man and nature together, without causing changes in environmental quality.

Presently the NPDP (National Physical Development Plan) is being implemented for the control of areas for living and working in, and proposed guide plans are being prepared to conform with this National Plan. However, these policies cover only the physical aspect of South African development and it is strongly recommended that the Nature Conservation policy should be incorporated with it. This is to ensure a total national framework covering ecological and biological facets, as well as physical and human demands and needs.

Total co-operation and liaison will then be required between all public, private and semi-public bodies concerned with environmental and physical planning to implement these policies.

It is only by incorporating all these factors and criteria, that a complete framework can be developed. However, it is not the objective of this dissertation to attempt to achieve this now, as it is beyond its scope, and the whole process is a long-term one, and much of it will depend on the political and economic future of the country.

9.5 Conclusion

It was observed that two overseas countries and South Africa have experienced environmental modifications and degradation from urbanization and industrialization, with the passage of time. Each country has adopted a form of approach to the conservation of the natural environment, appropriate to its problems and increasing pressures. But, whereas the overseas examples have developed sophisticated and well organized approaches, based on a planning system and within an authoritative structure, South Africa has developed no systematic approach to conservation and has only a loosely bound organizational framework, within which bodies operate on an ad hoc basis. This has resulted, therefore in continued despoilation of the environment by unchecked and increasing pressures.

These facts show the change in attitude and awareness of the British and American people towards the conservation of the environment, while South Africa is not as advanced in cycle as they are with industrialisation and has little environmental consciousness. However, a transitional stage has now been reached, brought about by a climax in pressures similar to those experienced by Britain and America some years ago and they have accelerated a South African environmental consciousness.

Together with the implementation of the conservation policy and a revised organizational structure, there is a deliberate stimulation in the speeding up of environ-

mental awareness and in ensuring there is some action forthcoming in the protection of our natural resources. In doing this, it is hoped that some of our natural landscape can be saved from pointless destruction, by thoughtless human action so that areas and species can continue to evolve in their natural, undisturbed states.

APPENDICES

APPENDIX 1

LIST OF RESERVES SHOWN ON MAP 2
(Edwards, 1974).

Cape Province

Kalahari Gemsbok National Park
Augrabies Falls National Park
Spitskop Nature Reserve
Hester Malan Wild Flower Reserve
Prieska Nature Reserve
Rolfontein Provincial Nature Reserve
Oviston Provincial Nature Reserve
Akkerendam Nature Reserve
Madeira Nature Reserve
N'dule Nature Reserve
Rocher Pan Provincial Nature Reserve
Mountain Zebra National Park
Table Mountain Nature Reserve
Andries Venter Research Station
Vrolijkheid Provincial Nature Reserve
Goukamma Provincial Nature Reserve
The Lake Nature Conservation Station
Kuurbooms Recreational Resort
Addo Elephant National Park
Settlers Park Nature Reserve
Thomas Baines Nature Reserve
The Rondevlei Bird Sanctuary
Silvermine Nature Reserve
Cape of Good Hope Nature Reserve
The Helderberg Nature Reserve
Fernkloof Nature Reserve
The Salmons Dam Nature Reserve
Bontebok National Park
De Hoop Provincial Nature Reserve
Tsitsikama Forest and Coastal National Park
The Robbeberg Nature Reserve
Seekooi River Provincial Nature Reserve

Natal

Ndumu Game Reserve
Kosi Bay Nature Reserve
St. Lucia Game Reserve
Mkuzi Game Reserve
Hluhluwe Game Reserve
False Bay Park
Sordwana Bay National Park
Rugged Glen Nature Reserve
Royal National Park
Umfolozi Game Reserve
Dhlinza Forest Nature Reserve
Entumeni Nature Reserve
Umlalazi Nature Reserve
Richards Bay Nature Reserve
Enseleni Nature Reserve
St. Lucia Park
Richards Bay Park
Giant's Castle Reserve and Parl
Harold Johnston Nature Reserve
Kamsberg Nature Reserve
Vergelegen Nature Reserve
Colelord Nature Reserve
Himeville Nature Reserve
Loteni Nature Reserve
Soado Nature Reserve
Krantzkloof Nature Reserve
Moor Park Nature Reserve
Stainbank Nature Reserve
North Park Nature Reserve
Paradise Valley Nature Reserve
Oribi Gorge Nature Reserve
Umtamvuna Nature Reserve

Orange Free State

Willem Pretorius Game Reserve
Golden Gate Highlands National Park
Tussen-die-Riviere Nature Reserve

Transvaal

Langjan Nature Reserve
Kruger National Park
Hans Merensky Nature Reserve
Percy Fyfer Nature Reserve
Blyderivierspoort Nature Reserve
Berghoek Nature Reserve
Ohrigstad Dam Nature Reserve
Rustenburg Nature Reserve
Loskop Dam Nature Reserve
Vertroosting Nature Reserve
Thorncroft Nature Reserve
Cynthna Letty Nature Reserve
Tinie Louw Nature Reserve
Ida Döyer Nature Reserve
Barberspan Nature Reserve
S.A. Lambard Nature Reserve

Others not on Map

(from Transvaal Provincial Administration Nature Conservation Division, Eleventh Annual Report 1975 - 1976)

Suikerbosrand Reserve
Roodepoort Dam Reserve
Doorndraai Dam Reserve
Vaal Dam Reserve
Boskop Dam Reserve
Nylsvley Reserve
Marievale Reserve
Haartbeespoort Dam Reserve
Lillie Reserve
Happy Rest Reserve

APPENDIX B

Extracts of the Physical Planning and Utilization of Resources Act

Page 1 of the following extracts is the original Act, number 88 of 1967, that controls the use of resources and co-ordinates their use with physical planning. But , as can be seen, the Act provides mainly for the control of land for industrial purposes and related matters.

Pages 2 and 3 are extracts from the Physical Planning and Utilization of Resources Amendment Act, Number 73, of 1975. This amendment provides for the reservation of land for any purpose and this includes land as natural areas, reserves, parks, etc. This amendment to the original Act is a great improvement to the protection of the natural environment, and if it was enacted more effectively would be extremely successful.

(1)

ACT

To provide for co-ordinated physical planning and the utilization of the Republic's resources and for those purposes to provide for control of the zoning and sub-division of land for industrial purposes and of the establishment or extension of factories, for the establishment of controlled areas, for restrictions upon the subdivision and use of land in controlled areas and for other matters incidental thereto.

(*Afrikaans text signed by the State President.*)
(*Assented to 9th June*, 1967.)

BE IT ENACTED by the State President, the Senate and the House of Assembly of the Republic of South Africa, as follows:—

Definitions.

1. In this Act, unless the context otherwise indicates—

(i) "Administrator" means the Administrator of a province acting on the advice of the executive committee thereof; (i)

(ii) "building" includes any structure; (v)

(iii) "business" means any trade or occupation specified in the Second Schedule to the Licensing Act, 1962 (Act No. 44 of 1962); (iii)

(iv) "controlled area" means an area declared or deemed to have been declared a controlled area under section 2 and includes an area declared or deemed to have been declared under the said section to form part of a controlled area; (ii)

(v) "factory" means a factory as defined in section 3 of the Factories, Machinery and Building Work Act, 1941 (Act No. 22 of 1941), and includes any premises on which or in which any industrial undertaking which the State President, by proclamation in the *Gazette*, declares a factory for the purposes of this Act, (iv)

(vi) "land" includes any portion of land and any building; (vi)

(vii) "Minister" means the Minister of Planning; (viii)

(viii) "prescribed" includes [illegible] means of prescribing [illegible] and includes in regard [illegible] (vii)

Zoning and subdivision of land for industrial purposes.

2. (1) Without the prior written approval of the Minister [illegible]

(b) land zoned for industrial purposes may be subdivided; and

(c) no industrial township may be established [illegible]

Act 88, 1975 PHYSICAL PLANNING AND UTILIZATION OF RESOURCES AMENDMENT ACT, 1975

ACT

To amend the Physical Planning and Utilization of Resources Act, 1967, so as to provide for the reservation of land for use for specific purposes; for the compilation and approval of guide plans; for restrictions upon the use of land for certain purposes unless reserved for use for such purposes; and for the investigation of suspected offences; and to provide for matters connected therewith.

(*Afrikaans text signed by the State President.*)
(*Assented to 30 June 1975.*)

BE IT ENACTED by the State President, the Senate and the House of Assembly of the Republic of South Africa, as follows:—

Substitution of section 1 of Act 88 of 1967

1. The following section is hereby substituted for section 1 of the Physical Planning and Utilization of Resources Act, 1967 (hereinafter referred to as the principal Act):

'Definitions

1. In this Act, unless the context otherwise indicates—

(i) 'Administrator' means an Administrator and the other members of the executive committee concerned; (i)

(ii) 'building' includes any structure; (v)

(iii) 'business' means any trade or occupation as defined in any ordinance relating to the licensing of trades and occupations and of the province concerned; (iii)

(iv) 'committee' means a committee appointed in terms of section 6A (1); (vi)

(v) 'controlled area' means an area declared or deemed to have been declared a controlled area under section 5 and includes an area declared or deemed to have been declared under the said section part of a controlled area; (ii)

(vi) 'draft guide plan' means a draft guide plan contemplated in section 6A (1); (xv)

(vii) 'factory' means a factory as defined in section 1 of the Factories, Machinery and Building Work Act, 1941 (Act No. 22 of 1941), and includes any premises on which articles are prepared or manufactured and which the State President, by proclamation in the Gazette, declares to be a factory for the purposes of this Act; (iv)

(viii) 'guide plan' means a draft guide plan approved in terms of section 6A (3) (c);

(ix) 'land' means any area of land, whether which a guide plan is applicable in terms

(3)

Act No. 73, 1975 PHYSICAL PLANNING AND UTILIZATION OF RESOURCES AMENDMENT ACT, 1975.

(x) 'land' includes any portion of land and any building; (viii)

(xi) 'local authority' means any institution or body contemplated in section 84 (1) (*f*) of the Republic of South Africa Constitution Act, 1961 (Act No. 32 of 1961); (xvi)

(xii) 'mineral' means any substance, whether in solid, liquid or gaseous form, occurring naturally in or on the earth and having been formed by or subjected to a geological process, but does not include water and soil, unless they are taken from the earth for the production or extraction therefrom of a product of commercial value; (xii)

(xiii) 'Minister' means the Minister of Planning and the Environment; (xiii)

(xiv) 'natural area' means an area that could be utilized in the interests of and for the benefit and enjoyment of the public in general and for the reproduction, protection or preservation of wild animal life, wild vegetation or objects of geological, ethnological, historical or other scientific interest; (xiv)

(xv) 'process' means recover, extract, concentrate, refine or convert; (xviii)

(xvi) 'resources' includes land, minerals, water, means of generating power, labour and means of transport; (x)

(xvii) 'Secretary' means the Secretary for Planning and the Environment; (xvii)

(xviii) 'use of land' means the use of land for—

(*a*) township development, excluding township development for industrial purposes;

(*b*) industrial purposes;

(*c*) agricultural purposes;

(*d*) open spaces;

(*e*) any purpose contemplated in section 4 (1); or

(*f*) any purpose declared by the State President by proclamation in the *Gazette* to be a purpose for the purposes of this definition.". (ix)

Amendment of section 2 of Act 88 of 1967.

2. Section 2 of the principal Act is hereby amended by the addition of the following subsection:

"(4) The provisions of subsection (1) (*b*) and (*c*) shall not apply in respect of a guide plan area.".

Amendment of section 3 of Act 88 of 1967.

3. Section 3 of the principal Act is hereby amended by the addition of the following subsection:

"(5) If any condition imposed in terms of subsection (3) is not complied with the Minister may after not less than one month's notice revoke the approval in connection with which such condition was imposed."

Substitution of section 4 of Act 88 of 1967.

4. The following section is hereby substituted for section 4 of the principal Act:

"Reservation of land for particular purposes.

4. (1) The Minister may, after consultation with the Minister of Agriculture and the Administrator of the province concerned, by notice in the *Gazette* reserve any land specified in such notice for one or more of the following purposes, namely—

(*a*) water works as defined in section 1 of the Water Act, 1956 (Act No. 54 of 1956);

(*b*) railway stations and junctions;

(*c*) railway shunting yards;

(*d*) air- and sea-ports;

(*e*) thermic-power stations and hydro-electric power stations;

REFERENCES

LIST OF REFERENCES

Ackerman, D.P. "The Proclamation of Wilderness Areas by the Department of Forestry" South African Forestry Journal No. 84, 1973.

Acocks, J.P.H. Veld Types of South Africa, Dept. of Agriculture, Division of Botany. The Government Printer, Pretoria, 1953.

Acocks, J.P.H. Veld Types. Memoirs of the Botanical Survey of South Africa, No. 40, 2nd Edition Botanical Research Institute, Dept. of Agricultural Technical Services, 1975.

Allen and Leonard Conserving Natural Resources 3rd Edition, New York, McGraw-Hill Book Company, 1966.

Arvill, R. Man & Environment 3rd Edition, Penguin, 1973.
"Nature Conservation in the Transvaal" Bulletin No. 2, Nature Conservation Branch, Transvaal, 1968.

Board, C., Davies, R.J. and Fair, T.J.D. "The Structure of the South African Space Economy: an Integrated approach" Regional Studies 4:367 - 392. 1970.

Brandt, C. "The Mowhawk & Nature" World Wilderness Congress, Johannesburg, 1977

Brockman, C.F. and Merriam, L.C. (Eds) Recreational Use of Wild Lands McGraw-Hill Book Company, U.S.A., 1973

Burton, I. and Kates, R.W. (eds) — Readings in Resource Management and Conservation. University of Chicago Press, 1960.

Cape Department of Nature Conservation — Cape Department of Nature Conservation and Museum Services Report No. 32, 1975 - 1976.

Carson, R. — Silent Spring. Houghton Mifflin Company, Boston : The Riverside Press, Cambridge, 1962.

Clawson, M. and Held, P. — Planning and Urban Growth : An Anglo-American Comparison. Baltimore : John Hopkins University Press, 1973.

Clawson, M. and Knetsh, J.L. — Economics of Outdoor Recreation. Baltimore : John Hopkins Press, 1966.

Countryside Commission — Nature Conservation at the Coast. Special Study Report Vol. 2 : Coastal Preservation and Development. HMSO, 1969.

Dasmann, R.F. — "Classification and Use of Protected Natural and Cultural Areas". IUCN Occasional Paper No. 4, 1973.

Dasmann, R.F. — "Ecological Principles for Economic Development'. IUCN Publication No. 42, 1973.

Dasmann, R.F. — Environmental Conservation. 3rd Edition, New York, John Wiley & Sons, 1968.

De Graaf, G. — "Principles and Techniques for the Management and Conservation of Fauna and Flora in National Parks and Game Reserves' in Planning for Environmental Conservation. Proceedings of the Inter-

national Symposium. Dept. of Planning and the Environment, 1973.

Department of Planning and the Environment — National Physical Development Plan 1975.

Edwards, D. — "Survey to Determine the Adequacy of Existing Conserved Areas in Relation to Vegetation Types. A Preliminary Report" Koedoe No. 17:3 - 38, Pretoria, Aurora, 1974.

Edwards, D. — Biomes of South Africa Unpublished Report prepared for the Standing Committee for Nature Conservation, Wildlife Utilization and Management of SARCCUS, 1977.

Farrell & Van Riet — A National Park System for Swaziland General Guidelines for Resource Management Planning. For Swaziland National Trust Commission. Landscape Architects and Ecological Planners, 1975.

Focus on Key Economic Issues — The Homelands No. 9 Dept. of Economics of the University of Pretoria. Mercabank Limited, 1974.

Focus on Key Economic Issues — The Metropoles No. 11. Dept. of Economics of the University of Pretoria. Mercabank Limited, 1975.

Fuggle, R.F. — "Population Growth and the Environment" Transactions of the Royal Society of South Africa Vol. 43, Part 1, 1978.

Hall, A.V. "Endangered Species in a Rising Tide of Human Growth". Transactions of the Royal Society of South Africa Vol. 43, Part 1, 1978.

Hanks, J. "Will Wildlife Survive"? South African Wildlife Journal 30 No. 4, 1976.

Hedberg, I. (ed) Conservation of Vegetation in Africa South of the Sahara Sweden, 1968.

Herfindahl, O.C. "What is Conservation?" in Burton, I. & Kates, R.W. (ed) Readings in Resource Management and Conservation University of Chicago Press, 1960

Highsmith, R.M. Conservation in the United States 2nd edition, Chicago : Rand McNally and Company, 1969.

Hey, D. "Planning for Environmental Conservation in Natural Areas - Man and Nature" in Planning for Environmental Conservation - Proceedings of the International Symposium, Dept. of Planning and the Environment, 1973.

Hey, D. "History and Status of Nature Conservation in South Africa," written for the Centennial Volume "The History of Scientific Endeavour in South Africa" of the Royal Society of South Africa April 1976.

Hey, D. "Twenty-five Years of Nature Conservation in the Cape Province" Veld and Flora Journal July, 1977.

Heydorn, A.E.F. "Wilderness and the Sea" World Wilderness Congress, Johannesburg, 1977.

King, L.C. South African Scenery Edinburgh, London : Olivier & Boyd Ltd., 1942.

Kruger, F.J. "Economic Reserves in Cape Fynbos - Towards a Strategy for Conservation" S.A. Journal of Science Vol. 73, No. 3, 1977.

La Grange, J.J. "The National Status of Environmental Conservation" Planning for Environmental Conservation. Dept. of Planning and the Environment, 1973.

Lovejoy, P. (ed) Land Use and Landscape Planning Great Britain : International Textbook Company, 1973.

Lucas, R.C. "Wilderness Perception and Use : The Example of the Boundary Waters Canoe Area' in Burton, I. & Kates, R.W. (eds) Readings in Resource Management and Conservation University of Chicago Press, 1960

Malherbe, E.L. De W. "The Influence of Forestry Practises on the Natural Environment" Planning for Environmental Conservation Proceedings of the International Symposium Dept. of Planning and the Environment, 1973.

National Committee for Nature Conservation "Register of Permanent Conservation Areas in South Africa and South West Africa (Aug. 1973)"

Koedoe No. 17: 85 - 119, Pretoria: Aurora, 1974.

Nicholson, J.H. and Morton, J.G. — Man's Environment Pietermaritzburg: Shuter and Shooter, 1975.

Noble, P.G. — "An Evaluation of the Conservation Status of Aquatic Biotopes" Koedoe No. 17: 71 - 84, Pretoria: Aurora, 1974

Odum, W.E. — "Ecological Guidelines for Tropical Coastal Development" IUCN Publication No. 42, 1976

ORRRC — A Report of the Outdoor Recreation Resources Review Commission to the President and Congress Washington D.C.: U.S. Government Printing Office, 1962.

Patmore, J.A. — Land and Leisure England: Penguin Books Ltd, 1970.

Patricios, N.N. — "The Environmental Perception and Behavioural Approach in Planning" International Journal of Environmental Studies Vol. 9:109 - 208, 1976.

Rabie, A. — South African Environmental Legislation Pretoria : Heer Printing Co., 1976.

Schumann, A.W.H. — "Planning for the Impact of Mining Activities on the Landscape" Planning for Environmental Conservation Dept. of Planning and the Environment, 1973.

Tinley, K.L. — "The Conservation of Ecosystems & Tourist Impact upon these and their Custodians"

	Nature Conservation as a Form of Land Use SURCLUS Proceedings, 27 - 42 Sept. 1971
Van Raay, H.G.T. and Lugo, ... (eds)	Man and Environment Ltd. Rotterdam University Press, 1974.
Van Riet, W.	"Introductory Thoughts on the Need for a Landscape Approach as a Prerequisite to any form of Land Use in a Conservation Area as a Defence against the Destruction to the Wilderness Atmosphere" Nature Conservation as a Form of Land Use SURCLUS US Proceedings, 17 - 25, Sept. 1971.
Verbeek, J.A.	"Agriculture and Landscape Conservation" Planning for Environmental Conservation Proceedings of the International Symposium, Dept. of Planning and the Environment, 1973.
Von Richter, W.	"Survey of the Adequacy of Existing Conserved Areas in Relation to Wild Animal Species" Koedoe No. 17: 39 - 70, Pretoria: Aurora, 1974
Walker, B.H.	Towards a Science of Ecological Management Inaugural Lecture : Wits University Press, Johannesburg, 1977.
Warren, A. and Goldsmith, F.B. (eds)	Conservation in practice John Wiley and Sons, Ltd., 1974.

...rington, D.H.

South African Geographic Study
Vol. 1
Cambridge University Press, 1955.

...ildlife Society of Southern Africa

"Preliminary Survey of the Transkei Coast, 1977

...lson, ... and ...

The Oxford History of South Africa 1870 - 1966
Volume 2, Oxford University Press, 1971

Author Johnston J H
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