

**A WATER RESOURCES AND
SANITATION SYSTEMS SOURCE BOOK
WITH SPECIAL REFERENCE TO
KWAZULU-NATAL:**

PART 1

by

Peter Glen Alcock

**Submitted to the Faculty of Science in partial fulfilment
of the requirements for the degree of
Doctor of Philosophy
in the Department of Geography
at the University of Zululand
KwaDlangezwa**

Promoter: Professor B.E. Kelbe

Date submitted: January 1999

DECLARATION

I hereby certify that the thesis is the product of my own work, except for Sections 11.6 - 11.8 inclusive in Chapter 11 of the document.

January 1999. 

NOTE

- (a) This thesis has been submitted, as a separate report, to the Water Research Commission (WRC), P O Box 824, Pretoria, 0001, South Africa. The Commission funded most of the research. Other funding organizations are listed in the WRC version of this document. Likewise listed are the names of several people who kindly assisted in the search for data. Further acknowledgements are made in the report. The executive summary - required for all WRC reports - has been retained in the thesis to provide important background information.
- (b) The WRC version of the document includes a large bibliographic database (discussed in Chapter 1). The database and the WRC report are both available from the Water Research Commission.
- (c) Readers should bear in mind that the document (source book) is the product of several years of work. The name "Natal/KwaZulu" was in use for much of the writing period. The current name is KwaZulu-Natal. The latter is reflected in the title of the thesis. However, the former is used elsewhere in the document. The two maps, similarly, reflect the previous terminology. Additional details are given in the first two chapters.
- (d) An IBM-compatible Pentium 100 computer was used to produce the source book. The font used is Univers 11 point (text); 10 point (tables), and 9 point (footnotes). Those wishing to print pages from the electronic version of the document should use a Hewlett Packard Laserjet IV printer. A Hewlett Packard Laserjet III printer can *also be used. However, in the latter instance, there is a possibility of data being deleted from certain tables.* Layout changes in some tables as well as in the text may also be apparent. The computer programs used in this project are firstly, WordPerfect 5.1 (the source book) and secondly, Microsoft Word for Windows 6.0 (the bibliographic database).
- (e) The author records his willingness to assist **academic users** with regard to material contained in the thesis and the WRC bibliographic database.
- (f) Finally, I should like to thank my promoter, Professor B.E. Kelbe, for his sustained interest and support. His encouragement is sincerely appreciated!

ADDENDUM

Readers should bear in mind that two important Acts were promulgated after the document was written. This material, as such, could not be incorporated in the text. The two Acts are the National Water Act No. 36 of 1998, dated the 26th of August 1998; and the Water Services Act No. 108 of 1997, dated the 19th of December 1997. The first Act replaced the Water Act No. 54 of 1956. The second Act essentially deals with issues surrounding the supply of water. The procedure for obtaining details of Acts and other forms of legal notification is explained in Chapter 19: The laws of South Africa (Part 6).

FORMAT

This thesis consists of 20 chapters which are contained in six parts. You are now reading Part 1. Parts 2 - 6 inclusive are separately bound. Each of the 20 chapters has its own contents page/s. The pagination in every part is consecutive. The six parts consist of the following:

Part 1

Executive summary

Table of contents for the entire source book

Chapter 1: Introduction

INTRO

Chapter 2: General information

GEN INFO

Chapter 3: Maps, aerial photographs and satellite images available for Natal/KwaZulu

MAPS

Chapter 4: Geology

GEOLOGY

Chapter 5: Planning regions in Natal/KwaZulu

REGIONS

Part 2

Chapter 6: Catchments in Natal/KwaZulu

CATCHMENTS

Chapter 7: Estuaries in Natal/KwaZulu

ESTUARIES

Chapter 8: Wetlands and pans in Natal/KwaZulu

WETLANDS

Chapter 9: Rainfall

RAINFALL

Part 3

Chapter 10: A brief inventory of the surface water resources of Natal/KwaZulu

SURFACE WATER

Chapter 11: Groundwater in Natal/KwaZulu

GROUNDWATER

Chapter 12: Water supply planning for infrastructure provision

WATER SUPPLY

Part 4

Chapter 13: Soils and soil erosion

SOILS

Chapter 14: Fire in grasslands and forests

FIRE

Chapter 15: Water quality

QUALITY

Part 5

Chapter 16: Health aspects of water and sanitation

HEALTH

Chapter 17: Solid waste management in South Africa

SOLID WASTE

Part 6

Chapter 18: Sanitation in South Africa

SANITATION

Chapter 19: The laws of South Africa

LAWS

Chapter 20: Appendices

APPENDICES

The thesis contains 279 tables and two maps. The tables are distributed as follows:

Chapter	Number of tables	Chapter	Number of tables
1	1	11	9
2	12	12	19
3	1	13	20
4	1	14	7
5	4	15	21
6	27	16	4
7	15	17	18
8	22	18	22
9	11	19	8
10	45	20	12

EXECUTIVE SUMMARY

A WATER RESOURCES AND SANITATION SYSTEMS SOURCE BOOK WITH SPECIAL REFERENCE TO KWAZULU-NATAL

(a) Motivation for the project

It is well known that water, perhaps to a slightly lesser extent in Natal/KwaZulu, is a major constraint on South Africa's economic development. To find new sources of water (groundwater), to best utilize what is available (supply and demand), and to safeguard the quality of our water supplies is of paramount importance. It follows that water resources might not be properly utilized and protected in the future, if the recording and collation of water and sanitation information is deficient. Since water is vital to South Africa's well-being, so too is information.

(b) Aims of the project

The main aim of the project was to compile a bibliographic database and source book in terms of water and sanitation systems, with special reference to Natal/KwaZulu. Natal and KwaZulu as a specific region received major emphasis in the project, although relevant material from across South Africa and in some cases, southern Africa, was included. The word "source" is stressed in that the project was intended as a reference work either as a source of data in its own right, or as a source of further information. An important aim of the project was to present information in a multi-disciplinary format, in an attempt to provide an holistic perspective for the reader with regard to a broad range of sub-disciplines. The material covered in the project varies, for example, from bioclimatic regions (groups) to sanitation. With the increasing complexity of the modern world, no single discipline can hope to encompass all, or even most aspects of water and sanitation. Readers therefore, will find valuable information on allied disciplines - information which was often difficult to acquire and to verify. In summary, the main purpose of the project was to provide the user with a conceptual framework within which to obtain further information. This applies particularly to the environmental manager who must integrate material - written by the individual researcher following his chosen research path - in an holistic manner in practical day-to-day situations.

Another primary aim was to sharpen perceptions of the importance of water and sanitation information (information awareness) in a broad spectrum of water-related disciplines in a largely semi-arid land; and to assist in the best possible use of water resources through knowledge of pertinent information. It is the writer's belief that full use is not being made of extant information resulting in, at worst, the omission of significant facts necessary for

the overall success of specific projects. There is evidence to suggest that certain civil engineering (consulting) firms are particularly at risk in this regard. The project accordingly, attempted to bridge this gap by providing both scientific and planning data. Some emphasis was placed on water supply and sanitation systems in black settled areas.

A particularly important aim of the project was to retrieve, and to alert users to the increasing proportion of material now appearing in the form of "grey literature". The latter consists of unpublished or internal reports (such as civil engineering reports) which are a valuable source of practical data. These reports are seldom examined by a wider audience. The explosion in grey literature in South Africa - as in other countries - implies that determined efforts are necessary to locate the material in the first instance. In the field of water resources planning much of the information may only be available as grey literature. The sole discovery method, frequently necessary, involves the physical searching of the libraries and information storage areas of numerous consulting engineering firms and similar sources. The retrieval of grey literature, accordingly, is a major challenge facing the planning (and scientific) community.

A further objective of the project was to gather information on older technologies and procedures, which together with modern scientific concepts, might profitably be re-examined for possible future use especially in rural areas. Reference is made here for example to hydraulic rams (rampumps) and sand storage dams.

(c) Results of the project

Successful management decisions in terms of water resources require a multi-disciplinary approach. The project therefore attempted to mirror these issues*. The selection of items for inclusion in the source book (and to some extent the database), reflects the personal approach of the writer within the ultimate constraints of time and funds. Such a selection may not always satisfy the expert in a specific discipline, although the book was written with the general scientific or field practitioner in mind. The current project may be viewed as a somewhat novel approach to the complex problems of information

* It follows that multi-disciplinary research is both desirable and essential. An example is the investigation of severe soil erosion in a particular area, where a geologist, a soil physicist/chemist, a geographer and a sociologist may well be able to provide a detailed analysis of the causes of the problem - as well as concrete proposals for improved land use practices, and for the rehabilitation of the soil.

awareness and retrieval. The project involved a multi-disciplinary "voyage of discovery" with the only real parameter best described as "the more one searches, the more one finds"; or "more money and more time = more references". To this end, 78 libraries and other sources of information in Natal/KwaZulu were physically searched, book by book, report by report. A further 32 organizations in Natal/KwaZulu and as far afield as Windhoek were contacted by fax, phone or post in order to obtain information.

Major deficiencies were noted at certain libraries in terms of the value placed on unpublished material, and the necessity for proper storage and a listing of the material. It became evident that there is a wealth of information "available" in this country, a considerable proportion of which, is buried and therefore "lost" to all but the most determined researcher. It was likewise apparent that certain categories of information (mainly grey literature), are being lost at more or less the same rate that the information is being generated. Only a fraction of all the literature examined could in any manner whatsoever, be regarded as a review paper or report per se. There is a pressing need for the compilation of review documents which summarize previous research in detail, thereby providing a benchmark analysis for use by the expert and non-expert alike.

Following directly from these problems, a future aim of the project is to "dislodge" additional material, especially grey literature, which was not found (or available) during the previous information-search phase, and which could be incorporated into a later edition. It is the writer's opinion that serious efforts will have to be made to inculcate an "information awareness", particularly amongst young researchers and those working alone, or in isolated surroundings. This applies especially in the field of water resources planning where the wheel is sometimes "re-invented", with surveys being repeated over a number of years - or the results thereof completely ignored due to a lack of awareness of older reports. It is hoped that the present publication will to some extent succeed in addressing these issues, by revealing not only the information per se, but also the sources of such information. In essence, it is true to say that much emphasis is placed (at large) on the production of data, with a seemingly limited concern for the collation and synthesis of information. South African universities are particularly at fault in this regard.

The source book and especially the database will also assist in the identification of gaps in water and sanitation research, and as outlined above, will likewise assist in the discovery of older technologies worth re-examining. The search procedure for the

bibliographic database was accordingly extended to 1900, primarily to find papers which discuss the older technologies. An example of the identification of a gap in scientific literature concerns groundwater in Natal/KwaZulu. There is no up-to-date (overall) report describing groundwater in the province as a whole. Very few scientific papers were found on groundwater in Natal/KwaZulu, with the literature available, consisting largely of consulting engineering reports, research reports, conference papers and theses. This material is difficult to locate especially when time or resources are limited. It is encouraging to note however, that the Department of Water Affairs and Forestry is presently involved in a major groundwater study across South Africa (including Natal/KwaZulu).

The project also revealed the extent to which information tends to be "library" specific. With the exception of the major (mainly university) libraries in Natal/KwaZulu, there appeared to be little effective communication between libraries in the province - with the result that researchers and especially planners associated with a given library, were often unaware of the type of material held by another library. In some instances, the very existence of the library or resource centre was unknown*. A primary advantage of the current project is the availability of data in one locality - with material from the various libraries and information sources examined - to be found in the database or in the book. This information is presented to a wider audience. The project therefore enables the individual researcher equipped with an ordinary personal computer to physically possess and to use (at his own convenience) all the multi-disciplinary data derived during the programme. The possibility exists that some organizations may wish to use sections of the database as "seed data" to develop their own highly specialized databases. Interest has been expressed for example, in using the literature dealing with schistosomiasis (bilharziasis), and which only covered certain topics, to initiate a computerized bibliography covering all aspects of the disease in southern Africa. Another possibility concerns the literature on urbanization, which mainly refers to demography and the demand for services including water and sanitation.

* A recent initiative in this regard is the Cataloguing Network in Pietermaritzburg (CATNIP) bibliographic database which links numerous libraries in the Natal Midlands. Users are able to examine the combined holdings by means of computer terminals. See Table B7 in Chapter 2.

(d) Recommendations for further research

The need for the discovery of additional information has already been discussed. One method would involve the re-examination of the literature to incorporate material (where relevant) for the other provinces. This would involve considerable time and expense. An alternative would be to institute a programme requesting the personal curriculum vitae of as many research workers and practitioners as possible, within the parameters of the current project, or within expanded parameters. Numerous scientific and professional bodies such as the South African Institution of Civil Engineers could likewise be approached for a print-out of all the material produced or held by the library of the institution concerned. Both routes would yield additional and important items of information at relatively low cost.

It may be possible to convince scientific personnel to automatically notify WATERLIT* or some other agency of relevant literature, especially unpublished material or papers published in overseas journals or presented at overseas conferences. Notification could be undertaken once or twice a year. Similarly, Government departments and research institutions must be encouraged to maintain up-to-date bibliographies of all their reports and papers (which would include topics other than water). In this manner, literature (it is hoped), would not be buried or eventually lost. The onus in many respects would fall on the individual researcher and/or institution. The latter would be required - as part of a general scientific responsibility - to ensure that material was logged by the relevant bibliographic agencies. The present situation where a few bibliographers desperately attempt to remain abreast of the flood of literature (which is an exhausting, very time consuming and less than satisfactory procedure), would to some extent be obviated.

It is suggested that abstracts, as opposed to key words, should be used in bibliographic databases in South Africa in the future. The compilation and inclusion of key words, while desirable, greatly increases the complexity and costs of information collation. Budget limitations accordingly, might preclude the discovery and listing of certain other material, particularly grey literature. It follows that abstracts would be required for all types of literature ranging from engineering reports to conference papers. The abstracts would

* WATERLIT is the water literature database previously maintained by the CSIR. WATERLIT is now part of the Water Research Commission. Readers should bear this in mind whenever reference is made to WATERLIT in the present publication.

need to be carefully written. A scanner could be used to enter the abstracts, thereby reducing input time. Authors might also be required to submit key words as an integral component of the paper, thesis or report (already policy for certain journals). The selection of appropriate key words however, is a specialized task which if incorrectly undertaken, could result in confusion.

Another information retrieval strategy concerns the establishment of a database listing all consulting engineering reports of relevance to water and sanitation. By means of changes to the Water Act No. 54 of 1956 and/or the Legal Deposit of Publications Act No. 17 of 1982, it may be possible to institute the compulsory recording of the bibliographic details of (suitable) consulting engineering reports, on a nation-wide basis. The computerized list would enable all documents relating to a specific project or geographic area to be identified. It follows that use of a computerized database would enable the perusal of report titles available for the Transvaal for example, to be undertaken at a terminal, say, in Pietermaritzburg. Only reports which involve public funds could be entered. Reports generated for private purposes would not be listed, unless specifically agreed to by all parties. Procedures could be applied to prevent the use of the database for the purposes of unfair competition. Copies of the reports in addition, could only be obtained if justification was provided, for instance, by a Government department.

It became evident during the course of the project that several consulting engineering as well as town and regional planning firms were not fully informed of the activities of the Water Research Commission, namely: the publication of research reports, the SA Waterbulletin, and the formal journal, Water SA. These firms were also unaware of WATERLIT. A large body of information accordingly, is not reaching part of the intended audience. Attempts should be made to draw such firms into the formal "water information network", by means of seminars presented at research institutions undertaking work for the Commission. Another possibility in this regard is the forwarding of names of firms to the Commission, for an invitation to be placed on the mailing list for the SA Waterbulletin and perhaps Water SA.

Reference has already been made to the scarcity of review papers or reports, which is a characteristic of the South African water and sanitation literature. One of the reasons for this state of affairs is believed to be the South African Post Secondary Education (SAPSE) formula, whereby the Department of National Education pays a subsidy to the university

or institution for papers published in approved journals. A subsidy is also paid for books meeting certain criteria. No additional subsidy is paid in terms of the SAPSE formula for review papers. There is accordingly, only a limited incentive for the writing of review papers. The compilation of review papers is difficult and can only be undertaken by a select number of research leaders. It is therefore suggested that a properly constituted review paper be regarded as equivalent to say, two or three "normal" or non-review papers. An alternative procedure would involve the financing of review papers or reports by specialist agencies such as the Water Research Commission. The reduction in research funding currently being experienced in South Africa might prove opportune for a careful assessment of past research results, and for a detailed analysis of future research policies and programmes in this country.

Another recommendation stemming from the current project concerns the development of an "information package" which could be used, at least in part, by university departments involved in the training of water scientists and engineers. The objective of the programme would be to provide a basis for instruction in scientific information retrieval techniques for South African and overseas water literature.

It is further suggested, following critical comment, that a second edition of the source book be produced perhaps in three years time, which would incorporate material from the other provinces. It may be feasible thereafter, to update the book at specified intervals or to expand the book to include topics not covered, but also of relevance. It is possible that the book could serve as a prototype for similar water information publications elsewhere in southern Africa.

Several other proposals have already been submitted to the Water Research Commission and need not be repeated here. A report outlining sources of scientific and planning information in South Africa, and relevant methods for obtaining this information (some of which are described above), was sent to the Commission in 1991. A brief overview paper based on the memorandum, and which was published with the approval of the Commission, appeared in a local journal during 1992*.

* See Alcock, P., 1992. A proposed strategy for water and sanitation-related information retrieval in South Africa: 1900 to the present, Innovation, No. 5, December 1992, p. 12 - 15.

In conclusion, the present work represents a point of departure in the long search for unpublished material; as well as for the listing of semi-formal and formal literature not found in any scientific bibliographic database in South Africa. Some of the material already retrieved is presented in the first instance in the source book, in order to alert users to the availability of such (multi-disciplinary) information. Secondly, the bibliography by presenting what has been discovered will, hopefully, lead to the retrieval of additional information possibly forgotten, and all but lost to science. Water is vital to South Africa's advancement and so too is a detailed synthesis of water and sanitation information - a process which should receive much greater emphasis in the future.

(e) Overview

Possibly the most appropriate description of the project is the following, which was written with other purposes in mind by an eminent British historian, Sir Charles Oman:

"What is required is zeal, insatiable curiosity, a dogged determination to work at all times and in all places, and then a stern resolve to print the results - even though they seem incomplete, and though there may be a danger of their being superseded on account of later discoveries"*.

The writer has attempted to undertake the former. The latter will be self evident, especially in certain chapters.

* Quoted in Bott, G., 1994. Keswick: the Story of a Lake District Town, Cumbria County Library, Cumbria Supplies and Chaplins of Keswick-Booksellers, [Keswick], 212 p. and map.

TABLE OF CONTENTS

- **Part 1. Chapters 1 - 5**
- **Part 2. Chapters 6 - 9**
- **Part 3. Chapters 10 - 12**
- **Part 4. Chapters 13 - 15**
- **Part 5. Chapters 16 - 17**
- **Part 6. Chapters 18 - 20**

CHAPTER 1: INTRODUCTION

<u>Contents</u>	<u>Page</u>
1.1 Aims of the project and how to use this report	2

<u>Table</u>	<u>Page</u>
Table A1: Bibliographic database subject categories	5

<u>Maps</u>	<u>Page</u>
Figure 1: A map of Natal/KwaZulu indicating the main towns and cities as well as certain rivers and dams	9
Figure 2: KwaZulu, in the context of Natal/KwaZulu	10

CHAPTER 2: GENERAL INFORMATION

<u>Contents</u>	<u>Page</u>
2.1 Overview	17
2.2 Some primary source documents of relevance (see Table B7 where necessary)	125
2.2.1 Individual expertise/relevant organizations/suppliers and manufacturers of commodities	125
(a) Agricultural expertise	125
(b) Business data and product information	126
(c) Chemistry	127
(d) Development-orientated activities	127
(e) Energy	129
(f) Environment	130
(g) Research organizations and professional associations	132
(h) Waste management	134
(i) Water and related issues	135
2.2.2 General information sources	135
2.2.3 Sources of local data and information	138
(a) Municipal records	138

Contents (continued)**Page**

	(b) University departments	138
2.2.4	Some printed (or computerized) bibliographies and similar sources available in South Africa	139
	(a) Agriculture	139
	(b) Botany	140
	(c) Energy	141
	(d) Environment	141
	(e) Fire	142
	(f) Forestry	142
	(g) General development-orientated activities	143
	(h) Geology	144
	(i) Health	144
	(j) Mining	145
	(k) Non-government organizations	145
	(l) Planning and the urban environment	145
	(m) Soil erosion	147
	(n) South African spatio-temporal databases	148
	(o) Waste disposal	148
	(p) Water in general (including the marine environment, as well as organisms living in or associated with water)	149
	(q) Other bibliographies	155
2.2.5	Government reports	155

Tables**Page**

Table B1:	Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993	19
Table B2:	Selected Natal Provincial Administration branches, chief directorates, directorates and sub-directorates, 1993	33
Table B3:	Selected KwaZulu Government departments, 1993	36
Table B4:	Selected specialist libraries in southern Africa, 1993	38
Table B5:	Selected statutory, quasi-government and private organizations in South Africa, 1993	70
Table B6:	Universities in southern Africa	92
Table B7:	Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases	95

Tables (continued)**Page**

Table B8:	Some central Government and Natal Provincial Commissions and Committees of Inquiry, 1917 - 1986	156
Table B9:	Reports by the Director of Irrigation and the Irrigation Commission on water projects in Natal, submitted to the House of Assembly as Manuscript Annexures to Minutes of Proceedings	161
Table B10:	Some Select Committee reports, 1914 - 1984	162
Table B11:	Some White Papers on Government policy, 1980 - 1991	163
Table B12:	Department of Water Affairs and Forestry White Papers on projects in Natal/KwaZulu, 1958 - 1990	164

**CHAPTER 3: MAPS, AERIAL PHOTOGRAPHS
AND SATELLITE IMAGES AVAILABLE FOR NATAL/KWAZULU**

Contents**Page**

3.1	Introduction	171
3.2	Topographic and other maps covering Natal/KwaZulu	171
3.2.1	Topographic maps scale 1 : 50 000	171
3.2.2	Topographic and topo-cadastral maps scale 1 : 250 000	172
3.2.3	Topographic and administrative maps (indicating magisterial districts) scale 1 : 500 000	173
3.2.4	Other maps	173
3.2.5	Sources of maps	173
3.2.6	Orthophoto maps scale 1 : 10 000	174
3.2.7	Orthophoto maps scale 1 : 2 000	174
3.2.8	Orthophoto maps scale 1 : 1 000	175
3.3	Aerial photographs	175
3.3.1	Colour aerial photos scale 1 : 20 000	176
3.3.2	Ultra small scale aerial photos	176
3.3.3	Medium scale aerial photos scale 1 : 20 000	176
3.3.4	Medium scale aerial photos scale 1 : 30 000	177
3.3.5	Small scale aerial photos scale 1 : 50 000 - 1 : 60 000	177
3.3.6	Sources of orthophoto maps and aerial photographs	178
3.4	Satellite images	184
3.5	Some specialist maps and aerial photographs available for Natal/KwaZulu (mainly separately published items)	187

Contents (continued)**Page**

3.5.1	Agriculture	187
3.5.2	"Estuaries"	188
3.5.3	Priority wetlands	188
3.5.4	Forests	188
3.5.5	Coastal zone vegetation maps	189
3.5.6	M.O.S.S. (Metropolitan Open Space System - urban conservation) maps	189
3.5.7	Water resources	189
3.5.8	Climate	191
3.5.9	Natal Drakensberg	191
3.5.10	KwaZulu catchments maps	192
3.5.11	Natural resources of Maputaland scale 1 : 100 000	192
3.5.12	Natural resources of the Natal South Coast (European owned land) scale 1 : 100 000	193
3.5.13	Soil erosion map of South Africa	193
3.5.14	Natal/KwaZulu resource atlas	193
3.5.15	Topographic/settlement maps scale 1 : 250 000	194
3.5.16	Terrain recreation inventory maps of South Africa scale 1 : 250 000	195
3.5.17	Terrain morphological map of southern Africa scale 1 : 2 500 000	196
3.5.18	Geological Survey open file maps	196
3.5.19	Durban Functional Region aerial photographs and maps	196
3.5.20	KwaZulu maps scale 1 : 800 000	198
3.5.21	Natal/KwaZulu maps scale 1 : 1 000 000	198
3.5.22	Population map of South Africa scale 1 : 2 500 000	199
3.5.23	Street/suburb/town maps of Natal/KwaZulu	200
3.5.24	General map of Natal/KwaZulu	200
3.5.25	Magisterial districts of Natal/KwaZulu	200
3.6	Geographic Information Systems in Natal/KwaZulu	201
3.6.1	Some GIS projects undertaken in Natal/KwaZulu	203

Table**Page**

Table C1:	Scales and sizes of various satellite images available from the CSIR ..	185
-----------	---	-----

CHAPTER 4: GEOLOGY

<u>Contents</u>	<u>Page</u>
4.1 Overview of the chapter	212
4.2 South African stratigraphy	214
4.2.1 Official geological bibliographies of the Union/Republic of South Africa	217
4.2.2 The 1 : 1 000 000 scale geological map (and explanation) of southern Africa	218
4.2.3 Geological Survey reports specifically on Natal/KwaZulu (1 : 250 000 scale map series)	219
4.3 Geology and soils in Natal/KwaZulu	222

<u>Table</u>	<u>Page</u>
Table D1: Summary of principal geomorphic events in southern Africa since the Mesozoic	212

CHAPTER 5: PLANNING REGIONS IN NATAL/KWAZULU

<u>Contents</u>	<u>Page</u>
5.1 Planning regions in Natal/KwaZulu	228
5.2 Town and regional planning in Natal/KwaZulu	234
5.2.1 Structure plans in Natal	234
5.2.2 Structure plans in KwaZulu	236
5.3 Regional Development Associations in Natal/KwaZulu (Development Region E)	237

<u>Tables</u>	<u>Page</u>
Table E1: Correlation between statistical regions, census (magisterial) districts and planning regions in Natal/KwaZulu, 1992	228
Table E2: Areas of magisterial districts in Natal, 1993	230
Table E3: Areas of KwaZulu magisterial districts, 1986	232
Table E4: Regional Development Associations in Natal/KwaZulu, 1993	238

CHAPTER 6: CATCHMENTS IN NATAL/KWAZULU

<u>Contents</u>	<u>Page</u>
6.1 Introduction	4
6.2 Physiographic regions of Natal/KwaZulu	4
6.3 Bioclimatic regions of Natal/KwaZulu	26
6.4 Geobioclimatic sub-regions in Natal/KwaZulu	50
6.5 Catchment management in Natal/KwaZulu	52
6.5.1 Mountain Catchment Areas	52
6.5.2 The Natal Drakensberg	55
6.5.3 Other catchments	61
6.6 Forestry in Natal/KwaZulu	63
6.6.1 Commercial afforestation potential in Natal/KwaZulu	63
6.6.2 Impacts of commercial afforestation	67
6.6.3 The afforestation permit system in South Africa	72
6.6.4 Some primary publications on grasslands and forests in southern Africa	79
6.7 Conservation areas and categories in Natal/KwaZulu	87
6.7.1 Other nature reserves in Natal	104
6.7.2 Biosphere reserves in Natal/KwaZulu	108
6.7.3 Wetlands of International Importance in Natal/KwaZulu	109
6.7.4 The South African Natural Heritage Programme	111
6.7.5 Sites of Conservation Significance in Natal	115
6.7.6 Conservancies in Natal	119
6.7.7 Metropolitan Open Space System (M.O.S.S.) areas in Natal	130
6.7.8 State forests in Natal and conservation areas within the forests ..	132
6.7.9 Protected areas and indigenous forests in KwaZulu	133

<u>Tables</u>	<u>Page</u>
Table F1: Physiographic regions and sub-regions of Natal/KwaZulu	5
Table F2: Physiographic regions of Maputaland	25
Table F3: Bioclimatic regions of Natal/KwaZulu	28
Table F4: Monthly distribution of rainfall plus other climatic data and present vegetation in each bioclimatic group in Natal/KwaZulu	38

Tables (continued)**Page**

Table F5:	Further data on bioclimatic groups in Natal/KwaZulu	46
Table F6:	Correlation of physiographic regions, bioclimatic groups and mean annual runoff density in Natal/KwaZulu	47
Table F7:	Some important geobioclimatic sub-regions in Natal/KwaZulu	50
Table F8:	Summary of use and management guidelines for zones of the Natal Drakensberg	57
Table F9:	Some catchment afforestation data for Natal/KwaZulu	64
Table F10:	Veld types (Acocks, 1975) which would be affected by future afforestation and their present nature conservation status in Natal, 1990	69
Table F11:	Conservation status of indigenous forests in Natal/KwaZulu (forests > 50 ha)	70
Table F12:	Afforestation permits allocated from June 1972 - October 1986 in relation to the area planted before June 1972 and to the biological potential after 1975 - with reference to Natal/KwaZulu	74
Table F13:	Nature reserves in Natal controlled by the Natal Parks Board, 1994 . .	90
Table F14:	Game reserves in Natal controlled by the Natal Parks Board, 1994 . . .	99
Table F15:	Game parks and (national) parks in Natal controlled by the Natal Parks Board, 1994	101
Table F16:	Marine reserves in Natal controlled by the Natal Parks Board, 1994 . .	103
Table F17:	Conservation areas on former South African Development Trust land in Natal and previously controlled by the (since defunct) Department of Development Aid, 1994	104
Table F18:	Some nature reserves in Natal owned or administered by local authorities, the Wildlife Society of Southern Africa and the South African Nature Conservation Centre (now the Delta Environmental Centre), 1989	106
Table F19:	Biosphere reserves in Natal/KwaZulu, 1994	109
Table F20:	Wetlands of International Importance in Natal/KwaZulu, 1993	110
Table F21:	South African Natural Heritage Sites in Natal, 1993	112
Table F22:	Sites of Conservation Significance in Natal, 1993	115

Tables (continued)**Page**

Table F23: Conservancies in Natal, 1994	120
Table F24: State forests including wilderness areas in Natal, controlled by the Natal Parks Board, 1994	133
Table F25: Conservation areas in Natal State forests, controlled by the Department of Water Affairs and Forestry, 1993	136
Table F26: Game, nature, forest and freshwater reserves in KwaZulu, 1993	138
Table F27: Some proclaimed indigenous forests in KwaZulu	140

CHAPTER 7: ESTUARIES IN NATAL/KWAZULU

Contents**Page**

7.1 Estuaries, lagoons, bays and river mouths in Natal/KwaZulu	161
7.1.1 Overview	161
7.2 Water quality in the estuaries of Natal/KwaZulu	196
7.3 A community degradation index for South African estuaries	200
7.4 CSIR data sources on estuaries and coastal zone management in Natal/KwaZulu	205
7.5 CSIR publications series on estuaries and coastal zone management in Natal/KwaZulu	207
7.6 The SANCOR estuaries programme	210
7.7 Some primary publications on estuaries and coastal zone management in Natal/KwaZulu	211
7.8 Coastal and estuarine lakes in Natal/KwaZulu	220
7.9 Mangroves in Natal/KwaZulu	227

Tables**Page**

Table G1: A revised basis for the classification of estuaries in Natal/KwaZulu, according to Begg (1984)	163
--	-----

Tables (continued)**Page**

Table G2:	The classification of South African estuaries, according to Noble and Hemens (1978)	165
Table G3:	A simplified categorization of estuaries in Natal/KwaZulu (north to south)	166
Table G4:	Characteristics of the main rivers and estuaries in Natal/KwaZulu, 1984 (north to south)	170
Table G5:	Total freshwater requirements of estuaries in Natal/KwaZulu (north to south)	175
Table G6:	The environmental condition of estuaries in Natal/KwaZulu, 1978 (north to south)	179
Table G7:	The state of knowledge of estuaries in Natal/KwaZulu, 1978 (north to south)	183
Table G8:	Major impacts on estuaries in Natal/KwaZulu, 1978 (north to south) .	186
Table G9:	Specific estuarine problems in Natal/KwaZulu, 1983 (north to south) .	189
Table G10:	Summary of the various types and likely consequences of man-induced modifications to the estuarine environment in Natal/KwaZulu	194
Table G11:	The sediment yield of Natal estuaries (north to south) (after Rooseboom, 1975)	197
Table G12:	Estuary and group, species richness and CDIs calculated for 62 estuaries in Natal/KwaZulu	202
Table G13:	A classification of coastal and estuarine lakes in South Africa	221
Table G14:	Named coastal and estuarine lakes in Natal/KwaZulu (north to south) (freshwater to brackish or highly saline)	222
Table G15:	Mangroves in Natal/KwaZulu (north to south)	227

CHAPTER 8: WETLANDS AND PANS IN NATAL/KWAZULU

<u>Contents</u>	<u>Page</u>
8.1 Wetlands in Natal/KwaZulu	233
8.1.1 Introduction	233
8.1.2 Overview	234
8.2 The distribution of wetlands by bioclimatic group in Natal/KwaZulu	246
8.3 Priority wetlands of Natal/KwaZulu	247
8.4 The sustainable use of wetlands	247
8.5 Wetland degradation	265
8.6 Wetlands awareness programmes	266
8.7 Pans in Natal/KwaZulu	268
8.7.1 Pans of the Pongolo-Usuthu River system	268
8.7.2 Pans of the Mkuze River Floodplain	282
8.7.3 Other pans in Natal/KwaZulu	284
8.8 Some primary publications on wetlands in Natal/KwaZulu	288

<u>Tables</u>	<u>Page</u>
Table H1: A simplified classification of wetlands in Natal/KwaZulu	236
Table H2: A classification of vleis (wetlands) based on physiography in the Natal Highland Sourveld (bioclimatic group 4)	237
Table H3: Types of vleis (wetlands) in Natal/KwaZulu	238
Table H4: A provisional basis for differentiation between the main types of wetlands, other than floodplains in Natal/KwaZulu	240
Table H5: A brief overview classification of wetlands in South Africa	241
Table H6: A detailed wetland classification system for South Africa	242
Table H7: The estimated extent and distribution of wetlands in Natal and East Griqualand, 1981	246

Tables (continued)**Page**

Table H8:	An overview of selected characteristics of the priority wetlands of Natal/KwaZulu	248
Table H9:	A qualitative assessment of the functions and values of the priority wetlands of Natal/KwaZulu, according to the benefits that accrue from existing land uses	252
Table H10:	A general interpretive guide to the sustainable use of wetlands in bottomland situations	255
Table H11:	A simplified overview of some negative consequences of man-induced modifications to wetland ecosystems	257
Table H12:	The effects of specific land use practices on some wetland characteristics and functions	259
Table H13:	Wetland assessment and remedial checklist	261
Table H14:	The status of soil and water conservation in each bioclimatic group of Natal in 1972, as determined by the then Department of Agriculture and Water Supply	264
Table H15:	Named semi-permanent and permanent pans of the Pongolo River Floodplain (south to north)	269
Table H16:	Named pans of the Usuthu River Floodplain (south to north)	278
Table H17:	Inundation of Pongolo Floodplain pans in relation to river flow, due to releases from the Pongolapoort Dam	279
Table H18:	The volume of water contained in various Pongolo Floodplain pans during and immediately after floods	281
Table H19:	Percentage loss of volume with varying decreases in water levels of some Pongolo Floodplain pans (calculated from the maximum retention levels)	281
Table H20:	Named semi-permanent and permanent pans of the Mkuze River Floodplain (north to south)	282
Table H21:	Named semi-permanent and permanent pans of the Mfolozi River catchment (north to south)	284
Table H22:	Some named semi-permanent and permanent pans elsewhere in Natal/KwaZulu (north to south)	285

CHAPTER 9: RAINFALL

<u>Contents</u>	<u>Page</u>
9.1 Weather	299
9.2 Types of weather stations in South Africa (excluding automatic stations) ..	302
9.2.1 Weather station identification numbers	304
9.3 Primary climatological data sources	306
9.3.1 Some Weather Bureau data publications of relevance	307
9.3.2 Some (regularly) published climatological data available from the Weather Bureau	310
(a) Less formal publications	310
(b) More formal publications	311
9.3.3 Department of Water Affairs and Forestry data publications of relevance	311
9.3.4 Other sources of climatological data	313
9.3.5 Climatological data available from the Department of Agriculture, Cedara	315
9.4 Rainfall maps	316
9.5 Record lengths for rainfall and evaporation in South Africa	319
9.5.1 Rainfall	319
9.5.2 Evaporation	320
9.6 Cloud types and precipitation	320
9.7 Mean annual precipitation over Natal/KwaZulu	324
9.8 Temperatures in Natal/KwaZulu	326
9.9 Floods	327
9.10 Droughts	330
9.11 Extreme wet and dry periods in South Africa	334
9.12 Wind	336
9.13 The length of daylight in South Africa	338

<u>Tables</u>	<u>Page</u>
Table 11: Some weather terms used by the South African Weather Bureau	299
Table 12: Weather stations manned by Weather Bureau staff in South Africa, 1993	302
Table 13: Some climatological data available from the Weather Bureau	306
Table 14: Climatological and other data available from the Computing Centre for Water Research, University of Natal, Pietermaritzburg	314
Table 15: Number of stations with various lengths (years) of rainfall records in South Africa, 1984	319
Table 16: Cloud genera and associated prospects for precipitation in South Africa	321
Table 17: Characteristics of synoptic rain-producing types for Natal/KwaZulu . .	325
Table 18: Frequency of occurrence (percentage) of synoptic categories and their contributions to integrated annual rainfall over Natal/KwaZulu, 1965 - 1985	326
Table 19: Some consequences of extended wet and dry periods in southern Africa	335
Table 110: Beaufort scale of wind for a standard height of 10 m above flat ground	336
Table 111: Times of sunrise and sunset at selected South African cities	338

CHAPTER 10: A BRIEF INVENTORY OF THE SURFACE WATER RESOURCES OF NATAL/KWAZULU

<u>Contents</u>	<u>Page</u>
10.1 Introduction	6
10.2 Precipitation and runoff in Natal/KwaZulu	6
10.3 Rivers of Natal/KwaZulu	8
10.4 Drainage catchments and related data in Natal/KwaZulu	11
10.4.1 KwaZulu catchments	39
10.5 Homogeneous climate zones in Natal/KwaZulu	40

Contents (continued)**Page**

10.6	Runoff models	42
10.7	Mean annual runoff in Natal/KwaZulu	43
10.8	Median monthly runoff in Natal/KwaZulu	43
10.9	The variability of monthly runoff in Natal/KwaZulu	44
10.10	Water demand in Natal/KwaZulu	44
10.11	Sources of hydrological data	55
10.12	Department of Water Affairs and Forestry hydrological gauging station reference system and network	62
10.13	Aspects of runoff data for Natal/KwaZulu	84
10.14	International rivers of Natal and environs	86
10.15	Some voluntary river catchment and similar organizations in Natal/KwaZulu	89
10.16	Dams in Natal/KwaZulu	92
10.16.1	Classification of dams for safety purposes	92
10.16.2	Environmental impacts of dams and other works	104
10.17	Some legal aspects of water in South Africa	114
10.17.1	Public and private water	114
10.17.2	Riparian rights	115
10.17.3	Use of water by local authorities	117
10.17.4	Use of water by industrial undertakings	118
10.17.5	Water restrictions	118
10.17.6	Water research levy	118
10.18	Some water control systems in Natal/KwaZulu	119
10.18.1	Government water control areas	119
10.18.2	Government water schemes	120
10.18.3	Government-assisted water schemes	120
10.18.4	River diversions	122
10.18.5	Water boards	122
10.18.6	Irrigation districts and boards in Natal	124
10.19	The provision of services in Natal/KwaZulu	131
10.19.1	Local authorities and services in Natal	131
10.19.2	Local authorities and services in KwaZulu	146
10.19.3	Joint Services Boards in Natal/KwaZulu	151

Contents (continued)**Page**

10.20 Civil defence (now known as civil protection) in Natal/KwaZulu	156
10.20.1 The severe weather watch service for South Africa	161
10.20.2 The flood relief scheme for flood disaster areas	162

Tables**Page**

Table J1: Mean annual precipitation and approximate annual runoff density data for South Africa	7
Table J2: Water budgets for Natal/KwaZulu and South Africa	8
Table J3: Distribution of the catchment areas of the 71 main rivers in Natal/KwaZulu	9
Table J4: Overall gradient distribution of the 71 main rivers in Natal/KwaZulu ..	10
Table J5: Examples of rivers in Natal/KwaZulu with variable gradients (north to south)	10
Table J6: Mean annual runoff and other data for secondary drainage regions in Natal/KwaZulu	13
Table J7: Approximate location of Hydrological Research Unit (HRU) tertiary catchments in Natal/KwaZulu	15
Table J8: Hydrological Research Unit (HRU) tertiary and quaternary catchments in Natal/KwaZulu	18
Table J9: Cross reference of Department of Water Affairs and Forestry secondary drainage regions and Hydrological Research Unit (HRU) quaternary sub-catchments in Natal/KwaZulu	20
Table J10: Areas, mean annual precipitation and virgin mean annual runoff from Hydrological Research Unit (HRU) quaternary sub-catchments in Natal/KwaZulu	23
Table J11: Runoff equations for the ACRU runoff regions of Natal/KwaZulu	38
Table J12: KwaZulu catchments as determined by Eksteen Van der Walt and Nissen (EVN), 1990	40
Table J13: Homogeneous climate zones in Natal/KwaZulu (north to south)	41
Table J14: Mean annual surface runoff (natural MAR) and utilizable MAR for Natal/KwaZulu in 1980	45

Tables (continued)**Page**

Table J15: Estimated mean annual groundwater abstraction for Natal/KwaZulu (10^6m^3)	45
Table J16: Estimated mean annual return flow for Natal/KwaZulu (10^6m^3)	46
Table J17: Estimated mean annual total available water (MAR + estimated return flow + estimated groundwater abstraction) for Natal/KwaZulu (10^6m^3)	46
Table J18: Estimated mean annual total utilizable water (utilizable MAR + estimated return flow + estimated groundwater abstraction) for Natal/KwaZulu (10^6m^3)	47
Table J19: Estimated mean annual intentional evaporation and disposal of poor quality water for Natal/KwaZulu (10^6m^3)	47
Table J20: Estimated annual water demand statistics for Natal/KwaZulu (10^6m^3).	48
Table J21: Estimated annual water demand and surface runoff for South Africa and KwaZulu (10^6m^3)	51
Table J22: Estimated annual water demand for Natal/KwaZulu for 1980 and 2010 (10^6m^3)	53
Table J23: Types of gauging stations/points maintained by the Department of Water Affairs and Forestry	63
Table J24: Department of Water Affairs and Forestry flow gauging stations in Natal/KwaZulu, 1993 (south to north)	65
Table J25: Number of stations with various lengths (years) of streamflow data for catchments of given size in South Africa, 1980	85
Table J26: International rivers of Natal/KwaZulu	87
Table J27: Some voluntary river catchment and similar organizations in Natal/KwaZulu, 1993	90
Table J28: Some relevant data on selected dams in Natal/KwaZulu	93
Table J29: Size classification of dams with a safety risk	101
Table J30: Hazard potential classification of dams with a safety risk	101
Table J31: Category classification of dams with a safety risk	102
Table J32: A simplified form of the environmental matrix used by the International Commission on Large Dams, with respect to project activities	106

Tables (continued)**Page**

Table J33: Actions and environmental effects of water projects (according to the environmental criteria of the International Commission on Large Dams)	107
Table J34: Components of the environmental impact assessment matrix for the proposed Muzi Pan irrigation scheme	110
Table J35: Government water supply schemes owned and administered by the Department of Water Affairs and Forestry or administered by Umgeni Water in Natal/KwaZulu, 1993	121
Table J36: Irrigation districts in Natal, 1993	125
Table J37: Irrigation boards in Natal, 1993	127
Table J38: Some urban areas in Natal, 1993	132
Table J39: Administrative regions and offices of the Directorate of Community Development and the Directorates of Physical Development (Regions 1 and 2), Community Services Branch, Natal Provincial Administration, 1993	142
Table J40: Administrative regions and offices of the KwaZulu Department of Works	147
Table J41: Administrative regions and offices of the KwaZulu Department of Agriculture and Forestry	147
Table J42: Proclaimed KwaZulu townships administered by the KwaZulu Department of the Interior, 1993	148
Table J43: Joint Services Boards in Natal/KwaZulu with their constituent local authorities, 1993	152
Table J44: Some relevant statistics for Joint Services Boards in Natal/KwaZulu, 1992	157
Table J45: Civil protection organizations (including municipalities) in the Joint Services Board areas of Natal, 1993	159

CHAPTER 11: GROUNDWATER IN NATAL/KWAZULU

<u>Contents</u>	<u>Page</u>
11.1 Introduction	170
11.2 Groundwater in South Africa	171
11.3 A brief overview of certain legal aspects of groundwater in South Africa ..	174
11.4 Some primary sources of groundwater information for Natal/KwaZulu	175
11.4.1 Detailed surveys	175
11.4.2 Groundwater data	176
11.4.3 The National Groundwater Database	178
11.5 Groundwater models	179
11.6 A review of groundwater conditions in Natal/KwaZulu	180
11.6.1 Types of aquifers	180
11.6.2 Factors affecting groundwater availability	180
11.6.3 Hydrogeological characteristics of geological formations and methods of groundwater extraction	182
(a) Primary aquifers	182
(i) Alluvial and estuarine sediments (Quaternary)	182
(ii) Berea Formation (Quaternary)	184
(iii) Holocene sands (Quaternary)	185
(b) Secondary aquifers	186
(i) Intrusive rocks	186
11.6.4 Aquifer characteristics of geological formations and faults	191
(a) Proterozoic and older granitic and related rock formations ...	191
(b) Natal Group formations	191
(c) Dwyka Tillite Formation	191
(d) Pietermaritzburg Shale and Vryheid formations	192
(e) Volksrust and Estcourt formations and various formations of the Adelaide and Tarkastad subgroups (Beaufort Group) and the Molteno, Elliot and Clarens formations	192
(f) Drakensberg, Letaba and Jozini formations	193
(g) Intrusive Karoo dolerite	194
(h) Faults	195
(i) Makatini, Msinene and St Lucia formations (Cretaceous)	195
(j) Uloa Formation (Miocene)	196
(k) Port Durnford Formation (Pleistocene)	196

Contents (continued)**Page**

11.7	Methods of groundwater exploitation	198
11.7.1	Borehole depths	198
11.7.2	Springs	198
11.8	Methods of groundwater location	199
11.9	Government drilling services	201
11.9.1	South Africa	201
11.9.2	KwaZulu	204
(a)	Boreholes	204
(b)	Wells	205
11.10	Groundwater equipment	206
11.11	Standards applicable to the borehole industry	207
11.12	Spring protection in KwaZulu	207
11.12.1	Types of springs	208
(a)	Gravity springs	209
(b)	Artesian springs	209
11.13	Springs, boreholes and wells in Natal	212
11.14	Overall groundwater quality in South Africa	217
11.14.1	Some general observations regarding groundwater quality (according to Bond, 1946)	220
11.14.2	An examination of the Bond (1946) classification, with comments on northern Natal/KwaZulu	221
11.15	Hygrophilous trees in Natal/KwaZulu	225
11.16	Grasses typical of wet areas in Natal/KwaZulu	225
11.17	Some primary publications on groundwater in South Africa	227
11.17.1	General	227
11.17.2	Natal/KwaZulu survey reports (as per mapping unit)	232

<u>Tables</u>	<u>Page</u>
Table K1: Some geological formations in South Africa, with special reference to Natal/KwaZulu	187
Table K2: A brief overview of the groundwater potential of Natal/KwaZulu in terms of bioclimatic group	197
Table K3: Methods of hydrogeological investigation used in Natal/KwaZulu	200
Table K4: Spring discharge in the Vulindlela District of KwaZulu, October 1982 - September 1983	211
Table K5: The number of ephemeral and perennial springs on white, Indian or Coloured owned or managed farms in Natal, 1960	213
Table K6: The depth and yield characteristics of functional boreholes providing usable water on white, Indian or Coloured owned or managed farms in Natal, 1960	215
Table K7: The depth and yield characteristics of functional wells providing usable water on white, Indian or Coloured owned or managed farms in Natal, 1960	216
Table K8: Some hygrophilous trees in Natal/KwaZulu	225
Table K9: Common grasses in Natal/KwaZulu found on wet soils	226

CHAPTER 12: WATER SUPPLY PLANNING FOR INFRASTRUCTURE PROVISION

<u>Contents</u>	<u>Page</u>
12.1 Introduction	241
12.2 Animal, domestic and industrial water consumption in South Africa	242
12.3 Major infrastructure projects in the black townships of Natal/KwaZulu	274
12.3.1 Historical background	274
12.3.2 The Reconstruction and Development Programme	275
12.4 Water and sanitation planning in black urban areas of Natal/KwaZulu	277
12.4.1 RSA-KwaZulu Development Project guidelines	277
12.4.2 Durban Metro Water guidelines	288
12.4.3 Department of Water Affairs and Forestry guidelines	289
12.4.4 Other guidelines	292

Contents (continued)**Page**

12.5	Alternative technology pumping equipment in Natal/KwaZulu	292
12.6	Some training agencies in Natal/KwaZulu, with relevance to water and sanitation in black settled areas	296
12.7	Types of informal settlement in Natal/KwaZulu	304
12.8	The size of households in black settled areas of Natal/KwaZulu	312
12.9	Housing delivery methods in the black urban areas of South Africa	318

Tables**Page**

Table L1:	A broad overview of water consumption by wild animals in South Africa	243
Table L2:	A broad overview of water consumption by livestock	245
Table L3:	Some South African domestic water consumption category data for formal urban households	247
Table L4:	Some per capita household consumption data for formal urban households in the Durban-Pietermaritzburg Metropolitan Axis	252
Table L5:	Some water consumption data for the Clermont Township in the Durban Functional Region	255
Table L6:	Some typical domestic water consumption data for black households in South Africa	260
Table L7:	Some South African industrial water consumption data including wastewater quality information	265
Table L8:	RSA-KwaZulu Development Project planning guidelines/standards for amenities in terms of the upgrading of existing areas, and for the establishment of new black (urban) residential sites and towns in Natal/KwaZulu, 1990	278
Table L9:	RSA-KwaZulu Development Project infrastructure options for the upgrading of existing areas, and for the establishment of new black (urban) residential sites and towns in Natal/KwaZulu, 1990	281
Table L10:	RSA-KwaZulu Development Project water demand guidelines for the upgrading of existing areas, and for the establishment of new black (urban) residential sites and towns in Natal/KwaZulu, 1990	285
Table L11:	Department of Community Development water demand guidelines ...	286

Tables (continued)**Page**

Table L12: Some extant water wheels, turgo-wheels, pelton wheels and turbines in Natal/KwaZulu, 1993	293
Table L13: Specific training agencies in Natal/KwaZulu, with relevance to water and sanitation in black settled areas, 1994	297
Table L14: A spatial typology of informal settlement patterns in Natal/KwaZulu, with special reference to the Durban Functional Region	306
Table L15: A typology of social categories in the informal urban fringe surrounding Durban	310
Table L16: Some sources of population data in Natal/KwaZulu, with special reference to the Durban Functional Region	314
Table L17: Household size in given settlement types in KwaZulu, 1992	316
Table L18: Mean household size per KwaZulu district, 1992	317
Table L19: Existing housing delivery systems and sub-systems in South Africa, 1993	318

CHAPTER 13: SOILS AND SOIL EROSION

Contents**Page**

13.1 The nature of soil	4
13.2 A brief history of soil classification in South Africa	7
13.3 The South African soil classification system	9
13.3.1 The 1977 binomial soil classification system	9
13.3.2 The 1991 taxonomic soil classification system	12
13.4 Regional and sub-regional soil surveys in Natal/KwaZulu (prior to the 1991 taxonomic classification system)	14
13.4.1 Regional soil surveys	14
(a) Soils characteristic of bioclimatic groups in Natal/KwaZulu ..	20
(i) Bioclimatic group 1 - Coastal Lowlands	20
(ii) Bioclimatic group 2 - Coastal Hinterland	21
(iii) Bioclimatic group 3 - Midlands Mistbelt	22
(iv) Bioclimatic group 4 - Highland Sourveld	23

Contents (continued)**Page**

(v)	Bioclimatic group 5 - Montane	23
(vi)	Bioclimatic group 6 - Moist Tall Grassveld	23
(vii)	Bioclimatic group 7 - Valley Thornveld - Tugela	24
(viii)	Bioclimatic group 8 - Dry Tall Grassveld	24
(ix)	Bioclimatic group 9 - Zululand Bush and Lowveld	25
(x)	Bioclimatic group 10 - Valley and Interior Thornveld ...	26
(xi)	Bioclimatic group 11 - Arid Lowland	26
(b)	Dominant soils of East Griqualand	26
13.4.2	Sub-regional soil surveys	27
13.4.2.1	Soils data for the sugar growing areas of Natal/ KwaZulu	28
13.5	Soil testing in Natal/KwaZulu	28
13.6	Land Type maps covering Natal/KwaZulu	29
13.6.1	Bioresource units and groups	32
13.6.2	Some implications of Land Types	33
13.7	Some soil studies in the coastal and afforested areas of Natal/KwaZulu ...	35
13.8	A brief overview of wetland soils in Natal/KwaZulu	36
13.9	Some primary publications on soils with special reference to Natal/KwaZulu	42
13.10	Soil erosion in Natal/KwaZulu	45
13.10.1	Some causes of soil erosion	45
13.11	The classification of soil erosion in southern Africa	48
13.11.1	Soil erosion features	48
13.11.2	Soil erodibility rating	55
(a)	Water	55
(b)	Wind	74
13.12	A brief examination of soil erosion in Natal/KwaZulu	75
13.13	Soil erosion surveys and remedial measures in Natal/KwaZulu	86
13.14	The National Grazing Strategy	94
13.15	A short history of some resource conservation measures in South Africa ..	95
13.16	The Soil Loss Estimation Model for Southern Africa (SLEMSA)	103

Contents (continued)**Page**

13.17 Land Type maps	106
13.18 Rainfall simulators	106
13.19 Summary	107
13.20 Soil erosion and the Conservation of Agricultural Resources Act No. 43 of 1983	107
13.21 The South African Sugar Association Experiment Station	115
13.21.1 Regional environment committees of the South African Sugar Association	116
13.22 Some primary publications on soil erosion with special reference to Natal/KwaZulu	117
(a) General publications	117
(b) Specific source documents	121

Tables**Page**

Table M1: Soil zones of Natal/KwaZulu	16
Table M2: Soil mapping units and their dominant soil forms in KwaZulu	18
Table M3: Some properties of soils of bioclimatic group 1	20
Table M4: Some properties of soils of bioclimatic group 2	21
Table M5: Some properties of soils of bioclimatic group 3	22
Table M6: Some properties of soils of bioclimatic group 4	23
Table M7: Some properties of soils of bioclimatic group 6	24
Table M8: Some properties of soils of bioclimatic group 8	25
Table M9: Dominant soil series in the bioclimatic sub-regions of East Griqualand ..	27
Table M10: Some properties of certain wetland (bottomland) soils	38
Table M11: Summary of the types and classes of soil erosion in southern Africa ..	49
Table M12: Soil erosion types in southern Africa	53
Table M13: Erosion hazard rating of South African soil series	56

Tables (continued)**Page**

Table M14: A general assessment of erosion in the bioclimatic groups of Natal/KwaZulu, 1978	76
Table M15: Indigenous trees suitable for the afforestation of degraded watercourses	80
Table M16: Some grasses suitable for the protection and conservation of stream banks and watercourses	83
Table M17: The percentage distribution of soil erosion in the Tugela Basin	88
Table M18: Administrative regions and offices of the Department of Agriculture in Natal	110
Table M19: Conservation committees in Natal, 1993	111
Table M20: Contact addresses of regional environment committees established by the South African Sugar Association, 1993	116

CHAPTER 14: FIRE IN GRASSLANDS AND FORESTS

Contents**Page**

14.1 Prescribed veld burning in Natal	128
14.2 The burning regime for mountain catchment grasslands of the Natal Drakensberg	134
14.2.1 Timing of burns	139
14.2.2 Frequency of burns	139
14.3 Causes of run-away veld and forest fires in Natal	141
14.4 Lightning ground flashes and fire	142
14.5 The fire danger index system	148

Tables**Page**

Table N1: Natal veld burning control measures, 1985	129
Table N2: Burning regulations in terms of the Forest Act No. 122 of 1984, dated the 25th June 1993	133

Tables (continued)**Page**

Table N3: Veld burning prescriptions in natural areas of the Drakensberg forest region, 1986 - 1991	135
Table N4: The number of lightning ground flashes $\text{km}^{-2} \text{y}^{-1}$ in southern Africa, 1975 - 1980	143
Table N5: The fire danger rating wind correction factor	149
Table N6: The fire danger rating rainfall correction factor	150
Table N7: The fire danger rating system used in South Africa by forest fire protection associations	151

CHAPTER 15: WATER QUALITY**Contents****Page**

15.1 Some water quality concepts	159
15.1.1 Criteria, guidelines and standards for drinking water quality	159
15.1.2 Determinands	160
15.1.3 Water quality criteria and risk	162
15.1.4 Water quality requirements in South Africa	164
15.1.5 The interpretation of water quality criteria	177
15.1.6 Summary	178
15.2 Water quality criteria for other categories of water use	178
15.3 Water quality analysis in Natal/KwaZulu	189
15.4 Sources of routine water quality data	189
15.4.1 Department of Water Affairs and Forestry	190
(a) Surface water	190
(b) The proposed national groundwater quality sampling and assessment programme	193
15.4.2 Mhlatuze Water	194
15.4.3 Umgeni Water	195
15.5 CSIR historical data sources	196
15.5.1 Water and wastewater treatment plants in KwaZulu	196
15.5.2 Natal rivers, dams, lakes and urban catchments	197

Contents (continued)**Page**

15.6	Water quality management in South Africa	198
15.6.1	Primary philosophies	198
15.6.2	A national monitoring system	203
15.6.3	Catchment (regional) monitoring systems	204
15.6.4	Compliance/project monitoring systems	205
15.7	Water quality problems in South Africa	206
15.8	Effluent and wastewater disposal in terms of the Water Act No. 54 of 1956	211
15.9	Regional development policy in South Africa, with specific reference to industrial location and environmental pollution	220
15.10	A brief overview of effluent and wastewater problems in Natal/KwaZulu	224
15.10.1	Sources of primary information on industrial water pollution (trade effluents) in Natal/KwaZulu	225
(a)	Direct sources	225
(b)	Indirect sources (to determine basic locational and product data)	227
15.11	Catchment water quality in Natal/KwaZulu	230
15.11.1	An historical overview	230
15.11.2	Some catchment water quality issues in Natal/KwaZulu	249
15.11.3	Sediment	251
(a)	Sediment processes	251
(b)	Sediment overview studies	254
15.11.4	Water quality of urban catchments in Natal/KwaZulu	256
15.11.5	Water quality in agricultural and evolving peri-urban catchments in Natal/KwaZulu	261
(a)	Research catchments characteristics	262
(b)	Results of investigations in the three catchments	263
15.11.6	Some impacts of rapid urbanization in the coastal zone, with special reference to "estuaries"	267
15.12	Potable water quality in peri-urban and rural KwaZulu	272
15.13	The classification and zonation of South African rivers: water quality implications	277

Contents (continued)**Page**

15.13.1 Classification	277
15.13.2 Zonation	279
15.14 The conservation status of South African rivers	285
15.14.1 Background analysis	285
15.14.2 Assessment procedures	292
15.14.3 Overview	296
15.15 Eutrophication	299
15.15.1 Factors controlling eutrophication	301
15.15.2 Specific sources of phosphorus	303
15.15.3 The effects of eutrophication	306
15.15.4 Eutrophication indicators	306
15.15.5 Perceptions of the water quality of impoundments	316
15.15.6 Eutrophication management strategies	318
15.15.7 A brief overview of eutrophication studies with special reference to Natal/KwaZulu	321
15.16 Some primary publications on water quality in South Africa	326
15.16.1 Water quality criteria, guidelines and standards	326
15.16.2 National water quality data sources and management issues	330
15.16.3 Overview of water quality in Natal/KwaZulu	333
15.16.4 Specific catchment water quality issues in Natal/KwaZulu	335
15.16.5 The classification and zonation of South African rivers	337
15.16.6 Eutrophication	340

Tables**Page**

Table O1: South African Bureau of Standards (SABS) specifications for water for domestic supplies	165
Table O2: Proposed drinking water criteria for South Africa	170
Table O3: Water quality criteria for livestock watering, for river/dam water (the protection of aquatic life), for recreational (high contact) purposes and for irrigation requirements	179
Table O4: Some examples of the types and effects of water pollutants	207
Table O5: The General and Special Standard applicable to direct discharges of effluent or wastewater into freshwater sources in terms of Section 21 of the Water Act No. 54 of 1956	213
Table O6: An example of the SIC industrial classification code	229

Tables (continued)**Page**

Table O7: Natal/KwaZulu rivers examined in the CSIR/Natal Town and Regional Planning Commission survey	232
Table O8: A water quality classification of Natal/KwaZulu river waters, as developed by the CSIR, 1967	234
Table O9: A revised water quality classification of Natal/KwaZulu surface and groundwaters, as developed by the CSIR, 1971	236
Table O10: The water quality index for rivers and dams developed by Umgeni Water	242
Table O11: Some trends in mean determinand concentrations for the three urban catchments examined by Simpson (1992) in the Durban Functional Region	259
Table O12: A brief overview of some urban catchment processes and consequent impacts on rivers and "estuaries"	269
Table O13: Generalized zonation in South African rivers (as per Noble and Hemens, 1978)	280
Table O14: Generalized zonation in South African rivers (as per Davies and Day, 1986)	283
Table O15: A physical zonation of the Mgeni River in Natal/KwaZulu	286
Table O16: The attributes and default weighting of the River Conservation System	295
Table O17: Some impacts of eutrophication on water use	307
Table O18: Some examples of common eutrophication indicators	309
Table O19: Trophic status criteria for dams/lakes, with a South African example .	310
Table O20: Water quality characteristics identified by the South African public and limnological equivalents	317
Table O21: Catchment nutrient loading rates for six dams in Natal/KwaZulu	322

CHAPTER 16: HEALTH ASPECTS OF WATER AND SANITATION

<u>Contents</u>	<u>Page</u>
16.1 Diseases related to water and soil	3
16.1.1 Human bacteriological and viral diseases	3
16.1.2 Animal diseases	14
16.2 Water, sanitation and human health	16
16.3 Some sources of medical data for human epidemiological studies	23
16.4 Interpretation of medical statistics	27
16.5 Infectious and parasitic diseases statistics for the black population	27
16.6 Death statistics (due to infectious and parasitic diseases) for the black population	29
16.7 Sources of health indicator data	34
16.8 A brief overview of poverty in South Africa	35
16.9 Two diseases of importance in South Africa	38
16.9.1 Malaria	38
16.9.2 Schistosomiasis	42
16.10 Some health aspects of natural wetlands	50
16.11 The blackfly problem in the Cape Province	52
16.12 A brief overview of some health implications of selected determinands in domestic water	54
16.12.1 Health aspects of nitrates	54
16.12.2 The fluoride content of surface and groundwaters	66
16.12.3 The hardness of water and cardiovascular disease	67
16.13 Poisons	67
16.14 Some primary publications on health in South Africa	68
16.14.1 Bacteriological and viral diseases	68
16.14.2 Wastewater reuse (for potable purposes) and health implications ..	69
16.14.3 Sources of epidemiological information and data	70

Contents (continued)**Page**

16.14.4	Services and health implications	74
16.14.5	Malaria	75
16.14.6	Schistosomiasis	76
16.14.7	Wetlands and health	79
16.14.8	The blackfly plague (as one example of ecosystem disturbance resulting in health problems)	80
16.14.9	Inorganic determinands and health	80
16.14.10	Poisons	82

Tables**Page**

Table P1:	Some water-related and soil-based diseases in man	4
Table P2:	Access to water, sanitation and waste disposal services with regard to dwelling type for the black population in Natal/KwaZulu, 1993	20
Table P3:	Reported cases of illnesses and deaths due to notifiable diseases (mainly in terms of water and soil-related diseases) in South Africa, 1981 - 1987	31
Table P4:	Some health and aesthetic implications of selected determinands in domestic water	55

CHAPTER 17: SOLID WASTE MANAGEMENT IN SOUTH AFRICA

Contents**Page**

17.1	Introduction	93
17.2	Some implications and definitions of waste	93
17.3	Some legal aspects of solid waste management on land in South Africa ...	96
17.3.1	The Environment Conservation Act No. 73 of 1989	96
17.3.2	Other Acts relevant to waste management on land	98
17.4	The process of solid waste management	104
17.5	Chemical (mainly oil) spillages at sea	110
17.6	The solid waste stream in South Africa	115
17.6.1	Overall estimates	115
17.6.2	Main components of the solid waste stream in South Africa	117

Contents (continued)**Page**

(a) Mining and mineral waste	117
(b) Pulverized fuel ash and metallurgical slags	117
(c) Urban waste	117
(d) Chemical waste	126
(e) Agricultural waste and sewage sludges	126
17.6.3 Freshwater waste streams	127
17.7 The disposal of municipal sewage sludge and wastewater (effluent)	129
17.7.1 Introduction	129
17.7.2 Health aspects	134
17.7.3 Guidelines for the land disposal of sewage sludge	137
17.7.4 Guidelines for irrigation with reclaimed municipal wastewater ...	151
17.8 Hazardous wastes in South Africa	155
17.8.1 Overview	155
17.8.2 Some primary management concepts for hazardous waste	157
17.8.3 Goals for regulatory authorities	159
17.8.4 Policy and regulatory strategies	161
17.9 Overall estimates of the hazardous waste generated in South Africa	164
17.10 The classification of hazardous waste according to the South African Bureau of Standards	168
17.10.1 The identification of a probable hazardous waste	172
17.11 Waste handling, storage and transportation	174
17.12 Emergency hazardous materials procedures in Natal/KwaZulu	176
17.12.1 The HAZCHEM system	178
17.13 Landfill site classification in South Africa	182
17.13.1 General landfill sites	183
17.13.2 Hazardous landfill sites	185
17.13.3 Current landfill site conditions	186
17.14 Minimum requirements for the treatment and disposal of hazardous waste .	187
17.15 Minimum requirements for landfill site selection	189
17.16 The permitting of landfill sites	191
17.17 Minimum requirements for the final site investigation	193

Contents (continued)**Page**

17.18 The design of landfills	196
17.19 The operation of landfill sites	198
17.20 The monitoring of landfill operations	202
17.20.1 Overall monitoring	202
17.20.2 Water quality monitoring	204
17.21 The rehabilitation, closure and end use of landfills	221
17.22 Conclusion	222
17.23 Pesticides, herbicides and fungicides (agricultural chemicals)	223
17.23.1 The classification of agricultural chemicals	223
17.23.2 Some human health implications of agricultural chemicals	233
17.23.3 Agricultural chemical residues in crops	241
17.24 Agricultural chemicals and the environment	242
17.25 Agricultural chemicals and freshwater	247
17.25.1 Potable guidelines	247
17.25.2 Surveys of agricultural chemical concentrations in water	250
(a) Surface waters	250
(b) Groundwater	251
17.26 Summary	254
17.27 Some primary publications on solid waste management in South Africa ...	255
17.27.1 General issues	255
17.27.2 Sewage sludge and effluent	263
17.27.3 Agricultural chemicals	266

Tables**Page**

Table Q1: The estimated composition of the solid waste stream in South Africa .	115
Table Q2: Important sources of solid waste as estimated by industrial category, for Natal/KwaZulu in 1990	116
Table Q3: The composition of municipal solid waste in three suburbs of Johannesburg (equivalent dry mass as a percentage of total mass) ..	122

Tables (continued)**Page**

Table Q4:	The total identified freshwater waste stream in South Africa in 1990 .	128
Table Q5:	Effluent/sludge volumes ($10^3 \text{ m}^3 \text{ day}^{-1}$) discharged into "estuaries", the surf zone and the offshore area of Natal/KwaZulu, 1991	132
Table Q6:	The results of an inorganic and nutrient chemical analysis of municipal sludges derived from 77 sewage works in South Africa, 1983 - 1987	138
Table Q7:	The classification of sewage sludges to be used or disposed of on land	141
Table Q8:	Permissible methods of sewage sludge disposal, according to land use and agricultural/domestic crops	144
Table Q9:	Guidelines for wastewater irrigation in South Africa	152
Table Q10:	The estimated amount of hazardous and non-hazardous industrial/mining waste generated annually in South Africa (assessed for the period 1990/91)	165
Table Q11:	The classification of hazardous waste, in terms of the South African Bureau of Standards Code of Practice 0228-1990 (The identification and classification of dangerous substances and goods)	170
Table Q12:	Minimum requirements for the treatment and disposal of hazardous waste	188
Table Q13:	Leachate concentrations in Cell No. 1 at the Coastal Park landfill site, Cape Town, 1986 - 1989	206
Table Q14:	Estimates of the number of waste sites in South Africa adequately equipped with monitoring facilities, 1994	214
Table Q15:	The pollution risk of aquifers in Natal/KwaZulu	216
Table Q16:	The World Health Organization agrichemical toxicity categories, as per the LD₅₀ test, 1975	225
Table Q17:	An overview classification of agrichemicals, with regard to chemical class and use	230
Table Q18:	Water quality criteria for human drinking water, in terms of pesticides	249

CHAPTER 18: SANITATION IN SOUTH AFRICA

<u>Contents</u>	<u>Page</u>
18.1 Introduction	5
18.2 Defecation frequencies of the South African population	6
18.3 The composition of raw domestic sewage and household grey water	7
18.4 Defecation data for livestock	16
18.5 Some health benefits of improved sanitation systems	20
18.6 Access to sanitation services in South Africa	21
18.6.1 Some definitions	21
18.6.2 Sanitation in urban areas	24
18.6.3 Sanitation in rural areas	27
18.6.4 Summary	31
18.7 Sanitation case studies	34
18.7.1 Peri-urban/rural areas	35
18.7.2 Urban areas	39
18.8 Some surface and groundwater implications of poor sanitation	44
18.9 Types of sanitation systems	47
18.9.1 Introduction	47
18.9.2 A classification of sanitation systems	49
18.9.3 The upgrading of sanitation systems	72
18.10 An overview of sanitation upgrading projects including lessons learned ...	73
18.10.1 VIP latrines	73
18.10.2 Bucket latrines	83
18.10.3 Anaerobic digesters (LOFLOS) with soakaways	85
18.10.4 Waterborne sanitation systems	86
18.11 Some sanitation design and planning parameters	89
18.11.1 Sanitary facilities required per building type and site population ..	90
18.11.2 The National Building Regulations in respect of pit latrines and similar systems	99
18.11.3 The National Building Regulations for the use of French drains and conservancy tanks	100

Contents (continued)**Page**

18.11.4 Soil percolation tests	104
18.11.5 Sanitation cordons in peri-urban and rural areas	108
18.11.6 Geotechnical investigations	115
18.12 Groundwater contamination with special reference to on site sanitation . . .	116
18.12.1 Groundwater quality studies	116
18.12.2 Simple models to assess some groundwater implications of on site sanitation	122
18.12.3 The passage of faecal contaminants in soil	124
(a) Introduction	124
(b) Protozoa, helminths and bacteria	126
(c) Viruses	129
(d) Nitrate	131
(e) Overview	132
18.13 Selected surface water quality studies involving sanitation	134
18.13.1 The Hennops River Valley	135
18.13.2 Khayelitsha	141
18.13.3 The Swartkops Estuary and environs	150
18.13.4 The Shembe catchment	158
18.13.5 Overview of the surface water quality studies with reference to sanitation	160
18.14 The use of artificial wetlands in the wastewater process	174
18.14.1 Introduction	174
18.14.2 Artificial wetland mechanisms	175
18.14.3 Artificial wetland design	178
18.14.4 The selection of sites for artificial wetlands	179
18.14.5 Artificial wetlands in South Africa	180
18.15 Sanitation research policies	183
18.15.1 The sanitation research funding policy of the Water Research Commission	183
18.15.2 The sanitation policy of the Department of Water Affairs and Forestry	188
18.15.3 Other sanitation research policies in South Africa	189
18.16 Some primary publications on sanitation in South Africa	189
18.16.1 Human and animal defecation data	189
18.16.2 Sewage characteristics	190
18.16.3 General issues	190
18.16.4 Some technical guidelines and other documents on alternative sanitation techniques	192

Contents (continued)**Page**

18.16.5 Some technical guidelines and other documents on conventional sewerage systems	197
18.16.6 Artificial wetlands	198
18.16.7 Groundwater pollution studies and related aspects	199
18.16.8 Surface water quality studies	201
18.16.9 Sanitation research policies	202

Tables**Page**

Table R1: Some determinand concentrations in raw domestic sewage (South African data)	9
Table R2: The quality of sewage effluent discharged from four Umgeni Water wastewater treatment works, January 1991 - December 1995	12
Table R3: Pollutant loads in wastewater derived from household plumbing fixtures in the USA	15
Table R4: Defecation data for cattle and sheep	16
Table R5: The estimated faecal coliform and faecal streptococci count in livestock faeces	19
Table R6: The percentage use of various household sanitation systems by the urban population in South Africa, 1990	25
Table R7: Sanitation systems at schools, clinics and households in the rural areas of South Africa, 1993	29
Table R8: Categories of sanitation systems	50
Table R9: An overview of different types of sanitation systems	51
Table R10: Selected comparisons between various sanitation systems	69
Table R11: Some upgrading methods for various sanitation systems	74
Table R12: The minimum number of sanitary fixtures required for given categories of occupancy or building and population, as per the National Building Regulations, 1990	91
Table R13: The minimum number of sanitary fixtures for black schools in areas without waterborne sewerage	99
Table R14: Estimates of sewage and grey water flows from various types of buildings	102

Tables (continued)**Page**

Table R15: Rates of percolation and effluent application	106
Table R16: The selection of various on site sanitation systems according to percolation rate	108
Table R17: Suggested minimum guideline distances separating a borehole/well and an on site sanitation system	112
Table R18: Summarized mean stormwater quality data for selected urban areas in the Transvaal	162
Table R19: Summarized mean stormwater quality data for selected urban areas in the Cape Province	166
Table R20: The water quality of storm flows and dry weather flows in the Shembe catchment, Durban	169
Table R21: The Water Research Commission master plan for future sanitation research in South Africa, 1991	184
Table R22: The revised Water Research Commission research plan for municipal wastewater management, 1995	187

CHAPTER 19: THE LAWS OF SOUTH AFRICA

Contents**Page**

19.1 The South African legal system	211
19.1.1 Statutes (Acts of Parliament) of South Africa	211
19.1.2 Statutes (Acts of the Legislative Assembly) of KwaZulu	213
19.1.3 Proclamations and Regulation Proclamations, Government Notices, Government Regulation Notices, General Notices and Board Notices	214
19.1.4 Natal Provincial Ordinances and Regulations, Administrator's Proclamations, Administrator's Notices and Provincial Notices ...	216
19.1.5 Municipal Notices (including by-laws)	217
19.2 Reports on decided Supreme Court cases	217
19.3 Published material (books and Government reports) specifically concerning water law in South Africa	219
19.4 The Natal Water Court (of the Natal Provincial Division of the Supreme Court of South Africa)	221

Contents (continued)**Page**

19.5 Acts and associated legislation in terms of the environment and related issues	223
19.5.1 The role of the Council for the Environment and the Committee for Environmental Management of the Department of Environment Affairs	235
19.6 The laws of KwaZulu (1992)	250

Tables**Page**

Table S1: Relevant (extant) Acts of the Parliament of South Africa listed under subject title, according to date (1910 - 1991)	223
Table S2: Some important environmental legislation in South Africa, 1992	231
Table S3: Some relevant South African Acts, Government Notices and Government Regulation Notices with respect to the environment, 1992	236
Table S4: Some relevant Proclamations, Government Notices, General Notices, Board Notices and Provincial Notices in terms of the Water Act No. 54 of 1956 and three related Acts (with special reference to Natal), 31 December 1989	241
Table S5: Some Natal Provincial Ordinances (passed before 1 July 1986), which are relevant to the environment and/or water resources management .	248
Table S6: Relevant (extant) Acts of the Legislative Assembly of KwaZulu listed under subject title, according to date (1976 - 1992)	252
Table S7: International environmental conventions to which South Africa is a signatory, 1933 - 1987	253
Table S8: Some United Nations days, weeks, years and decades	255

CHAPTER 20: APPENDICES

<u>Contents</u>	<u>Page</u>
20.1 Some sources of innovation	258
20.2 South African Bureau of Standards specifications, codes of practice and standard methods	262
20.2.1 Examples of SABS specifications	262
20.2.2 Example of SABS compulsory specifications (VC)	263
20.2.3 Examples of SABS co-ordinating specifications (CKS)	263
20.2.4 Examples of SABS codes of practice	264
20.2.5 Example of SABS recommended practice (ARP)	264
20.2.6 Examples of SABS standard methods (of analysis)	264
20.3 Chemical elements; specific gravities and densities; some physical constants; areas and volumes; the Greek alphabet; Système International d'Unités (SI) units; the distance of the sea horizon; the permanent calendar (1801 - 2000), and international time zones	265

<u>Tables</u>	<u>Page</u>
Table T1: Some technical, industrial and environmental awards in South Africa, 1993	258
Table T2: Chemical elements	266
Table T3: Approximate specific gravities and densities	270
Table T4: Some physical constants	272
Table T5: The calculation of some areas and volumes	273
Table T6: The Greek alphabet	275
Table T7: Preferred Système International d'Unités (SI) prefixes	276
Table T8: Alphabetical list of conversion factors to Système International d'Unités (SI) units	277
Table T9: Alphabetical list of conversion factors to non-SI (Système International d'Unités) units which are still used with the SI	293
Table T10: The distance of the sea horizon	296
Table T11: Permanent calendar for the period 1801 - 2000	298
Table T12: International time zones, 1996	300

CHAPTER 1: INTRODUCTION

The vastness of knowledge...

One cannot know everything...

Horace, Roman poet-satirist (68 BC - 8 BC).

CHAPTER 1: INTRODUCTION

Contents **Page**

1.1 Aims of the project and how to use this report	2
---	----------

Table **Page**

Table A1: Bibliographic database subject categories	5
--	----------

Maps **Page**

Figure 1: A map of Natal/KwaZulu indicating the main towns and cities as well as certain rivers and dams	9
Figure 2: KwaZulu, in the context of Natal/KwaZulu	10

1.1 Aims of the project and how to use this report

- (a) The main aim of the project is to provide the reader - who may not be an expert in the particular discipline - with a summarized array of water and sanitation related information, in the form of basic principles and/or facts. Considerable use is made of tables and footnotes, while inventories of systems have been listed where relevant. Tables are self explanatory, and are fully referenced regardless of the proximity elsewhere in the text of the appropriate reference/s. Space for notes has been left at the end of each chapter to accommodate additional information which readers may wish to record. The source book is presented in a multi-disciplinary format ranging, for example, from rainfall to environmental law. The book therefore attempts to "capture" some salient aspects of a very complex mosaic. Broad outlines only are possible, and the reader is invited to view a specific problem from a multi-disciplinary perspective, where for instance, an awareness of the functions of Government departments is important for an understanding of environmental law*. Follow-up procedures in terms of the multi-disciplinary bibliographic database provide a further source of material for the reader who wishes to obtain more detailed information in his own field, or in an allied field. It is thereby hoped that a climate of increased utility will be created, particularly for those with limited access to fully staffed libraries and other places of information, or those with limited time. No textbook, source book, thesis, paper or other publication can ever be completely up-to-date (notwithstanding enthusiastic claims often made, especially by publishers of expensive books). This project is no exception. The explosion in knowledge is simply too rapid to ever be fully "processed" at any one time. Readers are therefore urged to automatically seek the latest statistics or trends wherever possible. To this end, some pertinent organizations relevant to the given field are listed in a number of chapters - see (j) below. Further data are provided in Chapter 2: General information.

* While certain sections of the publication, for example on water law, are out of date (due to a major change in the legislation), it is hoped that readers not familiar with legal issues will be able to use the information provided as a point of departure for further enquiries. Readers should also note that the titles of four repealed Acts of environmental significance are given in the relevant chapters, together with the titles of the current Acts. The purpose is to indicate to the reader that certain important regulations - applicable in terms of the previous Act - have been incorporated into the current Act. See Table S3 in Chapter 19: The laws of South Africa for further details.

- (b) Proceed by examining the table of contents for your particular interest. Turn to the page/s concerned or flip through the book by examining the top left or right hand corner of each page, which identifies the subject matter. Note that landscaped pages (those with tables turned sideways), could not be subject coded due to the computer program used. The page number of each landscaped page is found above the table heading.
- (c) Should you wish to obtain additional information on the subject, consult the bibliographic database. Please read the notes supplied with the database before continuing. The database is available on either 360 Kb, 1,2 Mb or 1,44 Mb diskettes or on CD-ROM. The database on the diskettes is uncompressed, and does not have to be installed or restored. Users can choose between the following program formats: Microsoft Word for Windows 6.0, or plain MS-DOS text. The CD-ROM version contains both program formats. To use other word processing programs, retrieve and convert the MS-DOS text format. It is recommended that the files be retrieved in word processor format to preserve the formatting, such as the underlining of journal and book titles, as well as generic and specific names. For speed, it is suggested that the files be copied onto a hard drive. For systems with adequate memory, the files can be merged into a single A-Z file (of approximately 2,8 Mb in Microsoft Word for Windows 6.0). Information required can be found by searching on author, subject category (see (g)), or user-selected key words which may appear in reference titles.
- (d) All database references refer to South and southern African topics (with a few exceptions). Modelling was not specifically addressed in the current project because of the volume of material available in WATERLIT, the water literature database maintained by the CSIR in Pretoria*. It has been suggested to the Water Research Commission that a review document be prepared which covers all water models presently in use in South Africa: ranging from eutrophication models, to water-related diseases models (for example, malaria). Such a publication would be most valuable and is urgently needed.

* WATERLIT is now part of the Water Research Commission. Readers should bear this in mind whenever reference is made to WATERLIT in the present publication.

- (e) The source book consists of two types of chapters, namely, data chapters and discussion chapters. The purpose of the data chapters is to provide brief information on a number of different aspects (see for instance, Chapter 8: Wetlands and pans). Discussion chapters, by contrast, attempt to integrate and discuss relevant issues within obvious constraints. An example of the latter is Chapter 15: Water quality.

Since the report is not a textbook, but a source book, it was sometimes difficult to determine the depth and extent of coverage of a particular section. Hopefully however, a balance has been achieved, although virtually impossible choices were sometimes required. Readers seeking comprehensive information should consult the original reference/s quoted in the book, as well as the bibliographic database*. Certain references listed in the book (especially Government documents), may refer to the whole of South Africa although data for Natal/KwaZulu only, have been extracted. It should be noted that frequent data errors were found in the literature. Considerable time and effort was invested in attempting to resolve these errors. The present author nevertheless, is responsible for any subsequent errors in the source book. Given the scope of the project, it is inevitable that mistakes have been made.

- (f) Not all sections or chapters of the book (for example, geology) have a corresponding bibliography. Compare (g) with the overall table of contents for further information.
- (g) The individual subject categories and codes of the database, which covers the period 1900 - 1993, are listed in Table A1. The database has over 11 000 entries.
- (h) The source book and the bibliographic database include all categories of information, namely: formally published works (books/monographs and journals), theses, unpublished university and Government reports, as well as conference papers and consulting (engineering) firms' reports. The latter material is a particularly important category of information which is seldom published or made

* Sometimes only one or two pertinent references are provided in the text. Readers may wish to use these references as a point of departure in the search for further material - assuming that suitable literature cannot be found in the database. It is important to bear in mind that several useful source documents are no longer being published or revised in view of financial and other constraints. The updating of some information may accordingly be problematic.

Table A1: Bibliographic database subject categories.

Category	Code	Region
1. Solar radiation	[SOLA]	South Africa
2. Wind	[WIND]	Mainly Natal/KwaZulu
3. Rainfall	[RAIN]	South Africa
4. Floods	[FLOO]	South Africa
5. Droughts	[DROU]	South Africa
6. Fire in grasslands and forests	[FIRE]	Mainly Natal/KwaZulu
7. Veld management	[VELD]	Mainly Natal/KwaZulu
8. Catchment management	[CATCH]	South Africa
9. Soils (largely pedology)	[SOIL]	Mainly Natal/KwaZulu
10. Soil erosion	[EROS]	Southern Africa
11. Sanitation in developing areas	[SANI]	Mainly Natal/KwaZulu
12. Appropriate water technologies	[PUMP]	Southern Africa
13. Water supplies in developing areas	[SUPP]	Mainly Natal/KwaZulu
14. Water quality	[QUAL]	Mainly Natal/KwaZulu
15. Groundwater	[UNDA]	Mainly Natal/KwaZulu
16. Wetlands	[WETL]	Mainly Natal/KwaZulu and Zimbabwe
17. Estuaries	[ESTUA]	Mainly Natal/KwaZulu
18. Coastal zone management	[ZONE]	Mainly Natal/KwaZulu
19. Environmental impact of dams	[DAMS]	Mainly Natal/KwaZulu
20. General environmental issues	[ENVI]	Mainly Natal/KwaZulu
21. Solid waste management	[WAST]	Mainly Natal/KwaZulu
22. Environmental law	[ELAW]	South Africa
23. Bilharzia	[BILH]	South Africa
24. Health	[HEAL]	South Africa
25. Urbanization (largely with reference to demography and hence the demand for services)	[URBA]	Mainly Natal/KwaZulu

Note: The word "estuaries" has been placed in inverted commas in this publication (excluding the chapter on estuaries). The reader's attention is thereby drawn to the sometimes incorrect use of the term, when a bay, a lagoon or a river mouth is actually being described.

available to a wider audience. A list of all sources or places of information examined or contacted during the project can be found in the introduction to the bibliographic database. The five copyright (legal deposit) libraries, by law, holding copies of all material formally published in South Africa - together with specialized and university libraries - represent the major sources of South African literature. Consulting engineering firms' reports are often only available from the firm in question and/or the commissioning agency (usually Government and quasi-government bodies). Brief details of some of the most important libraries in South Africa are presented in Chapter 2 to aid the reader.

- (i) The data presented in the book refer to the situation at the time of writing. The ongoing rationalization of Government departments and other public bodies, plus political events, has resulted in considerable changes which are sometimes extremely difficult to track. In summary, material in the book mainly refers to the period prior to the 26th of April 1994 (the eve of the general election), after which for example, the political (although not geographic) entity of KwaZulu ceased to exist*. The material presented in the book therefore enables the reader to interpret (where relevant), the literature contained in the bibliographic database for the years 1900 - 1993**. Older (or previous) names for certain agencies and organizations have not been updated in this publication for two reasons. Firstly, due to time constraints, and sometimes the lack of (new) definitive data. Secondly, the complete removal of some names could result in confusion, where the reader examining the literature (with constant reference made to the older names), would not be able to find any mention of these names in the source book. The context in which a particular document was written would likewise not be apparent if more recent names only, had been used in the book. In the event of a second edition of the source book, and allowing for the passage of time, the required amendments

* Attempts to update this report prior to completion would simply have delayed publication even further, and could have resulted in a "closed loop" scenario. It is for this reason that literature dating from the beginning of January 1997 onwards was excluded from the source book.

** It is important to bear in mind that older material on a specific topic may form an integral component of the data in a related field. It follows that major changes in the core material are not reflected in the already published literature. A knowledge of the older primary material may well be necessary in order to understand or to interpret the earlier literature in an allied discipline. This situation will hold until the secondary information has been changed in accordance with the core data. An example is the re-definition of the boundaries of quaternary sub-catchments, where the previous boundaries were used to compile specific areal data in terms of wetland or estuarine characteristics.

will be made. It is accordingly important for readers to confirm the current status of agencies and organizations of interest, given the pace of change over the last few years.

- (j) In order to help the reader, the addresses of various organizations are provided in the source book (in the text, and/or at the end of certain chapters). Contact addresses are of particular importance where a local perspective is required, or where *"up-to-the-minute" information is needed*. *Total accuracy of the addresses cannot be guaranteed, in view of the speed with which the information dates*. However, such information serves to indicate to the reader that a specific organization exists, which will assist in any further enquiries. The listing of organizations is not exhaustive (a task clearly beyond the scope of the current project). Some primary source documents have been outlined in a number of chapters to guide the reader.
- (k) The bibliographic database should be examined as a source of *"market leader"* contacts, and to identify other authors prominent in the field. The database can also be used as a source of information on research trends, and to determine which aspects of a specific topic have *received attention in the literature*. For example, a few papers listed under *"floods"* refer to flood medicine, namely, some psychological aspects of assisting flood victims. These victims may have lost relatives as well as most of their possessions (the January 1981 Laingsburg and September 1987 floods in Natal/KwaZulu in particular).
- (l) A stage of diminishing marginal returns was reached by the end of the project with regard to information retrieval, especially for the bibliographic database. Readers are invited to contact the author with details of entries (of any sort) not found in the database, but within the research parameters. In the event of a second edition these references will be incorporated in the database, along with new entries published after the search completion date of the project.
- (m) It is important to note that the spelling and terminology used in the book and the database *refer to the source document/s in question* (unless compelling reasons

should dictate otherwise)*. Where no source document/s were used, spelling and terminology have been standardized. It is therefore possible, for example, to find "Mgeni" or "Umgeni" as the case may be. The name "Natal/KwaZulu" has been retained to accord with the bibliographic database. References have been cited in full in the source book, with the exception of those which could not be verified (mainly overseas literature). The reader accordingly, will find the phrase "... Smith (1979, quoted in Jones, 1984)", where Jones is cited in a footnote, and sometimes also at the end of the chapter. The reason for this procedure is simply to preserve the accuracy of citation. Numerous errors (for example, an incorrect date or volume number) have been found in the literature.

- (n) Two maps are provided overleaf. The first map (Figure 1) shows the location of important towns and cities as well as some rivers and dams in Natal/KwaZulu. The second map (Figure 2) illustrates the main component parts of KwaZulu, and includes the names of KwaZulu magisterial districts. Both maps refer to the pre-1994 provincial boundaries. The new provinces are outlined in Figure 1.
- (o) Poetry and in one case, prose, is presented at the beginning of each chapter to reinforce the central, or an important theme. The author requests the indulgence of readers in this regard.

* The botanical/zoological names of certain plants and animals may have changed since the quoted source document was published. Readers experiencing difficulties should consult an expert in the discipline. A listing of some botanical literature suitable for reference purposes can be found in Chapter 6: Catchments in Natal/KwaZulu.





Figure 2: KwaZulu, in the context of Natal/KwaZulu.

- (p) The following abbreviations are used in the source book (refer also to Chapter 20: Appendices):

$\times 10^3$	=	1 000
$\times 10^6$	=	1 000 000
$\times 10^9$	=	1 000 000 000
ha	=	hectare
s	=	second
min	=	minute
h	=	hour
y	=	year (referred to in some texts as yr or a)
m^3	=	cubic metre
ml	=	millilitre
ℓ	=	litre
kℓ	=	kilolitre
Mℓ	=	mega (or million) litres
t	=	metric tonne (sometimes not made clear in the original text).

The scientific notation for "per", for example, 50 ha y^{-1} has been used throughout. Accordingly, per capita is expressed as capita^{-1} , as in $20 \text{ ℓ capita}^{-1} \text{ day}^{-1}$ (a measure of water consumption). Other abbreviations or symbols are defined in the text or are standard scientific notation, for instance, 10 km^2 . Unfamiliar words or technical phrases have been explained in the text. A specific bibliographic abbreviation is: "... 20 p. + app." which indicates that the publication has 20 numbered pages plus additional non-consecutive or unnumbered pages. The statement "... 20 p. and map" indicates that an important fold-out or separate map is contained in the publication. The phrase "various pages" denotes a publication which does not have consecutive pagination. Each chapter or section accordingly, has its own page sequence. "No pagination" refers to a document without page numbers.

- (q) Any constructive suggestions regarding the source book and/or the bibliographic database or the use thereof are most welcome, and will help to improve a second edition. Any errors likewise, should be brought to the attention of the author. The need for a comprehensive index is recognized, although an index will only be

possible in a second edition of the source book. Other improvements could include a listing of all place names in Natal/KwaZulu, as well as maps illustrating the distribution of various features. A separate glossary is also desirable. Time and financial constraints however, precluded such innovations in the first edition. *Specific data only available on the Internet should be incorporated in an updated version of the book.* It is possible that a later edition of the book could be made available on the Internet.

Note: The regular revision and updating of the source book is recommended, where the book becomes a "living document". Each edition should reflect the issues and information trends pertinent to its historical niche*. Revision, while demanding, is never quite as difficult or time consuming as a first edition - especially if the publication has been archived on computer.

NOTES:

* What this proposal suggests, and in fact reinforces, is the need for the frequent updating of core material, say every 3 - 5 years. If this procedure is adopted then the information at worst, will be five years out of date. Failure to undertake some sort of regular revision could result in a surrender to "the relentless tide of paper". This in turn implies that the bigger picture is visible only to a select few (who have the time and energy for such labours). Secondly, readers wishing to derive an historical perspective would be able to examine individual chapters of previous editions of the book, in terms of the current version.

NOTES:

NOTES:

CHAPTER 2: GENERAL INFORMATION

Of hardship, Commissions of Inquiry, and the aftermath...

My plaas se grens

*Die tolbos het Augustusmaand
my plaas se heinings toegewai,
en in die grensdraad het die wind
die bondels waaigras vasgedraai.*

*Daarna het uit my akkerland
- soos in die groot Depressiejaar -
die stuifsand teen die doringdraad
in bloedrooi duine opgegaan.*

* * *

*Nou het ek in die woesteny
geen baken of beduidenis,
geen sekerheid, want elke grens
is deur die waisand uitgewis.*

P.W. Buys, quoted in Opperman, D.J., 1991. Junior Verseboek, Tafelberg-uitgewers Bpk, Cape Town, 239 p.

In die Hoëveld

*In die Hoëveld, waar dit oop is en die hemel wyd daarbo,
Waar kuddes waaigras huppel oor die veld...
Staan my huisie, wat ek moes verlaat vir geld.
En as ek in die gange van die myn hier sit en droom
Van die winde op die Hoëveld, ruim en vry,
Dan hoor ek die geklinkel van my spore, saal en toom,
Sawens as ek bees of skaap toe ry.*

T. Van den Heever, quoted in Opperman, D.J., 1979. Senior Verseboek, Tafelberg-uitgewers Bpk, Cape Town, 278 p.

CHAPTER 2: GENERAL INFORMATION

<u>Contents</u>	<u>Page</u>
2.1 Overview	17
2.2 Some primary source documents of relevance (see Table B7 where necessary)	125
2.2.1 Individual expertise/relevant organizations/suppliers and manufacturers of commodities	125
(a) Agricultural expertise	125
(b) Business data and product information	126
(c) Chemistry	127
(d) Development-orientated activities	127
(e) Energy	129
(f) Environment	130
(g) Research organizations and professional associations	132
(h) Waste management	134
(i) Water and related issues	135
2.2.2 General information sources	135
2.2.3 Sources of local data and information	138
(a) Municipal records	138
(b) University departments	138
2.2.4 Some printed (or computerized) bibliographies and similar sources available in South Africa	139
(a) Agriculture	139
(b) Botany	140
(c) Energy	141
(d) Environment	141
(e) Fire	142
(f) Forestry	142
(g) General development-orientated activities	143
(h) Geology	144
(i) Health	144
(j) Mining	145
(k) Non-government organizations	145
(l) Planning and the urban environment	145
(m) Soil erosion	147
(n) South African spatio-temporal databases	148
(o) Waste disposal	148
(p) Water in general (including the marine environment, as well as organisms living in or associated with water)	149
(q) Other bibliographies	155

Contents (continued)**Page**

2.2.5	Government reports	155
-------	--------------------------	-----

Tables**Page**

Table B1:	Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993	19
Table B2:	Selected Natal Provincial Administration branches, chief directorates, directorates and sub-directorates, 1993	33
Table B3:	Selected KwaZulu Government departments, 1993	36
Table B4:	Selected specialist libraries in southern Africa, 1993	38
Table B5:	Selected statutory, quasi-government and private organizations in South Africa, 1993	70
Table B6:	Universities in southern Africa	92
Table B7:	Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases	95
Table B8:	Some central Government and Natal Provincial Commissions and Committees of Inquiry, 1917 - 1986	156
Table B9:	Reports by the Director of Irrigation and the Irrigation Commission on water projects in Natal, submitted to the House of Assembly as Manuscript Annexures to Minutes of Proceedings	161
Table B10:	Some Select Committee reports, 1914 - 1984	162
Table B11:	Some White Papers on Government policy, 1980 - 1991	163
Table B12:	Department of Water Affairs and Forestry White Papers on projects in Natal/KwaZulu, 1958 - 1990	164

2.1 Overview

The aim of this chapter is to provide background information: firstly, on some central Government departments (Table B1), Natal Provincial Administration departments (Table B2), and KwaZulu Government departments (Table B3). Such data are presented to assist the reader in reviewing the broad functions of Government departments and accordingly, responsibility for various duties including health and the environment. An understanding of the role of certain Government departments is an important requirement in any detailed assessment, for example of water pollution, and the legal consequences as well as remedies. Readers should note that the tables refer to the situation in 1993, reflecting the period covered in the bibliographic database (1900 - 1993) and therefore, the literature examined. Numerous changes have taken place and are still taking place, following the 1994 general election. An important difference is the separation of central Government departments into national and provincial organizations, with some still-to-be-decided functions. The names of several departments have also changed. These changes refer to the division of South Africa into nine provinces, as opposed to the previous four provinces*.

Changes are also apparent in the new provinces, following the amalgamation of former homeland/national state departments and central or provincial Government departments. In KwaZulu-Natal (referred to in this publication as Natal/KwaZulu), some (former) KwaZulu Government departments have only recently (in 1995), been amalgamated with (former) Natal Provincial Administration departments. Other departments will only be amalgamated in 1996. A case-in-point is the KwaZulu Department of Nature Conservation (previously the KwaZulu Bureau of Natural Resources) and the Natal Parks Board. It is evident that rationalization which is still underway, precludes a detailed presentation of accurate and up-to-date information on departments. (All changes will be reflected in any second edition of this publication). Information provided in the literature on the role (however described), of some Government departments similarly, may not fully indicate present realities or may be out of date. For several reasons therefore (and until the literature

* The old provinces were the Transvaal, the Orange Free State, the Cape and Natal, the latter more recently known as Natal/KwaZulu. The nine new provinces are as follows: Gauteng (the Greater Witwatersrand area); Northern; North-West (the old Bophuthatswana and environs); Mpumalanga (the eastern Transvaal); the Free State; the Northern Cape; the Western Cape; the Eastern Cape (including the former Ciskei and Transkei), and KwaZulu-Natal. Certain difficulties are apparent in the term "Natal/KwaZulu". Physical and other features may refer specifically to Natal per se versus KwaZulu per se, although such phenomena are evident in Natal/KwaZulu as a combined areal identity.

reflects the latest circumstances), it is necessary to be aware of previous Government departments. It is essential however, for readers to determine the current situation where Tables B1 - B3 can be used as a point of departure.

It follows that material (literature) written in terms of the previous dispensation will be problematic for years to come. In which new province for example, does a given river, or parts of that river, or even sampling sites on that river, now fall? Those attempting such an exercise will be obliged to consult a map (hopefully detailed enough), showing the new provinces. Only in KwaZulu-Natal is this (currently) unnecessary. The success of the mapping procedure will depend on the extent of the information contained in the (older) *paper or publication*.

Information secondly, on selected specialist libraries in southern Africa is provided in Table B4 (also with respect to 1993). Table B5 lists a number of statutory, quasi-government and private organizations in South Africa. The addresses of universities in southern Africa are presented in Table B6. Some computerized South African bibliographic, numeric, textual and Geographic Information System (GIS) databases are listed in Table B7. Table B7 is followed by an examination of certain primary source documents in South Africa. In similar vein some important Government reports including White Papers are outlined in Tables B8 - B12. The purpose of Tables B4 - B12 and the accompanying text is to advise readers of the numerous sources of information available (in terms of libraries, professional and other organizations, computerized and non-computerized databases/bibliographies and Government reports), which will assist in the search for data, including the physical location (or probable location) of the data. Chapter 2 accordingly, provides the reader with a general understanding of some information flows in this country. Other pertinent sources of data are outlined in the various chapters of this publication.

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993.

Department/statutory organization	Address
Constitutional Development Service	Private Bag X804, Pretoria, 0001
Department of Agriculture	Private Bag X250, Pretoria, 0001
<u>Agricultural Economic Affairs Branch</u>	
<u>Chief Directorate: Administrative and Financial Services</u>	
Directorate of Agricultural Administration	Private Bag X250, Pretoria, 0001
Directorate of Technical Administration	Private Bag X250, Pretoria, 0001
<u>Chief Directorate: Economics</u>	
Directorate of Agricultural Economics	Private Bag X250, Pretoria, 0001
Directorate of Agricultural Economic Trends	Private Bag X246, Pretoria, 0001
Directorate of Co-operatives	Private Bag X237, Pretoria, 0001
<u>Chief Directorate: Resources Development</u>	
Directorate of Plant and Quality Control	Private Bag X258, Pretoria, 0001
Directorate of Resource Conservation	Private Bag X120, Pretoria, 0001
<u>Chief Directorate: Veterinary Services</u>	
Directorate of Animal Health	Private Bag X138, Pretoria, 0001
Directorate of Livestock Improvement and Agricultural Production Resources	Private Bag X343, Pretoria, 0001
Directorate of Meat Hygiene	Private Bag X250, Pretoria, 0001
<u>Agricultural Development Branch</u>	
Regional Director Natal Region	Private Bag X9059, Pietermaritzburg, 3200
<u>Chief Directorate: Agricultural Advancement</u>	
Directorate of Agricultural Technology	Private Bag X116, Pretoria, 0001
Directorate of Farming Development	Private Bag X116, Pretoria, 0001
Directorate of Land Utilization	Private Bag X116, Pretoria, 0001
Directorate of Socio-economics	Private Bag X116, Pretoria, 0001
<u>Chief Directorate: Agricultural Engineering and Water Supply</u>	
Directorate of Agricultural Mechanization	Private Bag X515, Silverton, 0127
Directorate of Irrigation Engineering	Private Bag X515, Silverton, 0127
Directorate of Soil Conservation and Drilling Services	Private Bag X515, Silverton, 0127

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
<u>Chief Directorate: Farming Development</u>	
Cedara Agricultural Development Institute	Private Bag X9059, Pietermaritzburg, 3200
Döhne Agricultural Development Institute	Private Bag X15, Stutterheim, 4930
Elsenburg Agricultural Development Institute	Private Bag, Elsenburg, 7607
Glen Agricultural Development Institute	Private Bag X01, Glen, 9360
Grootfontein Agricultural Development Institute	Private Bag X529, Middelburg, 5900
Highveld Agricultural Development Institute	Private Bag X804, Potchefstroom, 2520
Transvaal Agricultural Development Institute	Private Bag X180, Pretoria, 0001
<u>Chief Directorate: Financial Assistance</u>	
Directorate of Agricultural Information	Private Bag X144, Pretoria, 0001
Directorate of Financial Assistance	Private Bag X118, Pretoria, 0001
Directorate of Foot and Mouth [?]	Private Bag X116, Pretoria, 0001
<u>Statutory organizations</u>	
Agricultural Credit Board	Private Bag X118, Pretoria, 0001
Agricultural Research Council	P O Box 8783, Pretoria, 0001
National Marketing Council	Private Bag X250, Pretoria, 0001
Southern African Regional Commission for the Conservation and Utilization of the Soil (SARCCUS)	Private Bag X250, Pretoria, 0001
Department of Environment Affairs	
<u>Chief Directorate: Administration</u>	
Sub-directorate of Information	Private Bag X447, Pretoria, 0001
Sub-directorate of Antarctica and Islands	Private Bag X447, Pretoria, 0001
<u>Chief Directorate: Environmental Conservation</u>	
Directorate of Environmental Education	Private Bag X447, Pretoria, 0001
Directorate of Environmental Management	Private Bag X447, Pretoria, 0001
Sub-directorate of Built Environment	Private Bag X447, Pretoria, 0001
Sub-directorate of Natural Environment	Private Bag X447, Pretoria, 0001
Directorate of Environmental Protection	Private Bag X447, Pretoria, 0001
Sub-directorate of Development Control	Private Bag X447, Pretoria, 0001
Sub-directorate of Pollution Control	Private Bag X447, Pretoria, 0001

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
<u>Chief Directorate: Sea Fisheries</u>	
Sea Fisheries Research Institute	Private Bag X2, Rogge Bay, 8012
Directorate of Sea Fisheries Administration	Private Bag X2, Rogge Bay, 8012
Sub-directorate of Extension and Liaison Management	Private Bag X2, Rogge Bay, 8012
Sub-directorate of Sources Management	Private Bag X2, Rogge Bay, 8012
Chief Marine Superintendent	Private Bag X2, Rogge Bay, 8012
<u>Chief Directorate: Weather Bureau</u>	
Directorate of Climatology	Private Bag X097, Pretoria, 0001
Climate Data Bank	Private Bag X097, Pretoria, 0001
Directorate of Observations and Communication	Private Bag X097, Pretoria, 0001
Directorate of Research and Development	Private Bag X097, Pretoria, 0001
Sub-directorate of Precipitation Research	Private Bag X15, Bethlehem, 9700
Sub-directorate of Synoptic, Climatological and Dynamical Studies	Private Bag X097, Pretoria, 0001
Sub-directorate of Systems Development and Instrumentation	Private Bag X097, Pretoria, 0001
Sub-directorate of Marine Meteorology	P O D.F. Malan Airport, 7525
Directorate of Weather Forecasting	Private Bag X097, Pretoria, 0001
Sub-directorate of Central Weather Forecasting	Private Bag X097, Pretoria, 0001
Sub-directorate of Numerical Meteorology	Private Bag X097, Pretoria, 0001
Central Forecasting Office	Private Bag X097, Pretoria, 0001
<u>Advisory and controlling councils/boards</u>	
Committee for Environmental Management	Private Bag X447, Pretoria, 0001
Council for the Environment	Private Bag X447, Pretoria, 0001
Fisheries Advisory Council	Private Bag X2, Rogge Bay, 8012
National Botanical Institute	Private Bag X7, Claremont, 7735
National Parks Board of Trustees	P O Box 787, Pretoria, 0001
<u>Department of Finance</u>	Private Bag X115, Pretoria, 0001
<u>Chief Directorate: Intergovernmental Relations</u>	
Directorate of Intergovernmental Affairs	Private Bag X115, Pretoria, 0001
Directorate of Local Authorities Budget Control	Private Bag X115, Pretoria, 0001

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
Directorate of Local Authorities Financial Policy Affairs	Private Bag X115, Pretoria, 0001
Commissioner for Inland Revenue	P O Box 402, Pretoria, 0001
Department of Foreign Affairs	Private Bag X152, Pretoria, 0001
<u>Chief Directorate: Multilateral Relations</u>	
Directorate of Environmental, Scientific and Technical Affairs	Private Bag X152, Pretoria, 0001
Sub-directorate of Environment and Marine	Private Bag X152, Pretoria, 0001
Sub-directorate of Scientific, Technical, Nuclear and Disarmament	Private Bag X152, Pretoria, 0001
Directorate of International Economic Affairs	Private Bag X152, Pretoria, 0001
Sub-directorate of External Economic Liaison and International Organizations	Private Bag X152, Pretoria, 0001
Directorate of Multilateral Political and Humanitarian Affairs	Private Bag X152, Pretoria, 0001
Sub-directorate of European Communities and European Organizations	Private Bag X152, Pretoria, 0001
Sub-directorate of Humanitarian Affairs and International Church Organizations	Private Bag X152, Pretoria, 0001
Sub-directorate of UN Organizations and other International Organizations	Private Bag X152, Pretoria, 0001
Department of Home Affairs	Private Bag X114, Pretoria, 0001
Central Statistical Service	Private Bag X44, Pretoria, 0001
Regional Representative Natal Region	Private Bag X54337, Durban, 4000
Government Printing Works	Private Bag X85, Pretoria, 0001
Department of Housing and Works: House of Assembly	Private Bag X340, Pretoria, 0001
Regional Representative Natal Region	Private Bag X54319, Durban, 4000
<u>Chief Directorate: Housing</u>	Private Bag X340, Pretoria, 0001
<u>Chief Directorate: Works</u>	Private Bag X340, Pretoria, 0001
Department of Justice	Private Bag X81, Pretoria, 0001
South African Law Commission	Private Bag X668, Pretoria, 0001

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
Department of Local Government and National Housing	Private Bag X644, Pretoria, 0001
<u>Chief Directorate: Local Government Affairs</u>	Private Bag X644, Pretoria, 0001
<u>Chief Directorate: Local Government Development</u>	Private Bag X644, Pretoria, 0001
<u>Chief Directorate: National Housing</u>	
Directorate of Economics and Financing	Private Bag X644, Pretoria, 0001
Directorate of Housing	Private Bag X644, Pretoria, 0001
Directorate of Residential Environment	Private Bag X644, Pretoria, 0001
Directorate of Urban Development	Private Bag X644, Pretoria, 0001
<u>Statutory organizations</u>	
National Civil Protection Committee	Private Bag X644, Pretoria, 0001
National Housing Board	Private Bag X644, Pretoria, 0001
South African Housing Advisory Council	Private Bag X644, Pretoria, 0001
South African Housing Trust	P O Box 3316, Randburg, 2125
Department of Manpower	Private Bag X117, Pretoria, 0001
<u>Chief Directorate: Manpower Training</u>	Private Bag X117, Pretoria, 0001
<u>Chief Directorate: Occupational Safety</u>	Private Bag X117, Pretoria, 0001
Office of the Workmen's Compensation Commissioner	Private Bag X117, Pretoria, 0001
<u>Statutory institutions</u>	
Advisory Council for Occupational Safety	Private Bag X117, Pretoria, 0001
Industrial Court	Private Bag X117, Pretoria, 0001
Manpower Board	Private Bag X117, Pretoria, 0001
National Manpower Commission	Private Bag X117, Pretoria, 0001
National Training Board	Private Bag X117, Pretoria, 0001
Department of Mineral and Energy Affairs	Private Bag X59, Pretoria, 0001
<u>Chief Directorate: Electricity and Coal</u>	Private Bag X03, Lynnwood Ridge, 0040
<u>Chief Directorate: Energy, Administration and Support Services</u>	Private Bag X03, Lynnwood Ridge, 0040
Dundee Regional Director	Private Bag 2014, Dundee, 3000
<u>Chief Directorate: Geological Survey</u>	Private Bag X112, Pretoria, 0001
Natal Sub-office	P O Box 900, Pietermaritzburg, 3200

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
<u>Chief Directorate: Mine Equipment Safety</u>	Private Bag X59, Pretoria, 0001
<u>Chief Directorate: Mine Safety and Health</u>	Private Bag X59, Pretoria, 0001
<u>Chief Directorate: Mineral Resources Utilization</u>	Private Bag X4, Braamfontein, 2017
<u>Chief Directorate: Mineral Rights and Management Services</u>	Private Bag X59, Pretoria, 0001
<u>Chief Directorate: Transport, Energy and Energy for Development</u> (incorporating the now defunct National Energy Council)	Private Bag X03, Lynnwood Ridge, 0040
<u>Associated institutions</u>	
Atomic Energy Corporation of South Africa Ltd	P O Box 582, Pretoria, 0001
Council for Mineral Technology (MINTEK)	Private Bag X3015, Randburg, 2125
Council for Nuclear Safety	P O Box 7106, Centurion, 0046
Institution of Nuclear Engineers	c/o J.H. Wilson, P O Box 6, Kernkrag, 7440
South African Diamond Board	P O Box 260499, Excom, 2023
Department of National Education	Private Bag X122, Pretoria, 0001
<u>Statutory organizations</u>	
National Monuments Council	P O Box 7888, Pretoria, 0001
Department of National Health and Population Development	Private Bag X828, Pretoria, 0001
Regional Director Natal Region	Private Bag X54318, Durban, 4000
<u>Chief Directorate: Environmental Control</u>	
Directorate of Air Pollution Control	Private Bag X828, Pretoria, 0001
Directorate of Water and Waste Control	Private Bag X828, Pretoria, 0001
<u>Chief Directorate: Environmental Health Control</u>	
Directorate of Foodstuffs, Cosmetics, Disinfectants and Hazardous Substances	Private Bag X828, Pretoria, 0001
Directorate of Medicine Control and Registration	Private Bag X828, Pretoria, 0001
Directorate of Pharmaceutical Services	Private Bag X828, Pretoria, 0001
Directorate of Public Hygiene	Private Bag X828, Pretoria, 0001
Directorate of Radiation Control	Private Bag X828, Pretoria, 0001

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
<u>Chief Directorate: Forensic and Research Services</u>	
Directorate of Forensic Services	Private Bag X828, Pretoria, 0001
Medical Bureau for Occupational Diseases	Private Bag X828, Pretoria, 0001
National Centre for Occupational Health Genetic Services	Private Bag X828, Pretoria, 0001
National Institute for Virology	Private Bag X4, Sandringham, 2131
State Vaccine Institute	Private Bag X828, Pretoria, 0001
<u>Chief Directorate: Oral Health</u>	Private Bag X828, Pretoria, 0001
<u>Chief Directorate: Population Development</u>	
Directorate of Demographic and Population Analysis	Private Bag X828, Pretoria, 0001
Directorate of Information, Education and Communication	Private Bag X828, Pretoria, 0001
Directorate of Programme Development	Private Bag X828, Pretoria, 0001
<u>Chief Directorate: Primary Health Care</u>	
Directorate of Community Health Care Services	Private Bag X828, Pretoria, 0001
Directorate of Infectious and Communicable Disease Control	Private Bag X828, Pretoria, 0001
Directorate of Health Promotion	Private Bag X828, Pretoria, 0001
Institute for Tropical Diseases	Private Bag X828, Pretoria, 0001
<u>Chief Directorate: Support Planning</u>	
Directorate of Epidemiology and Information	Private Bag X828, Pretoria, 0001
Directorate of Strategic Planning	Private Bag X828, Pretoria, 0001
National Health Policy Council	Private Bag X828, Pretoria, 0001
Department of Public Works	Private Bag X65, Pretoria, 0001
Regional Representative Natal Region	Private Bag X54315, Durban, 4000
<u>Chief Directorate: Land Affairs</u>	
Directorate of Land Acquisition and Valuation	Private Bag X65, Pretoria, 0001
Directorate of State Land Control	Private Bag X65, Pretoria, 0001
Department of Regional and Land Affairs	Private Bag X833, Pretoria, 0001
Regional Director Natal Region	Private Bag X9000, Pietermaritzburg, 3200

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
<u>Chief Directorate: Deeds Registration</u>	Private Bag X833, Pretoria, 0001
<u>Chief Directorate: Land Reform</u>	
Directorate of Land Allocation	Private Bag X183, Pretoria, 0001
Directorate of Land Management	Private Bag X183, Pretoria, 0001
Directorate of Land Policy and Rural Development	Private Bag X183, Pretoria, 0001
Directorate of Land Tenure	Private Bag X183, Pretoria, 0001
<u>Chief Directorate: Physical Planning</u>	
Directorate of National Spatial Planning and Urbanization	Private Bag X833, Pretoria, 0001
Directorate of Regional Planning North	Private Bag X833, Pretoria, 0001
Directorate of Regional Planning South	Private Bag X833, Pretoria, 0001
<u>Chief Directorate: Regional Development</u>	Private Bag X833, Pretoria, 0001
<u>Chief Directorate: Regional Economic Development</u>	Private Bag X833, Pretoria, 0001
<u>Chief Directorate: Regional Industrial Development</u>	
Directorate of Establishment Support	Private Bag X833, Pretoria, 0001
Directorate of Industrial Establishment	Private Bag X833, Pretoria, 0001
<u>Chief Directorate: Regional Systems</u>	
Directorate of Development Management and Relations	Private Bag X833, Pretoria, 0001
Directorate of Regional Budgetary Planning	Private Bag X833, Pretoria, 0001
Directorate of Regional Government	Private Bag X833, Pretoria, 0001
<u>Chief Directorate: Surveys and Land Information</u>	Private Bag, Mowbray, 7705
Surveyors General Office (Natal)	P O Box 396, Pietermaritzburg, 3200
<u>Statutory bodies</u>	
Advisory Commission on Land Allocation	P O Box 56720, Arcadia, 0007
Deeds offices (Pretoria, Cape Town, Pietermaritzburg, Bloemfontein, Johannesburg, King William's Town, Kimberley, Vryburg)	Pietermaritzburg Deeds Office, Private Bag X9028, Pietermaritzburg, 3200
Deeds Registration Regulation Board	Private Bag X183, Pretoria, 0001
Survey Regulation Board	Private Bag, Mowbray, 7705
Sectional Titles Regulation Board	Private Bag X183, Pretoria, 0001

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
Department of Trade and Industry	Private Bag X84, Pretoria, 0001
<u>Chief Directorate: Industrial Promotion</u>	
Directorate of Industrial Development and Investment Centre	Private Bag X84, Pretoria, 0001
Directorate of Industry I	Private Bag X84, Pretoria, 0001
Directorate of Industry II	Private Bag X84, Pretoria, 0001
Directorate of Industry III	Private Bag X84, Pretoria, 0001
<u>Chief Directorate: Internal Trade Functions</u>	
Directorate of Companies and Close Corporations	Private Bag X429, Pretoria, 0001
Directorate of Patents, Trade Marks, Designs and Copyright	Private Bag X400, Pretoria, 0001
<u>Chief Directorate: Technology and Industrial Strategy</u>	
Directorate of Policy and Strategy	Private Bag X84, Pretoria, 0001
Directorate of Systems Co-ordination	Private Bag X84, Pretoria, 0001
Directorate of Technology Promotion	Private Bag X84, Pretoria, 0001
<u>Statutory bodies and associated institutions</u>	
Board for Regional Industrial Development	Private Bag X84, Pretoria, 0001
Board on Tariffs and Trade	Private Bag X84, Pretoria, 0001
Business Practices Committee	Private Bag X84, Pretoria, 0001
CSIR	P O Box 395, Pretoria, 0001
Industrial Development Corporation of South Africa Ltd	P O Box 784055, Sandton, 2146
Patent Examination Board	Private Bag X84, Pretoria, 0001
South African Bureau of Standards	Private Bag X191, Pretoria, 0001
Department of Transport	Private Bag X193, Pretoria, 0001
<u>Chief Directorate: Land Transport Management</u>	
Directorate of Commuter Transport	Private Bag X193, Pretoria, 0001
Directorate of Road Traffic	Private Bag X193, Pretoria, 0001
Directorate of Road Traffic Safety	Private Bag X193, Pretoria, 0001
<u>Chief Directorate: National Roads</u>	Private Bag X193, Pretoria, 0001
<u>Chief Directorate: Civil Aviation</u>	Private Bag X193, Pretoria, 0001

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
<u>Chief Directorate: Shipping</u>	
Directorate of Shipping	Private Bag X193, Pretoria, 0001
Durban Marine Office	Private Bag X54309, Durban, 4000
<u>Advisory and controlling boards</u>	
Air Services Licensing Board	Private Bag X193, Pretoria, 0001
National Road Traffic Fund	Private Bag X193, Pretoria, 0001
National Transport Commission	Private Bag X193, Pretoria, 0001
South African Roads Board	Private Bag X193, Pretoria, 0001
Transport Advisory Council	Private Bag X193, Pretoria, 0001
<u>Department of Water Affairs and Forestry</u>	Private Bag X313, Pretoria, 0001
<u>Water Branch</u>	
Regional Director Natal Region	P O Box 1018, Durban, 4000
<u>Chief Directorate: Administration (relevant items only)</u>	Private Bag X313, Pretoria, 0001
(Permits; special services; liaison services; parliamentary services; provisioning services; Government water schemes and land matters; law administration)	
<u>Chief Directorate: Development</u>	Private Bag X313, Pretoria, 0001
(Civil design; canal systems; earth and rockfill dams; concrete dams; regional water supply; dam safety; mechanical and electrical engineering; dam outlets; pumping installations; crest gates and corrosion control; electrical services; contract administration and quality control; design services; materials laboratory; hydraulic studies; environment studies; structural studies; draughting services; specialist structural behaviour; construction; construction equipment and boring services)	
<u>Chief Directorate: Planning</u>	Private Bag X313, Pretoria, 0001
(Strategic planning; planning support systems; general water resources planning; corporate planning; information systems planning; systems development; project planning; Deputy Chief Engineer West/East/North/South/North East/Central; dam safety office; business economics)	

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
<u>Chief Directorate: Scientific Services</u> (Hydrology; network services; hydrological data management; water resources studies; technical services; Hydrological Research Institute; water quality information; chemical and biological services; catchment area studies; water quality studies; geohydrology; exploration; evaluation and development; water quantity; water quality planning; water care works; waste control)	Private Bag X313, Pretoria, 0001
<u>Chief Directorate: Water Resources</u> (Water utilization; water apportionment; Government supported water schemes; operations systems; mechanical maintenance; electrical maintenance; technical services; irrigation; survey services; hydrographic surveys; aerial surveys; deflection surveys; ground surveys; land surveys)	Private Bag X313, Pretoria, 0001
<u>Forestry Branch</u> Regional Director Natal Region	Private Bag X9029, Pietermaritzburg, 3200
Regional Director Zululand Region	P O Box 1531, Eshowe, 3815
<u>Chief Directorate: Forestry Development</u> (Forestry planning and extension; conservation forestry; business economics)	Private Bag X313, Pretoria, 0001
Directorate of Law Administration	
<u>Chief Directorate: Timber Production</u> (Forestry management; systems development; forest products; harvesting; timber utilization; marketing; works inspectorate)	Private Bag X313, Pretoria, 0001
<u>Advisory and controlling councils/boards</u> Forestry Council	c/o Coopers and Lybrand, P O Box 2536, Johannesburg, 2000
National Hiking Way Board	Private Bag X313, Pretoria, 0001
Wattle Bark Industry Board	c/o Deloitte and Touche, P O Box 365, Pietermaritzburg, 3200
Department of Welfare: House of Assembly Regional Director Natal Region	Private Bag X730, Pretoria, 0001
<u>Chief Directorate: Welfare</u>	Private Bag X730, Pretoria, 0001
Office of the Auditor-General	P O Box 446, Pretoria, 0001

Table B1: Selected central Government departments, relevant directorates and statutory organizations in South Africa, June 1993 (continued).

Department/statutory organization	Address
Office of the Commission for Administration	Private Bag X121, Pretoria, 0001
Office of the State President	Private Bag X1000, Pretoria, 0001/Private Bag X1000, Cape Town, 8000
South African Communication Service	Private Bag X745, Pretoria, 0001
South African Defence Force	Private Bag X414, Pretoria, 0001
South African Navy	Private Bag X104, Pretoria, 0001
South African Police Endangered Species Protection Unit	P O Box 5306, Pretoria, 0001

Source: (i) After Trinco, O.M. and Valente, A.M., 1992. Direct Access to Key People in Southern Africa 1992, Penrose Publishers, Johannesburg, 312 p.

(ii) Fieldwork.

See also: Cloete, J.J.N., 1992. Central, Regional and Local Government Institutions of South Africa, J.L. Van Schaik, Pretoria, 239 p. (The book provides a broad overview analysis of the various central Government and other departments in South Africa).

Note: (i) The table reflects the situation as at the 30th of June 1993, given the rationalization of the civil service.

(ii) The Hydrological Research Institute (with effect from the 22nd of March 1994), is now known as the Institute for Water Quality Studies. The study emphasis has changed from hydrological research to an assessment of water quality and aquatic ecosystem health. The Institute was established in October 1972.

(iii) Geological Survey (as of November 1993) has become a statutory council, namely, the Council for Geoscience. The old departmental address remains the same.

(iv) Readers should note that Government departments change their names or some of their functions, at periodic intervals. The previous names of the (current) Department of Agriculture and the (current) Department of Water Affairs and Forestry, for example, were as follows:

(a) Department of Agriculture

Name	Year
Natal Department of Agriculture and Mines	1906 - 1908
Natal Department of Agriculture	1908 - 1910
Department of Agriculture	1910 - 1934
Department of Agriculture and Forestry	1934 - 1945
Department of Agriculture	1945 - 1958
Department of Agricultural Technical Services*	1958 - 1980
Department of Agriculture and Fisheries	1980 - 1981
Department of Agriculture	1981 - 1984
Department of Agriculture and Water Supply (House of Assembly)	1984 - 1989
Department of Agricultural Development (House of Assembly)	1989 - 1993
Department of Agriculture	1993 - current

(b) Department of Water Affairs and Forestry

Name	Year
Department of Lands (Sub-department of Irrigation)	September 1910 - June 1912
Department of Irrigation	July 1912 - July 1956
Department of Water Affairs	July 1956 - March 1980
Department of Water Affairs, Forestry and Environmental Conservation	April 1980 - October 1981
Department of Environment Affairs	November 1981 - September 1984
Department of Water Affairs	September 1984 - December 1990
Department of Water Affairs and Forestry	December 1990 - current

* The Department of Agriculture was divided into the Department of Agricultural Technical Services and the Department of Agricultural Economics and Marketing in 1958. (The latter Department became known as the Department of Agriculture in 1984), before re-integration in 1993 to form the (combined) Department of Agriculture.

- (v) The present Department of Regional and Land Affairs was first established as the Department of Planning in 1965. The sequence of events was as follows:

Name	Year
Department of Planning	1965
Department of Planning and the Environment	1973
Department of Environmental Planning and Energy	1979
Office of the Prime Minister	1980
Department of Constitutional Development and Planning	1982
Department of Planning and Provincial Affairs	1986
Department of Planning, Provincial Affairs and National Housing	1990
Department of Regional and Land Affairs	1991 (November)

See: Schaafsma, P., 1992. Recent central Government changes in responsibility for spatial planning, Monitor, No. 15, February 1992, p. 7.

- (vi) Post-1994 election data on Government departments can be found in the following: Anonymous, 1995. Government of National Unity: a directory, South African Communication Service, Pretoria, various pages, as well as in Hayes, S. (ed), 1996. Direct Access to Key People in Southern Africa, Jonathan Ball Publishers, Johannesburg, 332 p.

Table B2: Selected Natal Provincial Administration branches, chief directorates, directorates and sub-directorates, 1993.

Department (Branch)	Address
Community Services Branch (Planning and control services for land usage and development; provision of efficient local government assistance and services to local authorities; welfare services and regional administration services, plus town and regional planning services)	
<u>Chief Directorate: Local Government</u>	
Directorate of Local Government	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Local Government Finance	Private Bag X9037, Pietermaritzburg, 3200
<u>Chief Directorate: Physical Planning and Development</u>	
Directorate of Physical Development Region 1	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Physical Development Region 2	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Physical Planning	Private Bag X9037, Pietermaritzburg, 3200
<u>Chief Directorate: Social Development</u>	
Directorate of Community Development	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Land and Housing	Private Bag X1724, Pietermaritzburg, 3200
Directorate of Welfare Services	Private Bag X9037, Pietermaritzburg, 3200
General Provincial Services Branch (Personnel and financial management; works services, and other administrative and cultural services for the Natal Provincial Administration)	
<u>Chief Directorate: Administration</u>	
Directorate of Auxiliary Services	Private Bag X9037, Pietermaritzburg, 3200
Sub-directorate of the Administrator's Office	Private Bag X9037, Pietermaritzburg, 3200
Sub-directorate of Communication Services	Private Bag X9037, Pietermaritzburg, 3200
Sub-directorate of General Administration, Security and Civil Protection	Private Bag X9037, Pietermaritzburg, 3200
Sub-directorate of Legislation Services	Private Bag X9037, Pietermaritzburg, 3200
Sub-directorate of Library Services	Private Bag X9016, Pietermaritzburg, 3200
Sub-directorate of Museum Services	Private Bag X9050, Pietermaritzburg, 3200
Sub-directorate of Provisioning Administration	Private Bag X9037, Pietermaritzburg, 3200

Table B2: Selected Natal Provincial Administration branches, chief directorates, directorates and sub-directorates, 1993 (continued).

Department (Branch)	Address
Sub-directorate of Support Services	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Labour Relations	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Management Advisory Services	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Personnel Management	Private Bag X9037, Pietermaritzburg, 3200
<u>Chief Directorate: Financial Management</u>	
Directorate of Financial Management	Private Bag X9037, Pietermaritzburg, 3200
<u>Chief Directorate: Works</u>	
Directorate of Professional Services	Private Bag X9041, Pietermaritzburg, 3200
Sub-directorate of Administrative Services	Private Bag X9041, Pietermaritzburg, 3200
Regional office	Private Bag X9041, Pietermaritzburg, 3200
Health Services Branch (Provision of planning, medical support and community health services and co-ordination, direction and control of institutional health services in Natal)	
<u>Chief Directorate: Durban Functional Area, Nursing Services and Pharmacy</u>	
Directorate of Durban Institutions and Co-ordination of all AIDS and Academic Matters	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Durban Institutions and Co-ordination of all Planning Matters	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Northern Natal Institutions	Private Bag X9037, Pietermaritzburg, 3200
<u>Chief Directorate: Rest of Natal, Ambulance, Psychiatric, District Surgeon and Primary Health Services</u>	
Directorate of North and South Coast Institutions	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Northern Natal, Midlands Institutions and Ambulance and Emergency Medical Services (AEMS)	Private Bag X9037, Pietermaritzburg, 3200
Directorate of Administration	Private Bag X9037, Pietermaritzburg, 3200

Table B2: Selected Natal Provincial Administration branches, chief directorates, directorates and sub-directorates, 1993 (continued).

Department (Branch)	Address
Roads Branch (Maintenance of provincial roads and structures; planning, design and construction of new roads and bridges, and the provision of licensing and road traffic control services) <u>Chief Directorate: Roads Professional Services</u> Directorate of Construction Directorate of Design Directorate of Maintenance Directorate of Mechanical Engineering Directorate of Technological Services Directorate of Administrative Services	Private Bag X9043, Pietermaritzburg, 3200 Private Bag X9043, Pietermaritzburg, 3200 Private Bag X9043, Pietermaritzburg, 3200 Private Bag X9043, Pietermaritzburg, 3200 Private Bag X9043, Pietermaritzburg, 3200 Private Bag X9043, Pietermaritzburg, 3200
Statutory bodies Development and Services Board KwaZulu/Natal Joint Executive Authority Natal Parks Board Natal Sharks Board Natal Town and Regional Planning Commission Water Services Advisory Board	P O Box 416, Pietermaritzburg, 3200 Private Bag X54310, Durban, 4000 P O Box 662, Pietermaritzburg, 3200 Private Bag 2, Umhlanga Rocks, 4320 Private Bag X9038, Pietermaritzburg, 3200 Private Bag X9078, Pietermaritzburg, 3200

Source: (i) After Trinco, O.M. and Valente, A.M., 1992. Direct Access to Key People in Southern Africa 1992, Penrose Publishers, Johannesburg, 312 p.

(ii) Fieldwork.

Note: The table represents the situation as at December 1993.

Table B3: Selected KwaZulu Government departments, 1993.

Department	Address
Department of Agriculture and Forestry (Veterinary services; engineering; forestry; training; agriculture; administration and personnel)	Private Bag X05, Ulundi, 3838
Department of the Chief Minister (Local government and development; Bureau of Community Development; Bureau of Communication; Public Service Commission; legislative assembly; administration and youth affairs)	Private Bag X01, Ulundi, 3838
Department of Economic Affairs (Administration; Bureau of Natural Resources; town and regional planning and development planning)	Private Bag X23, Ulundi, 3838
Department of Finance (Inland revenue; accounts; treasury; financial administration; transport; salaries; expenditure; internal control and the KwaZulu Tender Board)	Private Bag X21, Ulundi, 3838
Department of Health (Health and nursing services; auxiliary services; personnel; stores; pharmaceutical services; dental and pathological services)	Private Bag X10, Ulundi, 3838
Department of the Interior (Auxiliary services; personnel management; land settlement matters; archives; manpower and local government)	Private Bag X02, Ulundi, 3838
Department of Justice (Training; administration; auxiliary services; legal planning; personnel and inspectorate)	Private Bag X06, Ulundi, 3838
Department of Welfare and Pensions (Administration; pensions and professional services)	Private Bag X27, Ulundi, 3838
Department of Works (Technical services; general/personnel/financial administration; civil engineering and land surveying)	Private Bag X03, Ulundi, 3838
Other organizations KwaZulu Finance and Investment Corporation Ltd KwaZulu Monuments Council KwaZulu Training Trust	 P O Box 87, Ulundi, 3838 P O Box 523, Ulundi, 3838 P O Box 10094, Ashwood, 3605

Source: (i) After Trinco, O.M. and Valente, A.M., 1992. Direct Access to Key People in Southern Africa 1992, Penrose Publishers, Johannesburg, 312 p.

(ii) Fieldwork.

- Note:**
- (i) The table represents the situation as at June 1993.
 - (ii) With effect from the 1st of January 1994 the KwaZulu Bureau of Natural Resources - formerly part of the KwaZulu Department of Economic Affairs - became a full department in its own right, namely the KwaZulu Department of Nature Conservation, Private Bag X98, Ulundi, 3838.

Table B4: Selected specialist libraries in southern Africa, 1993.

Library	Specialization	Address
Natal/KwaZulu		
Adcock Ingram Self Medication Ltd Library	Pharmaceuticals; medicine	P O Box 32074, Mobeni, 4060
Alusaf Ltd Library	Chemical engineering	P O Box 284, Empangeni, 3880
Association for Rural Advancement Library	Rural development	P O Box 2517, Pietermaritzburg, 3200
Bosch and Associates Inc. Library	Engineering	P O Box 2009, Durban, 4000
Campbell Bernstein and Irving Library	Engineering	P O Box 37002, Overport, 4067
CSIR		
<u>Division of Forest Science and Technology</u>		
Cathedral Peak Forestry Research Station Library	Hydrology; forestry	Private Bag X1, Winterton, 3340
Futululu Forestry Research Station Library	Forestry	Private Bag X7066, Mtubatuba, 3935
<u>Division of Information Services</u> Natal Library	General science (mainly water); estuarine ecology (controlled from Pretoria)	P O Box 17001, Congella, 4013
Deloitte and Touche Library	Accountancy; tax	P O Box 243, Durban, 4000
Department of Agriculture		
Allerton Regional Veterinary Library	Veterinary research	Private Bag X2, Cascades, 3202
Cedara Agricultural Development Institute Library	Agriculture	Private Bag X9059, Pietermaritzburg, 3200
Department of Justice Supreme Court		
Durban Library	Law	Private Bag X54314, Durban, 4000
Pietermaritzburg Library	Law	Private Bag X9014, Pietermaritzburg, 3200
Department of National Health and Population Development Library	Health; demography	Private Bag X54318, Durban, 4000
Department of Water Affairs and Forestry Library	Forestry	Private Bag X9029, Pietermaritzburg, 3200

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Durban Corporation		
City Engineer's Technical Library	Engineering	P O Box 680, Durban, 4000
Don Africana Library	Africana; architecture	P O Box 917, Durban, 4000
Electricity Department Library	Electricity	P O Box 147, Durban, 4000
Durban Museums Library	Natural history/science	P O Box 4085, Durban, 4000
Ecumenical Centre Trust Library	Religious affairs; rural development	P O Box 1128, Durban, 4000
Ernst and Young Library	Accountancy; tax	P O Box 859, Durban, 4000
Garlicke and Bousfield Inc. Library	Law	P O Box 223, Durban, 4000
Indian Ocean Fertilizer Ltd Library	Chemicals; chemical engineering	P O Box 208, Richards Bay, 3900
Inkatha Institute for South Africa Library	KwaZulu matters; rural development	P O Box 2415, Durban, 4000
ISCOR Library	Metallurgy; mining; engineering	P O Box 2, Newcastle, 2940
James Crosswell and Associates Inc. Library	Engineering	P O Box 37992, Overport, 4067
Kaymac Industries Ltd Library	Geosynthetic plastics; geotechnical engineering including groundwater drainage	P O Box 116, Pinetown, 3600
Keep Durban Beautiful Association Library	Environment (litter)	P O Box 1535, Durban, 4000
Keeve Steyn Inc. Library	Engineering	P O Box 37841, Overport, 4067
KwaZulu Finance and Investment Corporation Ltd Library	Socio-economic matters; agriculture; industrial development	P O Box 2801, Durban, 4000
KwaZulu Legislative Assembly Library	Official publications	Private Bag X01, Ulundi, 3838
KwaZulu National Library Service	Central library; official publications	Private Bag X72, Ulundi, 3838
KwaZulu-Natal Regional Economic Forum Library	Rural and urban development	P O Box 30886, Mayville, 4058

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Lever Brothers Ltd Technical Library	Chemicals	P O Box 909, Durban, 4000
Mangosuthu Technikon Library	Education	P O Box 12363, Jacobs, 4026
M L Sultan Technikon Library	Education	P O Box 1334, Durban, 4000
Nampak Ltd Library	Packaging; plastics technology	P O Box 968, Durban, 4000
Natal Archives Depot (State Archives Service) Library	History; archival science	Private Bag X9012, Pietermaritzburg, 3200
Natal Herbarium (National Botanical Institute) Library	Botany	P O Box 3740, Durban, 4000
Natal Institute of Immunology Library	Medicine	P O Box 2356, Durban, 4000
Natal Law Society Durban Library	Law	703 Salmon Grove Chambers, 407 Smith Street, Durban, 4001
Pietermaritzburg Library	Law	P O Box 1454, Pietermaritzburg, 3200
Natal Museum Library	Malacology; museology; conservation	Private Bag X9070, Pietermaritzburg, 3200
Natal National Botanical Gardens (National Botanical Institute) Library	Botany; nature conservation	P O Box 11448, Dorpspruit, 3206
Natal Parks Board Main Library	Ecology; nature conservation	P O Box 662, Pietermaritzburg, 3200
Hluhluwe-Umfolozi Game Park Research Centre	Ecology; nature conservation	P O Box 25, Mtubatuba, 3935
Mkuzi Game Reserve	Ecology; nature conservation	Private Bag X550, Mkuze, 3965
St Lucia Research Laboratory	Limnology; ecology; nature conservation	Private Bag, St Lucia Estuary, 3936
Natal Provincial Administration Addington Hospital Medical Library	Medicine	P O Box 977, Durban, 4000
Central Reference Library	Central library - controls numerous library depots, departmental and school libraries	Private Bag X9016, Pietermaritzburg, 3200

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Chief Directorate: Works Library	Construction; building technology	Private Bag X9041, Pietermaritzburg, 3200
Grey's Hospital Medical Library	Medicine	Private Bag X9001, Pietermaritzburg, 3200
Museum Service Departmental Library	Museology; history	Private Bag X9050, Pietermaritzburg, 3200
Northdale Hospital Medical Library	Medicine	Private Bag X9006, Pietermaritzburg, 3200
R K Khan Hospital Medical Library	Medicine	Private Bag X004, Chatsworth, 4030
Roads Branch Library	Road and traffic engineering	Private Bag X9043, Pietermaritzburg, 3200
Wentworth Hospital Medical Library	Medicine	Private Bag, Jacobs, 4026
Natal Sharks Board Library	Sharks; marine ecology	Private Bag X2, Umhlanga Rocks, 4320
Natal Society Library	Major library	P O Box 415, Pietermaritzburg, 3200
Natal Town and Regional Planning Commission Library	Town and regional planning	Private Bag X9038, Pietermaritzburg, 3200
National Chemical Products (NCP) Library	Chemicals; chemical engineering	P O Box 2204, Durban, 4000
Oceanographic Research Institute Library	Marine ecology	P O Box 10712, Marine Parade, 4056
Portland Cement Institute Library	Cement; concrete technology	P O Box 1393, Wandsbeck, 3631
Richards Bay Coal Terminal Library	Mining; engineering	P O Box 56, Richards Bay, 3900
Richards Bay Minerals Technical Library	Engineering; ecology	P O Box 401, Richards Bay, 3900
SAPPI SAICCOR Ltd Library	Pulp and paper; ecology	P O Box 62, Umkomaas, 4170
Shell and BP South African Petroleum Refineries Ltd Library	Petroleum; chemicals; plastics	P O Box 3179, Durban, 4000
Shepstone and Wylie Library	Law	P O Box 205, Durban, 4000
South African Bureau of Standards Library	Industrial and other standards; trade metrology	P O Box 30087, Mayville, 4058
South African Sugar Association Experiment Station Library	Sugar technology; agriculture; entomology	Private Bag X02, Mount Edgecombe, 4300

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
South African Timber Growers Association Library	Forestry	P O Box 803, Pietermaritzburg, 3200
Stewart Scott Inc. Library	Engineering	P O Box 1066, Pietermaritzburg, 3200
Technikon Natal Library	Education	P O Box 953, Durban, 4000
Tioxide Southern Africa Ltd Library	Chemicals	Private Bag X504, Umbogintwini, 4120
Tongaat-Hulett Sugar Ltd Library	Sugar technology; agriculture	Private Bag 3, Glenashley, 4022
Umgeni Water Library	Water; engineering	P O Box 9, Pietermaritzburg, 3200
University of Durban-Westville Institute for Social and Economic Research Library	Socio-economic matters	Private Bag X54004, Durban, 4000
Main Library	Education	Private Bag X54004, Durban, 4000
University of Natal - Durban Architecture Branch Library	Architecture; building technology	Private Bag X10, Dalbridge, 4014
Centre for Social and Development Studies Library	Socio-economic matters	Private Bag X10, Dalbridge, 4014
E G Malherbe Library	Education	Private Bag X10, Dalbridge, 4014
Killie Campbell Africana Library	Africana	Private Bag X10, Dalbridge, 4014
Law Library	Law	Private Bag X10, Dalbridge, 4014
Medical School Library	Medical research	Private Bag 7, Congella, 4013

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
University of Natal - Pietermaritzburg		
Cecil Renaud Library	Education	Private Bag X01, Scottsville, 3209
Institute for Commercial Forestry Research Library	Forestry	P O Box 100281, Scottsville, 3209
Institute of Natural Resources Library	Ecology; rural development	Private Bag X01, Scottsville, 3209
Law Library	Law	Private Bag X01, Scottsville, 3209
Life Sciences Library	Ecology; agriculture	Private Bag X01, Scottsville, 3209
University of Zululand		
Centre for Low Input Agricultural Research and Development Library	Socio-economic matters; rural development	Private Bag X1001, KwaDlangezwa, 3886
Main Library	Education	Private Bag X1001, KwaDlangezwa, 3886
Umlazi Extramural Division Library	Education	Private Bag X10, Isipingo, 4110
Valley Trust Library	Rural development	P O Box 33, Botha's Hill, 3660
Van Niekerk Kleyn and Edwards Inc. Library	Engineering	P O Box 37067, Overport, 4067
Van Wyk and Louw Inc. (now Africon Engineering International Ltd) Library	Engineering	P O Box 1319, Westville, 3630
ZAI (Natal) Inc. Library	Engineering	P O Box 3540, Durban, 4000
Transvaal		
Johannesburg and the Witwatersrand		
Adcock Ingram Critical Care Ltd Library	Pharmaceuticals	P O Box 6888, Johannesburg, 2000
Pharmaceutical Library	Pharmaceuticals	Private Bag X1, Industria, 2042
AECI Research Library	Chemicals; chemical engineering	Private Bag X2, Modderfontein, 1645
Afrox Ltd Library	Industrial gases; welding cryogenics	P O Box 5404, Johannesburg, 2000
Aiken and Peat Library	Accountancy; tax	P O Box 7400, Johannesburg, 2000
Altech Public Network TX Engineering Library	Engineering	P O Box 286, Boksburg, 1460

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Anglo American Corporation of South Africa Ltd Library	Mining; geology; engineering	P O Box 61587, Marshalltown, 2107
Babcock Engineering Contractors Technical Library	Engineering	P O Box 4561, Johannesburg, 2000
Barlows Equipment Manufacturing Company South Africa Ltd Library	Engineering	P O Box 762, Boksburg, 1460
Bayer Miles Ltd Medical Library	Pharmaceuticals; medicine	P O Box 198, Isando, 1600
Bell Dewar and Hall Library	Law	P O Box 4284, Johannesburg, 2000
Bentel Abramson and Partners Architectural Library	Architecture	P O Box 87619, Houghton, 2041
Bowens Attorneys Law Library	Law	P O Box 6434, Johannesburg, 2000
Bowman Gilfillan Hayman Godfrey Library	Law	P O Box 785812, Sandton, 2146
Bruinette Kruger Stoffberg (BKS) Inc. Library	Engineering	P O Box 31865, Braamfontein, 2017
Building Industries Federation of South Africa Library	Construction; building science	P O Box 1619, Halfway House, 1685
Carlton Paper Corporation Ltd Library	Packaging	P O Box 6473, Johannesburg, 2000
Chamber of Mines of South Africa Library	Mining; geology; medicine	P O Box 61809, Marshalltown, 2107
Research Organization Library	Mining; geology	P O Box 91230, Auckland Park, 2006
Chemical Services Ltd Library	Chemicals; water treatment	P O Box 12055, Chloorkop, 1624
Ciba-Geigy Ltd Library	Pharmaceuticals; medicine	P O Box 92, Isando, 1600
Cliffe Dekker and Todd Library	Law	P O Box 3382, Johannesburg, 2000
Cohen Bahr Lindsell and Associates Library	Architecture; engineering	P O Box 87366, Houghton, 2041
Consol Ltd Library	Glass; packaging	P O Box 562, Germiston, 1400
Coopers and Lybrand Library	Accountancy; business	P O Box 2536, Johannesburg, 2000
Council for Mineral Technology (MINTEK) Library	Minerals technology; engineering	Private Bag X3015, Randburg, 2125

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
De Leuw Cather Inc. Library	Engineering	P O Box 31384, Braamfontein, 2017
Deloitte and Touche Library	Accountancy; law	Private Bag X6, Gallo Manor, 2052
Deneys Reitz Private Law Library	Law	P O Box 61334, Marshalltown, 2107
Department of Justice Magistrate's Office Library	Law	Private Bag X1, Johannesburg, 2000
Supreme Court Library	Law	Private Bag X7, Johannesburg, 2000
Department of Mineral and Energy Affairs Mineralia Library	Mining; geology	Private Bag X4, Braamfontein, 2017
Department of National Health and Population Development National Centre for Occupational Health Library	Health	P O Box 32492, Braamfontein, 2017
Development Bank of Southern Africa Library	Development issues	P O Box 1234, Halfway House, 1685
D M Kisch Inc. (Patent and Trade Mark Agents) Library	Patent law	P O Box 668, Johannesburg, 2000
Edward L. Bateman Library	Engineering; mining	P O Box 565, Boksburg, 1460
Edward Nathan and Friedland Inc. Library	Law	P O Box 3370, Johannesburg, 2000
Environmental and Development Agency Trust Library	Development issues	P O Box 15840, Doornfontein, 2028
Ermetek Ltd Library	Heavy engineering	P O Box 8323, Germiston, 1400
Ernst and Young Library	Accountancy; business	P O Box 2322, Johannesburg, 2000
ESKOM Engineering Investigations Library	Electricity; engineering	Private Bag X40175, Cleveland, 2022
Megawatt Park Technical Library	Electricity; engineering; nuclear physics	P O Box 1091, Johannesburg, 2000
Fire Protection Association of Southern Africa Library	Fire	P O Box 61697, Marshalltown, 2107

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
First National Bank of Southern Africa Architectural Library	Architecture	P O Box 30998, Braamfontein, 2017
Fisher Hoffman Stride and Company Library	Accountancy; tax	P O Box 1370, Johannesburg, 2000
Fluor Engineers South Africa Ltd Technical Library	Chemicals; chemical engineering	P O Box 784850, Sandton, 2146
Fluxman Rabinowitz and Rubenstein Library	Law	P O Box 7140/1807, Johannesburg, 2000
Foster Wheeler South Africa Ltd Library	Plant design; safety chemical engineering	P O Box 76, Midrand, 1685
Genmin Mineral Resources Library	Mining; metallurgy	P O Box 61820, Marshalltown, 2107
Genmin Laboratories Technical Library	Metallurgy; chemistry	P O Box 2357, Springs, 1560
Glaxo Medical Library	Pharmaceuticals; medicine	P O Box 3388, Halfway House, 1685
Gold Fields Mining and Development Ltd Library	Mining; geology	P O Box 1167, Johannesburg, 2000
Group Five Ltd Technical Library	Engineering	P O Box 4399, Rivonia, 2128
Hill Kaplan Scott Law Gibb Ltd Library	Engineering	P O Box 2700, Rivonia, 2128
HL and H Mining Timber Library	Mining timber; forestry	P O Box 5906, Johannesburg, 2000
Hofmeyr Van der Merwe Inc. Library	Law	P O Box 9700, Johannesburg, 2000
Human Sciences Research Council Library	Human sciences	P O Box 32410, Braamfontein, 2017
Industrial Development Corporation of South Africa Ltd Library	Industry; agriculture	P O Box 784055, Sandton, 2146
Institute of Personnel Management Library	Personnel management	P O Box 31390, Braamfontein, 2017
Jeffares and Green Inc. Library	Engineering	P O Box 852, Randburg, 2125
Johannesburg Bar Library	Law	1st Floor, Innes Chambers, Pritchard Street, Johannesburg, 2001

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Johannesburg Corporation City Health Department Library	Health	P O Box 1477, Johannesburg, 2000
Electricity Department Library	Electricity	P O Box 699, Johannesburg, 2000
Engineering and Technical Information Library	Engineering	P O Box 4323, Johannesburg, 2000
Johannesburg Public Library	Major library	Market Square, Johannesburg, 2001
Keeve Steyn Inc. Library	Engineering	P O Box 31021, Braamfontein, 2017
Krueger Du Rand Inc. Library	Engineering	P O Box 559, Halfway House, 1685
Land and Agriculture Policy Centre Library	Ecology; rural development	P O Box 243, Wits, 2050
Legal Resources Centre Library	Law	P O Box 9495, Johannesburg, 2000
Logos Pharmaceuticals Library	Pharmaceuticals	Private Bag X3, Halfway House, 1685
LTA Process Engineering Ltd Library	Engineering	P O Box 68785, Bryanston, 2021
Technical Library	Engineering	P O Box 690, Kempton Park, 1620
Mallows Louw Hoffe and Partners Library	Architecture; town planning	P O Box 91850, Auckland Park, 2006
Moss-Morris Mendelow Browde Private Law Library	Law	P O Box 7066, Johannesburg, 2000
Murray and Roberts Engineering Management Services Library	Engineering	P O Box 585, Bedfordview, 2008
National Chemical Products (NCP) Library	Chemicals; chemical engineering	Private Bag X1067, Germiston, 1400
National Institute for Virology Library	Virology	Private Bag X4, Sandringham, 2131
Ninham Shand Inc. Library	Engineering	P O Box 1399, Randburg, 2125
Ove Arup Inc. Library	Engineering	P O Box 47012, Parklands, 2121
Phelps Dodge Mining Ltd Library	Mining; geology	P O Box 651944, Benmore, 2010

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Portland Cement Institute Library	Cement; concrete technology	P O Box 168, Halfway House, 1685
Portnet Library	Shipping; transport engineering	P O Box 32696, Braamfontein, 2017
Pretoria Portland Cement Company Ltd Library	Cement; concrete technology	P O Box 3811, Johannesburg, 2000
Price Waterhouse Meyernel Tax Library	Tax	P O Box 783027, Sandton, 2146
Price Waterhouse Technical Library	Finance; business	P O Box 61039, Marshalltown, 2107
Protea Chemicals Ltd Library	Chemicals	P O Box 782418, Sandton, 2146
Protechnik Ltd Library	Chemistry; engineering	P O Box 2276, Randburg, 2125
Public Accountants and Auditors Board Library	Accountancy	P O Box 59873, Kengray, 2100
Pyromet Library	Furnaces; metallurgy	P O Box 61582, Marshalltown, 2107
Rand Afrikaans University Library	Education	P O Box 524, Auckland Park, 2006
Rand Mines (Mining and Services) Ltd Technical Library	Mining; geology; engineering	P O Box 62370, Marshalltown, 2107
Rand Water Library	Water; engineering	P O Box 1127, Johannesburg, 2000
Rhodes-Harrison Fee and Bold Consulting Architects Library	Architecture	P O Box 52490, Saxonwold, 2132
Rio Tinto Exploration Ltd Library	Geology; mining	P O Box 784467, Sandton, 2146
Roche Products Ltd Library	Medicine; pharmaceuticals	P O Box 4589, Johannesburg, 2000
Roussel Laboratories Ltd Library	Pharmaceuticals	P O Box 39110, Bramley, 2018
Sandoz Pharmaceutical Library	Pharmaceuticals; medicine	P O Box 371, Randburg, 2125
SAPPI Management Services Library	Mining timber; forestry	P O Box 31560, Braamfontein, 2017
Technical Library	Mining timber; forestry	P O Box 3252, Springs, 1560
Sasol Sastech Technical Library	Chemicals; industrial processes; engineering	P O Box 5486, Johannesburg, 2000

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Sentraboer Library	Agriculture	P O Box 2851, Randburg, 2125
Shell South Africa Ltd Corporate Library	Chemicals	P O Box 747, Saxonwold, 2132
Small Business Development Corporation Library	Business	P O Box 7780, Johannesburg, 2000
Smith Kline and French Ltd Library	Agricultural chemicals; pharmaceuticals	P O Box 38, Isando, 1600
South African Broadcasting Corporation Reference Library	Telecommunications; broadcasting	Private Bag X3, Auckland Park, 2006
South African Druggists Library	Pharmaceuticals	P O Box 2251, Randburg, 2125
South African Housing Trust Library	Housing issues; urbanization	P O Box 3316, Randburg, 2125
South African Human Rights Commission Library	Law	Private Bag 2700, Houghton, 2041
South African Institute for Medical Research Library	Medical research	P O Box 1038, Johannesburg, 2000
South African Institute of Chartered Accountants Library	Accountancy; tax	P O Box 59875, Kengray, 2100
South African Institute of International Affairs Library	International affairs; bibliographies	P O Box 31596, Braamfontein, 2017
South African Institute of Welding Library	Structural engineering	P O Box 527, Crown Mines, 2025
Southby Bihl Detert and Slade Library	Building construction; quantity surveying	P O Box 9045, Johannesburg, 2000
Spoornet (Transnet) Main Library	Transport engineering	P O Box 12, Johannesburg Station, 2000
Stanway Edwards and Associates Library	Urban planning; transport engineering	P O Box 32795, Braamfontein, 2017
Steffen Robertson and Kirsten (SRK) Inc. Library	Engineering	P O Box 55291, Northlands, 2116
Steinmuller Library	Steam engineering	P O Box 1537, Rivonia, 2128
Stewart Scott Inc. Library	Engineering	P O Box 784506, Sandton, 2146
Technical College of South Africa Library	Education	Private Bag X7, Pinegowrie, 2123
Technikon SA Library	Education	Private Bag X6, Florida, 1710

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Technikon Witwatersrand Library	Education	P O Box 17011, Doornfontein, 2028
Total South Africa Ltd Library	Petroleum	P O Box 9454, Johannesburg, 2000
Union Carriage and Wagon Technical Library	Transport; engineering	P O Box 335, Nigel, 1490
United States Information Service Library	American affairs	P O Box 2155, Johannesburg, 2000
University of the Witwatersrand Government Publications Library	Official publications	Private Bag X1, Wits, 2050
Medical School Library	Medical research	7 York Road, Parktown, 2193
Wartenweiler Library	Education	Private Bag X1, Wits, 2050
Van Hulsteyn Duthie and Saner Library	Law	P O Box 46, Johannesburg, 2000
Vista University East Rand Campus Library	Education	Private Bag X025, Benoni, 1500
Soweto Campus Library	Education	Private Bag X09, Bertsham, 2013
Watermeyer Legge Piesold and Uhlmann Library	Engineering	P O Box 221, Rivonia, 2128
Wates Meiring and Barnard Library	Engineering	P O Box 61437, Marshalltown, 2107
Webber Wentzel Library	Law	P O Box 61771, Marshalltown, 2107
Wellcome Medical Library	Pharmaceuticals; medicine	P O Box 655, Kempton Park, 1620
Werksman Law Library	Law	P O Box 927, Johannesburg, 2000
World Vision Library	Development issues	P O Box 1101, Florida, 1710
Pretoria Africa Institute of South Africa Library	Anthropology; sociology	P O Box 630, Pretoria, 0001
Atomic Energy Corporation of South Africa Ltd Library	Nuclear science; chemistry; engineering	P O Box 582, Pretoria, 0001

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Bruinette Kruger Stoffberg (BKS) Inc. Library	Engineering	P O Box 3173, Pretoria, 0001
Burger Pretorius and Partners Library	Engineering	P O Box 20342, Alkantrant, 0005
Central Economic Advisory Service Library	Economics	Private Bag X455, Pretoria, 0001
Central Statistical Service Library	Statistics	Private Bag X44, Pretoria, 0001
Commission for Administration Library	Public administration	Private Bag X121, Pretoria, 0001
Constitutional Development Service Library	Public administration	Private Bag X804, Pretoria, 0001
Consulate-General of Japan Library	Japanese affairs	P O Box 11434, Brooklyn, 0011
CSIR Division of Information Services Library and other divisional libraries	Major library	P O Box 395, Pretoria, 0001
Deloitte and Touche Library	Accountancy; business	P O Box 4346, Pretoria, 0001
Department of Agriculture Central Agricultural Library	Agriculture	Private Bag X388, Pretoria, 0001
Directorate of Irrigation Engineering Library	Irrigation; agricultural engineering	Private Bag X515, Silverton, 0127
Directorate of Plant and Quality Control Library	Economic botany	Private Bag X258, Pretoria, 0001
Transvaal Agricultural Development Institute Library	Agriculture	Private Bag X180, Pretoria, 0001
Department of Environment Affairs Library	Ecology; environmental issues	Private Bag X447, Pretoria, 0001
Weather Bureau Library	Climate; weather	Private Bag X097, Pretoria, 0001
Department of Finance Library	Finance; tax; law	P O Box 402, Pretoria, 0001
Department of Foreign Affairs Library	International relations and law	Private Bag X152, Pretoria, 0001
Department of Home Affairs Library	Official publications	Private Bag X114, Pretoria, 0001
Department of Housing and Works: House of Assembly Library	Housing issues	Private Bag X340, Pretoria, 0001

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Department of Justice Head Office Library	Law	Private Bag X81, Pretoria, 0001
South African Law Commission Library	Law	Private Bag X668, Pretoria, 0001
Supreme Court Library	Law	Private Bag X67, Pretoria, 0001
Training Library	Law	Private Bag X659, Pretoria, 0001
Department of Local Government and National Housing Library	Public administration	Private Bag X644, Pretoria, 0001
Department of Manpower Library	Economics; occupational safety	Private Bag X117, Pretoria, 0001
Department of Mineral and Energy Affairs Geological Survey Library	Geology; minerals	Private Bag X112, Pretoria, 0001
Main Library	Mining; geology	Private Bag X59, Pretoria, 0001
(National Energy Council) Library	Energy	Private Bag X03, Lynnwood Ridge, 0040
Department of National Education Library	Education; library science	Private Bag X122, Pretoria, 0001
Public Service Library Services	Bibliographies; professional control of Government department libraries; planning of new libraries for Government departments	Private Bag X122, Pretoria, 0001
Department of National Health and Population Development Library	Health; demography	Private Bag X828, Pretoria, 0001
Department of Regional and Land Affairs Library	Public administration; regional planning	Private Bag X833, Pretoria, 0001
Department of Trade and Industry Library	Trade; industry; agriculture	Private Bag X84, Pretoria, 0001

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Department of Transport Directorate of Road Traffic Safety Library Implan Library Main Library	Transport engineering Transport engineering Transport engineering	Private Bag X147, Pretoria, 0001 Private Bag X193, Pretoria, 0001 Private Bag X193, Pretoria, 0001
Department of Water Affairs and Forestry Library	Water; engineering	Private Bag X313, Pretoria, 0001
Department of Welfare: House of Assembly Library	Social welfare	Private Bag X730, Pretoria, 0001
EMLC Consultants and Manufacturers Library	Engineering	P O Box 21206, Valhalla, 0137
Financial Services Board Library	Economics	Private Bag X238, Pretoria, 0001
Foundation for Research Development Library	Natural sciences	P O Box 2600, Pretoria, 0001
Fourie and Pretorius Inc. Library	Engineering	P O Box 3573, Pretoria, 0001
Geustyn Forsyth and Joubert Inc. Library	Engineering	P O Box 11449, Brooklyn, 0011
Hahn and Hahn (Patent and Trade Mark Agents) Library	Patent law	222 Richard Street, Hatfield, 0083
Human Sciences Research Council Library	Human sciences	Private Bag X41, Pretoria, 0001
Institute for Soil, Climate and Water Library	Soils; climate; engineering	Private Bag X79, Pretoria, 0001
ISCOR Library	Metallurgy, mining; engineering	P O Box 450, Pretoria, 0001
Medical Research Council Tuberculosis Research Institute Library	Biostatistics; environmental diseases	Private Bag X385, Pretoria, 0001
Medical University of Southern Africa Library	Medical and veterinary research	P O Medunsa, 0204
Metroplan Consortium Library	Transport engineering	P O Box 415, Pretoria, 0001
National Botanical Institute Library	Botany; nature conservation	Private Bag X101, Pretoria, 0001
National Cultural and History Museum Library	Anthropology; museology; agricultural history	P O Box 28088, Sunnyside, 0132

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
National Productivity Institute Library	Labour productivity	P O Box 3971, Pretoria, 0001
National Zoological Gardens of South Africa Library	Zoology; nature conservation	P O Box 754, Pretoria, 0001
Office of the Auditor-General Library	Official publications	P O Box 446, Pretoria, 0001
Onderstepoort Veterinary Institute Library	Veterinary research	Private Bag X05, Onderstepoort, 0110
Plan Associates Library	Town and regional planning; landscape architecture	P O Box 1889, Pretoria, 0001
Plant Protection Research Institute Library	Entomology; microbiology; weeds research	Private Bag X134, Pretoria, 0001
Pretoria Metal Pressings Ltd Library	Metallurgy	Private Bag X334, Pretoria, 0001
SABINET (South African Bibliographic Network) Library	Library and information science	P O Box 617, Pretoria, 0001
Savage Jooste and Adams Inc. Library	Law	P O Box 745, Pretoria, 0001
Society of Advocates of South Africa (Transvaal Provincial Division) Library	Law	Momentum Centre East Tower, 343 Pretorius Street, Pretoria, 0002
Solomon and Nicholson Inc. Library	Law	P O Box 645, Pretoria, 0001
South African Agricultural Union Library	Agriculture	P O Box 1508, Pretoria, 0001
South African Bureau of Standards Library	Industrial and other standards; trade metrology	Private Bag X191, Pretoria, 0001
South African Communication Service Library	Official publications	Private Bag X745, Pretoria, 0001
South African Defence Force Central Library	Military science	Private Bag X289, Pretoria, 0001
Swartkop Park Library	Military science	Private Bag X1007, Voortrekkerhoogte, 0143
South African Forestry Research Institute Library (now part of the CSIR)	Ecology; forestry; hydrology	P O Box 727, Pretoria, 0001

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
South African Medical Services 1 Military Hospital, Medical Reference Library	Medicine	Private Bag X1026, Voortrekkerhoogte, 0143
South African Naval Headquarters Library	Marine; shipping	Private Bag X104, Pretoria, 0001
South African Tourism Board Library	Tourism; nature conservation	Private Bag X164, Pretoria, 0001
State Library Book Exchange Centre	Major library	P O Box 397, Pretoria, 0001 P O Box 397, Pretoria, 0001
Stauch Vorster Library	Architecture	P O Box 1125, Pretoria, 0001
Suid-Afrikaanse Akademie vir Wetenskap en Kuns Library	Science and technology; history	P O Box 538, Pretoria, 0001
Technikon Northern Transvaal Library	Education	Private Bag X07, Pretoria North, 0116
Technikon Pretoria Library	Education	Private Bag X680, Pretoria, 0001
Transvaal Archives Depot Library	History; archival science	Private Bag X236, Pretoria, 0001
Transvaal Museum Library	Entomology; palaeontology	P O Box 413, Pretoria, 0001
Transvaal Provincial Administration Directorate of Nature and Environmental Conservation Library Library and Museum Service	Ecology; nature conservation Central library - controlling body for 18 regional libraries	Private Bag X209, Pretoria, 0001 Private Bag X288, Pretoria, 0001
University of Pretoria Agricultural Library Faculty of Veterinary Science Library Medical School Library Merensky Library Pre-clinical Library	Agriculture Veterinary research Medical research Medical and veterinary research Medical research	University of Pretoria, Pretoria, 0002 Private Bag X04, Onderstepoort, 0110 P O Box 667, Pretoria, 0001 University of Pretoria, Pretoria, 0002 P O Box 2034, Pretoria, 0001

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
University of South Africa Library	Education	P O Box 392, Pretoria, 0001
Van Niekerk Kleyn and Edwards Inc. Library	Engineering	P O Box 72927, Lynnwood Ridge, 0040
Van Wyk and Louw Inc. (now Africon Engineering International Ltd) Library	Engineering	P O Box 905, Pretoria, 0001
Vista University		
Head Office Library	Education	Private Bag X634, Pretoria, 0001
Further Training Campus Library Services	Education	Private Bag X634, Pretoria, 0001
Mamelodi Campus Library	Education	Private Bag X03, Mamelodi, 0101
Water Research Commission Library	Water; engineering	P O Box 824, Pretoria, 0001
Remainder of the Transvaal including Gazankulu, KaNgwane, KwaNdebele and Lebowa		
Anglo American Prospecting Services Library	Mining; geology	Private Bag X5035, Klerksdorp, 2570
Aviation Library	Aviation	Private Bag X504, Hoedspruit, 1380
CSIR Forestry Research Centre Library	Forestry	Private Bag X11227, Nelspruit, 1200
Department of Agriculture, Highveld Agricultural Development Institute Library	Agriculture	Private Bag X804, Potchefstroom, 2520
ESKOM Eastern Transvaal Region Library	Electricity	P O Box 223, Witbank, 1035
ETC Ltd Agricultural Development Library	Agriculture	P O Box 100, Bethal, 2310
FOSKOR Ltd Library	Phosphates	P O Box 1, Phalaborwa, 1390
Gazankulu National Library Services	Central library; official publications	Private Bag X9668, Giyani, 0826
ISCOR Branch Library	Metallurgy; mining; engineering	P O Box 2, Vanderbijlpark, 1900
KaNgwane Agricultural Development Corporation Ltd Technical Library	Agriculture	P O Box 1330, Nelspruit, 1200
KwaNdebele Legislative Assembly Library	Official publications	Private Bag X4014, Kwamhlanga, 1022

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Lebowa National Library Service	Central library; official publications	Private Bag X03, Chuniespoort, 0745
Lowveld College of Agriculture Library	Agriculture	Private Bag X11283, Nelspruit, 1200
Naschem Ltd Library	Chemicals	Private Bag X1254, Potchefstroom, 2520
National Parks Board Library	Ecology; nature conservation	P O Box 50, Skukuza, 1350
Northern Transvaal Co-operative Ltd Agricultural Development Library	Agriculture; official publications	P O Box 29, Nylstroom, 0510
Potchefstroom University for Christian Higher Education Library	Education	Private Bag X05, Noordbrug, 2522
Sasol Sastech Library	Chemicals; industrial processes; engineering	Private Bag X1034, Secunda, 2302
Tompi Seleka College of Agriculture Library	Agriculture	Private Bag X9619, Marble Hall, 0450
Transvaal Provincial Administration Fisheries Institute Library	Ichthyology; fisheries	Private Bag X1088, Lydenburg, 1120
University of the North Library	Education	Private Bag X1112, Sovenga, 0727
Vaal Triangle Technikon Library	Education	Private Bag X021, Vanderbijlpark, 1900
Vista University Sebokeng Campus Library	Education	Private Bag X050, Vanderbijlpark, 1900
Cape Cape Town Caltex Oil South Africa Ltd Technical Library	Petroleum; chemical engineering	P O Box 13, Milnerton, 7435
Cape Archives Depot Library	History; archival science	Private Bag X9025, Cape Town, 8000
Cape Provincial Administration Library Service	Central library - controls 130 library depots and one departmental library	P O Box 2108, Cape Town, 8000
Roads Technical Library	Road and traffic engineering	P O Box 2603, Cape Town, 8000
Cape Technikon Library	Education	P O Box 652, Cape Town, 8000
De Beers Marine Ltd Library	Coastal mining	P O Box 87, Cape Town, 8000

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Deloitte and Touche Library	Accountancy; tax	P O Box 578, Cape Town, 8000
Department of Justice Supreme Court Library	Law	Private Bag X9020, Cape Town, 8000
Department of National Health and Population Development, Radiation Control Library	Health; nuclear physics	Private Bag X62, Bellville, 7535
Department of Regional and Land Affairs, Chief Directorate: Surveys and Land Information Library	Cartography; photogrammetry; surveying	Private Bag, Mowbray, 7705
Department of Welfare: House of Assembly South Western Cape Region Library	Social welfare	Private Bag X55, Bellville, 7535
Engen Petroleum Ltd Library	Petroleum; chemical engineering	P O Box 35, Cape Town, 8000
ESKOM, Western Cape Regional Library	Electricity; engineering; nuclear physics	P O Box 2100, Bellville, 7535
Fine Chemicals Corporation Ltd Library	Pharmaceuticals; chemistry	P O Box 253, Eppindust, 7475
Herold Gie and Broadhead Library	Law	P O Box 105, Cape Town, 8000
Institute for Maritime Technology Library	Marine engineering	P O Box 181, Simonstown, 7995
Law Society of the Cape of Good Hope Library	Law	P O Box 4528, Cape Town, 8000
Library of Parliament	Major library	P O Box 18, Cape Town, 8000
Liebenberg and Stander Engineering Information Library	Engineering	P O Box 4733, Cape Town, 8000
Mallinick Ress Richman and Closenbergs Inc. Library	Law	P O Box 3667, Cape Town, 8000
Mallows Louw Hoffe and Partners Library	Architecture; town planning	P O Box 15002, Vlaeberg, 8018
Medical Research Council, Institute for Biomedical Communication Library	Medicine	P O Box 19070, Tygerberg, 7505
Metal Box South Africa Ltd Library	Packaging	P O Box 247, Howard Place, 7450
Mountain Club of South Africa (Cape Town Section) Library	Mountaineering	P O Box 164, Cape Town, 8000
Nampak Ltd Research and Development Library	Packaging; plastics technology	P O Box 247, Howard Place, 7450

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
National Botanical Institute Library	Botany; nature conservation	Private Bag X7, Claremont, 7735
National Monuments Council Library	Archaeology; architecture; history	P O Box 4637, Cape Town, 8000
Ninham Shand Inc. Library	Engineering	P O Box 1347, Cape Town, 8000
Old Mutual Management Library	Insurance; marketing; actuarial science	P O Box 5180, Cape Town, 8000
Peninsula Technikon Library	Education	P O Box 1906, Bellville, 7535
Sanlam Technical Library	Insurance; economics; actuarial science	P O Box 1, Sanlamhof, 7532
Sea Fisheries Research Institute Library	Oceanography; ocean pollution; marine biology	Private Bag X2, Rogge Bay, 8012
South African Cultural History Museum Library	Marine history	P O Box 645, Cape Town, 8000
South African Fisheries Museum Library	Marine; fisheries	P O Box 4239, Cape Town, 8000
South African Library	Major library	P O Box 496, Cape Town, 8000
South African Marine Corporation Library	Shipping	P O Box 27, Cape Town, 8000
South African Medical Services 2 Military Hospital, Medical Reference Library	Medicine	Private Bag X4, Wynberg, 7824
South African Museum Library	Entomology; museology; marine biology	P O Box 61, Cape Town, 8000
South African Navy Naval Reference Library	Marine; shipping	Private Bag X1, Simonstown, 7995
Naval Staff College Library	Marine; shipping	Private Bag X4, Muizenberg, 7950
Technical College Tygerberg Library	Education	Private Bag X1, Panorama, 7506

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
University of Cape Town Fishing Industry Research Institute Library J W Jagger Library Medical School Library Niven Library	Marine; fisheries Education Medical research Zoology; nature conservation; Antarctic science	Private Bag, Rondebosch, 7701 Private Bag, Rondebosch, 7701 Anzio Road, Observatory, 7925 Private Bag, Rondebosch, 7701
University of Stellenbosch Graduate School of Business Library Medical School Library	Futures research; business science Medical research	P O Box 610, Bellville, 7535 P O Box 19063, Tygerberg, 7505
University of the Western Cape Library	Education	Private Bag X17, Bellville, 7535
Van Niekerk Kleyn and Edwards Inc. Library	Engineering	58 Loop Street, Cape Town, 8001
Eastern Cape Albany Museum Library	Entomology; freshwater organisms; botany	Somerset Street, Grahamstown, 6139
Border Technikon Library	Education	P O Box 1421, East London, 5200
Cape Provincial Administration Livingstone Hospital Medical Library Port Elizabeth Hospital Medical Library	Medicine Medicine	Private Bag, Korsten, 6014 Private Bag X0003, Cooperskloof, 6007
Department of Agriculture Döhne Agricultural Development Institute Library Grootfontein Agricultural Development Institute Library	Agriculture Agriculture	Private Bag X15, Stutterheim, 4930 Private Bag X529, Middelburg, 5900
Department of Justice Supreme Court Library	Law	Private Bag X1011, Grahamstown, 6140
East London Museum Library	Ethnology; molluscs	P O Box 11021, Southernwood, 5213
Fort Beaufort Historical Museum Library	Africana	P O Box 94, Fort Beaufort, 5720

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Johnson and Johnson Ltd Research and Development Library	Pharmaceuticals	P O Box 727, East London, 5200
Kaffrarian Museum Library	Mammalogy; Africana; ethnography	P O Box 1434, King William's Town, 5600
Lennon Ltd Medical Library	Pharmaceuticals; medicine	P O Box 4002, Korsten, 6014
Mossgas Ltd Library	Petroleum; chemicals	Private Bag X14, Mossel Bay, 6500
Port Elizabeth Museum Library	Marine mammalogy; ichthyology	P O Box 13147, Humewood, 6013
Port Elizabeth Technikon Library	Education	Private Bag X6011, Port Elizabeth, 6000
Rhodes University Main Library	Education	P O Box 184, Grahamstown, 6140
East London Division Library	Education	P O Box 7426, East London, 5200
J L B Smith Institute of Ichthyology Library	Ichthyology; marine ecology	Private Bag 1015, Grahamstown, 6140
Spoornet (Transnet) Regional Library	Transport engineering	P O Box 1139, Port Elizabeth, 6000
University of Port Elizabeth Library	Education	Private Bag X6058, Port Elizabeth, 6000
Vista University, Port Elizabeth Campus Library	Education	Private Bag X613, Port Elizabeth, 6000
Western and northern Cape Cape Provincial Administration Chief Directorate: Nature and Environmental Conservation Library (Jonkershoek Nature Conservation Station)	Ecology; nature conservation	Private Bag X5014, Stellenbosch, 7599
Centre for Rural Legal Studies Library	Law	P O Box 1169, Stellenbosch, 7599

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
CSIR		
Division of Forest Science and Technology, Jonkershoek Forestry Research Centre Library	Ecology; forest hydrology	Private Bag X5011, Stellenbosch, 7599
Division of Information Services Library	Marine science; coastal engineering; physical oceanography; estuarine ecology	P O Box 320, Stellenbosch, 7599
Magnetic Observatory Library	Geophysics; geomagnetism	P O Box 32, Hermanus, 7200
Department of Agriculture		
Directorate of Plant and Quality Control, Plant Quarantine Library	Economic botany	Private Bag X5015, Stellenbosch, 7599
Elsenburg Agricultural Development Institute Library	Agriculture	Private Bag, Elsenburg, 7607
Department of Justice Supreme Court Library	Law	Private Bag X5043, Kimberley, 8300
ESKOM Koeberg Nuclear Power Station Library	Nuclear energy	Private Bag X10, Kernkrag, 7440
Houwteq Library	Engineering	Private Bag X8, Grabouw, 7160
McGregor Museum Library	Botany; museology; zoology	P O Box 316, Kimberley, 8300
Melis and Du Plessis Library	Geotechnics	P O Box 1476, Somerset West, 7129
National Accelerator Centre Library	Radiation; nuclear medicine; engineering	P O Box 72, Faure, 7131
Plant Protection Research Institute Library	Entomology; microbiology; weeds research	Private Bag X5017, Stellenbosch, 7599
Saasveld School of Forestry Library	Forestry	Private Bag X6531, George, 6530
University of Stellenbosch		
Engineering Library	Engineering	Private Bag X5036, Stellenbosch, 7599
J S Gericke Library	Education	Private Bag X5036, Stellenbosch, 7599

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Orange Free State including Qwaqwa Bloemfontein Public Library	Major library	P O Box 1029, Bloemfontein, 9300
Department of Agriculture, Glen Agricultural Development Institute Library	Agriculture	Private Bag X01, Glen, 9360
Department of Justice Appeal Court Library	Law	P O Box 258, Bloemfontein, 9300
Supreme Court Library	Law	Private Bag X20612, Bloemfontein, 9300
National Museum Library	Entomology; palaeontology; general science	P O Box 266, Bloemfontein, 9300
Omnia Fertilizer Ltd Library	Fertilizers	P O Box 489, Sasolburg, 9570
Orange Free State Archives Depot Library	History, architecture	Private Bag X20504, Bloemfontein, 9300
Orange Free State Provincial Administration Directorate of Nature and Environmental Conservation Library Library Service	Ecology; nature conservation Central library - controls regional libraries	P O Box 517, Bloemfontein, 9300 Private Bag X20606, Bloemfontein, 9300
Sasol Sastech Technical Library	Chemicals; industrial processes; engineering	P O Box 1, Sasolburg, 9570
Technikon Free State Library	Education	Private Bag X20539, Bloemfontein, 9300
University of the North Qwaqwa Campus Library	Education	Private Bag X13, Phuthaditjhaba, 9866
University of the Orange Free State Institute for Contemporary History Library (National Press Clippings Service) Rabie Saunders Library	Clippings on economic, social, cultural, educational, labour, political and military topics; official publications Education	P O Box 2320, Bloemfontein, 9300 P O Box 339, Bloemfontein, 9300

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Vista University		
Bloemfontein Campus Library	Education	P O Box 380, Bloemfontein, 9300
Welkom Campus Library	Education	P O Box 1881, Welkom, 9460
Bophuthatswana		
Agricor Information Centre Library	Agriculture	Private Bag X2137, Mmabatho, 2735
Bophuthatswana National Development Corporation Library	Industrial matters; rural development, agriculture	P O Box 3011, Mmabatho, 2735
Bophuthatswana National Library Service	Central library; official publications	Private Bag X2044, Mmabatho, 2735
L M Mangope College of Agriculture Library	Agriculture; education	Private Bag X532, Taung, 8584
Technikon North West (previously Setlogelo Technikon) Library	Education	P O Box 9111263, Rosslyn, 0200
University of Bophuthatswana (now the University of North-West) Library	Education	Private Bag X2046, Mmabatho, 2735
Botswana		
Botswana National Library Service	Economics; geography; Africana	Private Bag X0036, Gaborone, Botswana
Botswana Polytechnic Library	Education	Private Bag X0061, Gaborone, Botswana
Ministry of Agriculture		
Headquarters Library	Agriculture	Private Bag X003, Gaborone, Botswana
Research Station Library	Agriculture	Private Bag X0033, Gaborone, Botswana
Ministry of Mineral Resources and Water Affairs, Geological Survey Library	Geology	Private Bag X14, Lobatse, Botswana
Rural Industries Innovation Centre Library	Appropriate technology	Private Bag X11, Kanye, Botswana
University of Botswana Library	Education	Private Bag X0022, Gaborone, Botswana
Ciskei		
Ciskei Agricultural Corporation Library	Agriculture	P O Box 198, Bisho, 5605
Fort Cox College of Agriculture and Forestry Library	Agriculture; forestry	P O Box 2187, King William's Town, 5600

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
University of Fort Hare Library	Education	Private Bag X1322, Alice, 5700
Lesotho		
Lesotho National Library Service	Lesotho affairs	P O Box 985, Maseru, Lesotho
National University of Lesotho Library	Education	P O Roma 180, Lesotho
Malawi		
John F. Kennedy Memorial Library (American Library)	American affairs	P O Box 30373, Capital City, Lilongwe 3, Malawi
Malawi National Library Service Central Library	Official publications	P O Box 30314, Capital City, Lilongwe 3, Malawi
National Archives of Malawi Library	Malawi affairs	P O Box 62, Zomba, Malawi
University of Malawi Polytechnic Library	Education	Private Bag X303, Chichiri, Blantyre 3, Malawi
Namibia		
Department of Agriculture and Rural Development, National Agricultural Information Centre	Agriculture; veterinary science	Private Bag X13184, Windhoek, Namibia
Department of Water Affairs Library	Water; engineering	Private Bag X13193, Windhoek, Namibia
Ministry of Fisheries and Marine Resources Library	Marine; fisheries resources	P O Box 912, Swakopmund, Namibia
Ministry of Mines and Energy, Geological Survey Library	Mining; geology; minerals	P O Box 2168, Windhoek, Namibia
Namibian Scientific Society Library	Ethnology; natural sciences; Africana	P O Box 67, Windhoek, Namibia
National Archives Library	Africana; official publications; theses	Private Bag X13250, Windhoek, Namibia
Polytechnic of Namibia	Education	Private Bag 13388, Windhoek, Namibia
State Museum Library	Ethnology; entomology; mammals	P O Box 1203, Windhoek, Namibia
University of Namibia Library	Education	Private Bag 13301, Windhoek, Namibia
Swaziland		
Ministry of Agriculture and Cooperatives, Agricultural Library	Agriculture	P O Box 162, Mbabane, Swaziland

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Swaziland College of Technology Library	Education	P O Box 69, Mbabane, Swaziland
Swaziland National Library Service	Swaziana; United Nations matters	P O Box 1461, Mbabane, Swaziland
University of Swaziland Faculty of Agriculture Library Main Library	Agriculture Education	P O Luyengo, Swaziland Private Bag 4, Kwaluseni, Swaziland
Transkei Eastern Cape Technikon (previously Transkei Technikon) Library	Education	Private Bag X3182, Butterworth, 4960
Transkei Development Corporation Library	Industrial matters; rural development; agriculture	Private Bag X5028, Umtata, 5100
Transkei National Library Service	Central library; official publications	Private Bag X5095, Umtata, 5100
University of Transkei Library	Education	Private Bag X2, Unitra, 5117
Venda Venda National Library	Central library; official publications	Private Bag X2250, Sibasa, 0970
University of Venda Library	Education	Private Bag X5050, Thohoyandou, 0950
Zambia Department of Agriculture, Mount Makulu Agricultural Research Station Library	Agriculture	Private Bag 7, Chilanga, Zambia
Ministry of Agriculture and Water Development, Natural Resources Development College Library	Agriculture; engineering; water	P O Box CH 310099, Lusaka CH99, Zambia
Ministry of Water, Lands and Natural Resources, Forest and Timber Research Library	Forestry; agriculture	P O Box 22099, Kitwe 02, Zambia
National Council for Scientific Research, Documentation and Scientific Information Centre Library	Engineering; agriculture; water	P O Box CH 158, Chelston, Lusaka, Zambia
Zimbabwe British Council Library and Information Centre	United Kingdom affairs	P O Box 664, Harare, Zimbabwe
Bulawayo Polytechnic Library	Education	P O Box 1392, Bulawayo, Zimbabwe

Table B4: Selected specialist libraries in southern Africa, 1993 (continued).

Library	Specialization	Address
Department of National Parks and Wildlife Management Library	Ecology; nature conservation	P O Box 8365, Causeway, Harare, Zimbabwe
Department of Veterinary Services, Veterinary Research Laboratory Library	Veterinary research	P O Box 8101, Causeway, Harare, Zimbabwe
Library of Parliament	Zimbabweana; official publications	P O Box 8055, Causeway, Harare, Zimbabwe
Ministry of Lands, Agriculture and Water Development Agronomy Institute Library	Agriculture	P O Box 8100, Causeway, Harare, Zimbabwe
Central Library	Agriculture, rural development	Private Bag X7701, Causeway, Harare, Zimbabwe
Henderson Research Station Library	Pasture science; dairy science	Private Bag X2004, Mazowe, Zimbabwe
Matopos Research Station Library	Agriculture; veld ecology; dryland agronomy	Private Bag K5137, Bulawayo, Zimbabwe
Mutare Museum Library	History; transport	P O Box 920, Mutare, Zimbabwe
National Archives Library	Zimbabweana	Private Bag X7729, Causeway, Harare, Zimbabwe
National Free Library of Zimbabwe	Central library; Zimbabweana	P O Box 1773, Bulawayo, Zimbabwe
National Railways of Zimbabwe Library	Transport engineering; railway management	P O Box RY55, Raylton, Bulawayo, Zimbabwe
Natural History Museum of Zimbabwe Library	Zoology; archaeology	P O Box 240, Bulawayo, Zimbabwe
Queen Victoria Museum Library	History	P O Box 8006, Causeway, Harare, Zimbabwe
University of Zimbabwe Main Library	Education	P O Box MP45, Mount Pleasant, Harare, Zimbabwe
Medical School Library	Medical research	P O Box MP45, Mount Pleasant, Harare, Zimbabwe

- Source:**
- (i) After Anonymous, 1993. Interlending manual for southern African libraries, State Library, Pretoria, 299 p. (The publication is updated annually).
 - (ii) After Anonymous, 1990. Directory of Southern African Libraries 1989, Contributions to Library Science No. 36, State Library, Pretoria, 463 p. (Further libraries are listed in this comprehensive publication).
 - (iii) After Berghammer, C., 1987. Special libraries and information sources in Natal: a select list, Natal Branch, South African Institute for Librarianship and Information Science, [Durban], 36 p.
 - (iv) Fieldwork.

See also: Musiker, R., 1986. Companion to South African Libraries, AD. Donker, Johannesburg, 253 p. (The book lists various sources of information including South African bibliographies).

- Note:**
- (i) Certain university libraries have their own postal addresses. Some universities have more than one library and more than one campus.
 - (ii) The CSIR has several libraries on the Pretoria Campus.
 - (iii) The above table is not exhaustive, and is somewhat biased towards interlending scheme libraries.
 - (iv) Some libraries (especially certain consulting engineering firms' libraries), are not libraries in the full sense of the word, and can more properly be termed "resource centres".
 - (v) Copyright (legal deposit) libraries in terms of the Legal Deposit of Publications Act No. 17 of 1982 are as follows:

Bloemfontein Public Library	Bloemfontein
Library of Parliament	Cape Town
Natal Society Library	Pietermaritzburg
South African Library	Cape Town
State Library	Pretoria
 - (vi) The following publication (updated annually) lists addresses of universities, libraries, archives, learned societies, research institutes and museums in most countries of the world: Anonymous, 1992. The World of Learning 1993, Europa Publications, London, 2072 p.
 - (vii) The Division of Information Services, CSIR, P O Box 395, Pretoria, 0001, maintains a computerized database of scientific, industrial and other specialist libraries in southern Africa. The database lists any special features of each library.

- (viii) The information in the table applies to 1993, and does not reflect later changes. The various research institutes of the Medical Research Council, for example, have since been consolidated into six national research programmes. The programmes are as follows: the National AIDS Research Programme (Johannesburg); the National Malaria Research Programme (Durban); the National Research Programme for Nutritional Intervention (Tygerberg); the National Trauma Research Programme (Tygerberg); the National Tuberculosis Research Programme (Pretoria), and the National Urbanization and Health Research Programme (Tygerberg). Readers should therefore always confirm the current status of a particular organization and library.

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993.

Organization	Address
Architecture	
Institute of South African Architects (now the South African Institute of Architects)	Private Bag X10063, Randburg, 2125
KwaZulu-Natal Institute for Architecture	160 Bulwer Road, Glenwood, 4001
Chemicals	
Aerosol Manufacturers' Association	P O Box 483, Olifantsfontein, 1665
Agricultural, Mining and Industrial Chemical Manufacturers' Association	P O Box 781811, Sandton, 2146
Agricultural and Veterinary Chemicals Association of South Africa (now known as the Crop Protection and Animal Health Association)	P O Box 1995, Halfway House, 1685
Chemical Manufacturers' Association	Private Bag 34, Auckland Park, 2006
South African Chemical Institute	P O Box 93480, Yeoville, 2143
Natal Branch	P O Box 50235, Musgrave Road, 4062
Commerce and accounting	
Chartered Institute of Management Accountants	CC 99-324 Carlton Centre, Johannesburg, 2001
Institute of Accounting Technicians of Southern Africa	P O Box 61010, Marshalltown, 2107
Natal Regional Office	c/o D. Stead, Technikon Natal, P O Box 953, Durban, 4000
Institute of Administration and Commerce	P O Box 2907, Cape Town, 8000
Institute of Commercial and Financial Accountants of Southern Africa	P O Box 61010, Marshalltown, 2107
Institute of Directors in Southern Africa	P O Box 908, Parklands, 2121
Institute of Marketing Management	P O Box 91820, Auckland Park, 2006
Natal Coastal Branch	P O Box 746, Westville, 3630
Natal Midlands Branch	P O Box 11755, Dorpspruit, 3206
Institute of Municipal Treasurers and Accountants	P O Box 8652, Johannesburg, 2000
Institute of Personnel Management	P O Box 31390, Braamfontein, 2017
Manpower and Management Foundation of Southern Africa	P O Box 31793, Braamfontein, 2017
National Agricultural Machinery Trade Association	P O Box 2940, Randburg, 2125
Public Accountants' and Auditors' Board	P O Box 59873, Kengray, 2100

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
South African Chamber of Business (Committees: Agriculture; Energy and Water Affairs; Environment Affairs; Industrial Policy; Intellectual Property; Legislation; Parliamentary Liaison; Standards; Taxation; Technology; Transport; Travel and Tourism)	P O Box 91267, Auckland Park, 2006
South African Institute of Chartered Accountants	P O Box 59875, Kengray, 2100
South African Institute of Management	P O Box 31828, Braamfontein, 2017
Southern African Institute of Chartered Secretaries and Administrators	P O Box 1917, Johannesburg, 2000
South African Management Development Institute	Private Bag X759, Pretoria, 0001
Communications	
Satellite Communications Association of Southern Africa	P O Box 564, Isando, 1600
South African Broadcasting Corporation	Private Bag X1, Auckland Park, 2006
Durban Office	P O Box 1588, Durban, 4000
Computers	
Computer Society of South Africa	P O Box 1714, Halfway House, 1685
South African Institute for Computer Scientists and Information Technologists	c/o Department of Computer Science and Information Systems, University of South Africa, P O Box 392, Pretoria, 0001
Construction, housing and quantity surveying	
Aggregate and Sand Producers' Association of South Africa	Private Bag 34, Auckland Park, 2006
Aluminium Federation of South Africa	P O Box 423, Isando, 1600
Association of South African Quantity Surveyors	P O Box 3527, Halfway House, 1685
Natal Chapter	P O Box 4229, Durban, 4000
Building Industries Federation of South Africa	P O Box 1619, Halfway House, 1685
Built Environment Support Group	University of Natal, Private Bag X10, Dalbridge, 4014
Community Development Trust	P O Box 651321, Benmore, 2010
Concrete Manufacturers Association	P O Box 4829, Randburg, 2125
Concrete Society of Southern Africa	P O Box 168, Halfway House, 1685
Development Action Group	101 Lower Main Road, Observatory, 7925

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Federation of Associations of Sub-contractors (South Africa)	P O Box 19139, Fishers Hill, 1401
Federation of South African Sanitaryware and Builders' Merchants Associations	P O Box 28238, Kensington, 2101
Fibre Cement Association	P O Box 47406, Parklands, 2121
Get Ahead Foundation	P O Box 3776, Pretoria, 0001
Institute for Housing of Southern Africa (Natal Branch)	P O Box 1479, Pietermaritzburg, 3200
Institute of Materials (Southern African Region)	P O Box 2286, Parklands, 2121
Institute of Plumbing (South Africa)	P O Box 19139, Fishers Hill, 1401
Iron and Steel Producer's Association of South Africa	P O Box 1338, Johannesburg, 2000
Joint Acceptance Scheme for Water Installation Components (JASWIC)	c/o Durban Water and Waste, P O Box 1038, Durban, 4000
Master Builders' Association Natal Master Builders' and Allied Industries Association	P O Box 33271, Jeppeshtown, 2043 P O Box 582, Westville, 3630
Master Masons and Quarry Owner's Association (South Africa)	P O Box 1619, Halfway House, 1685
National Association of Home Builders and Urban Developers	P O Box 5150, Halfway House, 1685
National Housing Forum	P O Box 1115, Johannesburg, 2000
Non-ferrous Metal Industries Association of South Africa	P O Box 1338, Johannesburg, 2000
Plumbers and Engineers Brassware Manufacturers' Association	P O Box 1338, Johannesburg, 2000
Plumbing and Sanitaryware Manufacturers' Association of South Africa	Private Bag 34, Auckland Park, 2006
Project Management Institute (South African Chapter)	P O Box 31011, Braamfontein, 2017
South African Cement Producers' Association	Private Bag X11, Halfway House, 1685
South African Fibre Reinforced Cement Manufacturers' Association	Private Bag 34, Auckland Park, 2006
South African Institute of Building	P O Box 2142, Halfway House, 1685
South African Institute of Building Science Practitioners	P O Box 4898, Pretoria, 0001
South African Institute of Steel Construction	P O Box 1338, Johannesburg, 2000
South African Pump Manufacturers' Association	P O Box 1338, Johannesburg, 2000

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
South African Valve and Actuator Manufacturers' Association	P O Box 1338, Johannesburg, 2000
Steel and Engineering Industries Federation of South Africa	P O Box 1338, Johannesburg, 2000
Urban Sector Network	P O Box 32707, Braamfontein, 2017
Energy Association of Municipal Electricity Undertakings (Southern Africa)	c/o P O Box 36099, Menlo Park, 0102
Energy and Development Group	P O Box 261, Noordhoek, 7985
Energy Research Institute (Energy for Development Research Centre)	University of Cape Town, P O Box 207, Plumstead, 7801
<u>ESKOM</u> Drakensberg Pumped Storage Scheme Ingagane Power Station Majuba Power Station Electricity Council	P O Box 1091, Johannesburg, 2000 P O Box 92, Jagersrust, 3354 Private Bag X6652, Newcastle, 2940 Private Bag 9001, Volksrust, 2470 P O Box 1091, Johannesburg, 2000
Fossil Fuel Foundation of Africa	P O Box 760, Hurlingham Gardens, 2070
Institute for Energy Studies	Rand Afrikaans University, P O Box 524, Auckland Park, 2006
Institute for Futures Research (Energy Unit)	University of Stellenbosch, Private Bag X1, Matieland, 7602
International Institute for Energy Conservation - Africa	Private Bag X59, Pretoria, 0001
Minerals and Energy Policy Centre	P O Box 395, Wits, 2050
National Electricity Regulator	P O Box 856, Cape Town, 8000
Renewable Energy for South Africa	P O Box 786141, Sandton, 2146
Solar Energy Society of Southern Africa	P O Box 152, La Montagne, 0184
South African Coal Ash Association	P O Box 3981, Cresta, 2118
South African Coal Processing Society	P O Box 61457, Marshalltown, 2107
South African Petroleum Industry Association	P O Box 7082, Rogge Bay, 8012
South African Power Systems Studies Institute	c/o P O Box 1091, Johannesburg, 2000
South African Wind Energy Association	c/o P O Box 1091, Johannesburg, 2000
Southern African Institute of Energy	P O Box 93480, Yeoville, 2143

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Sunstove Organization	P O Box 21960, Crystal Park, 1515
World Energy Conference (South African National Committee)	P O Box 1091, Johannesburg, 2000
Engineering, land surveying and town/regional planning	
Academy of Engineers	P O Box 93143, Yeoville, 2143
Association of Consulting Town and Regional Planners	P O Box 36086, Menlo Park, 0102
Chartered Institute of Transport	P O Box 23853, Joubert Park, 2044
Civil Engineering Advisory Council	P O Box 415, Pretoria, 0001
Constructional Engineering Association (South Africa)	P O Box 1338, Johannesburg, 2000
Corrosion Institute of Southern Africa	P O Box 966, Kelvin, 2054
Federation of Institutes of Professional Land Surveyors of Southern Africa	P O Box 201657, Durban North, 4016
Institute of Engineering Technology	P O Box 72601, Lynnwood Ridge, 0040
Institute of Professional Land Surveyors of Natal	P O Box 1089, Durban, 4000
Institute of Quarrying (South Africa)	P O Box 940, Walkerville, 1876
Institute of Road Transport Engineers	P O Box 6623, Rogge Bay, 8012
Institute of Topographical Engineering Surveyors of South Africa	P O Box 1053, Pinetown, 3600
Institute of Transport in Southern Africa	P O Box 1305, Randburg, 2125
Institution of Certificated Mechanical and Electrical Engineers (South Africa)	P O Box 93480, Yeoville, 2143
Institution of Civil Engineers (Advisory Committee for Southern Africa)	P O Box 1399, Randburg, 2125
Institution of Municipal Engineers of Southern Africa	Private Bag 1, Randburg, 2125
Institution of Structural Engineers	P O Box 1808, Bedfordview, 2008
Natal Institute of Engineers	P O Box 1585, Durban, 4000
Registered Engineers for Disaster Relief	13 Engwena Road, Sebenza, 1609
Society for Professional Engineers	P O Box 93143, Yeoville, 2143
South African Association of Consulting Engineers	P O Box 1644, Randburg, 2125
Natal Branch	Prof K. Knight, P O Box 50223, Musgrave Road, 4062
South African Colliery Engineers' Association	P O Box 61809, Marshalltown, 2107

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
South African Council for Professional Land Surveyors and Technical Surveyors	P O Box 62041, Marshalltown, 2107
South African Drilling Association	P O Box 19246, Fishers Hill, 1401
South African Federation of Civil Engineering Contractors	P O Box 644, Bedfordview, 2008
South African Institute for Production Engineering	P O Box 31916, Braamfontein, 2017
South African Institute of Agricultural Engineers	P O Box 912719, Silverton, 0127
South African Institute of Engineering Geologists	P O Box 2812, Pretoria, 0001
South African Institute of Industrial Engineers	P O Box 3971, Pretoria, 0001
South African Institute of Marine Engineers and Naval Architects	107 Montclair Road, Montclair, 4004
South African Institute of Mining and Metallurgy	P O Box 61127, Marshalltown, 2107
South African Institute of Town and Regional Planners Natal Branch (Natal Town and Regional Planning Commission)	P O Box 61236, Marshalltown, 2107 Private Bag X9038, Pietermaritzburg, 3200
South African Institution of Chemical Engineers	P O Box 27706, Yeoville, 2143
South African Institution of Civil Engineers	P O Box 93495, Yeoville, 2143
South African Institution of Mechanical Engineers	P O Box 93395, Yeoville, 2143
South African National Group on Rock Mechanics	38, 17th Street, Orange Grove, 2192
South African Reinforced Concrete Engineers' Association	P O Box 1338, Johannesburg, 2000
Environment African Ethnobotany Network	c/o Department of Botany, University of Transkei, Private Bag X1, Umtata, 5117
Aluminium Can Recycling Association Natal Region	P O Box 14976, Wadeville, 1422 P O Box 12018, Dorpspruit, 3206
Bergwatch Coalition	c/o Wildlife Society of Southern Africa, P O Box 2985, Durban, 4000
Botanical Society of South Africa	Kirstenbosch, Private Bag X7, Claremont, 7735
Campaign for St Lucia	c/o P O Box 2985, Durban, 4000
Centre for Dolphin Studies	Port Elizabeth Museum, P O Box 13147, Humewood, 6013
Chemical and Allied Industries' Association	Private Bag 34, Auckland Park, 2006

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Chemical Industry Environmental Forum	c/o Chemical Manufacturers' Association, Private Bag 34, Auckland Park, 2006
Coast Watch	P O Box 421, Umhlanga Rocks, 4320
Coastwatchers' Organization	South African Naval Headquarters, Private Bag X104, Pretoria, 0001
Collect-a-Can	P O Box 43304, Industria, 2042
Consortium for Estuarine Research and Management	c/o Institute of Natural Resources, University of Natal, Private Bag X01, Scottsville, 3209
Dendrological Society and Foundation of South Africa	P O Box 104, Pretoria, 0001
Dolphin Action and Protection Group	P O Box 22227, Fish Hoek, 7974
Durban Harbour Watch	P O Box 5894, Durban, 4000
Earthlife Africa (Durban Branch)	P O Box 38396, Point, 4069
Earthlife Africa (Pietermaritzburg Branch)	P O Box 100468, Scottsville, 3209
Ecolink	P O Box 727, White River, 1240
Endangered Wildlife Trust/Trade Records Analysis of Flora and Fauna in Commerce (TRAFFIC) East/Southern Africa - South Africa	Private Bag X11, Parkview, 2122
Environmental Centre for Coastal Areas (ECCA)	P O Box 3540, Durban, 4000
Environmental Education Association of Southern Africa	P O Box 394, Howick, 3290
Environmental Justice Networking Forum	P O Box 100029, Scottsville, 3209
Environmental Monitoring Group (Western Cape)	P O Box 123, Observatory, 7935
Environmental Planning Professions Interdisciplinary Committee (EPPIC)	P O Box 90142, Bertsham, 2013
Environmental Scientific Association	Private Bag X40175, Cleveland, 2022
Glass Recycling Association	P O Box 562, Germiston, 1400
Group for Environmental Monitoring	P O Box 551, Newtown, 2113
Habitat Council	Suite 611, Buitenkloof Centre, 8 Kloof Street, Gardens, 8001
Industrial Environmental Forum of Southern Africa	P O Box 1091, Johannesburg, 2000
Institute of Landscape Architects of Southern Africa	P O Box 16484, Vlaeberg, 8018
Institute of Park and Recreation Management	200 Volkskas Building, 76 Market Street, Johannesburg, 2001

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
International Association for Impact Assessment (South African Chapter)	P O Box 44335, Claremont, 7735
International Association for Landscape Ecology	c/o Department of Botany, University of the Witwatersrand, Private Bag 3, Wits, 2050
Keep Durban Beautiful Association (and related organizations)	P O Box 1535, Durban, 4000
Keep South Africa Beautiful Association	P O Box 1514, Randburg, 2125
Mountain Club of South Africa	97 Hatfield Street, Cape Town, 8001
National Association for Clean Air	P O Box 5777, Johannesburg, 2000
National Environmental Awareness Campaign	P O Box 188, Dobsonville, 1865
National Recycling Forum	P O Box 1378, Pinetown, 2123
National Sea Rescue Institute of South Africa	P O Box 6085, Rogge Bay, 8012
National Veld Trust	P O Box 72862, Lynnwood Ridge, 0040
Poison Working Group (of the Endangered Wildlife Trust)	P O Box 72155, Parkview, 2122
Progreen (Trees for Africa)	P O Box 2035, Gallo Manor, 2052
Share-Net	P O Box 394, Howick, 3290
South African Landscapers' Institute	P O Box 11636, Dorpspruit, 3206
South African National Foundation for the Conservation of Coastal Birds (SANCCOB)	P O Box 11-116, Bloubaai, 7443
South African Nature Conservation Centre (now the Delta Environmental Centre)	Private Bag X6, Parkview, 2122
South African Rivers Association	P O Box 583, Constantia, 7848
South African Tourism Board	Private Bag X164, Pretoria, 0001
Natal Regional Office	P O Box 2516, Durban, 4000
Southern Africa Environment Project	P O Box 44340, Claremont, 7735
Southern African Crane Foundation	P O Box 905, Mooi River, 3300
Southern African Institute of Ecologists and Environmental Scientists	P O Box 37618, Vallyland, 7978
Southern African Wildlife College	P O Box 331, Hoedspruit, 1380
Southern African Wildlife Management Association	P O Box 3051, Pietermaritzburg, 3200
Southern African Women's Environment and Development Network	P O Box 92170, Boordfontein, 0201

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Strategic Management Society of Southern Africa	P O Box 9608, Johannesburg, 2000
Timberwatch	P O Box 22028, Mayor's Walk, 3208
Tree Society of Southern Africa	P O Box 4116, Johannesburg, 2000
Urban Greening Association	c/o Proggreen (Trees for Africa), P O Box 2035, Gallo Manor, 2052
Whale and Dolphin Foundation	P O Box 1233, Plettenberg Bay, 6600
Wilderness Foundation (incorporating the Wilderness Leadership School)	P O Box 53260, Yellowwood Park, 4011
Wildlife Society of Southern Africa (now known as the Wildlife and Environment Society of South Africa) <u>Note:</u> The old name has been retained in this publication	P O Box 394, Howick, 3290
Natal Branch	P O Box 2985, Durban, 4000
World Wide Fund for Nature South Africa (previously known as the Southern African Nature Foundation)/ The Green Trust	P O Box 456, Stellenbosch, 7599
Zoological Society of Southern Africa	Department of Zoology, Potchefstroom University for Christian Higher Education, Private Bag X6001, Potchefstroom, 2520
Zululand Environmental Alliance	P O Box 1585, Empangeni, 3880
Health	
Academy of Pharmaceutical Sciences	P O Box 31360, Braamfontein, 2017
Association of Societies for Occupational Safety and Health	P O Box 35764, Menlo Park, 0102
Cancer Association of South Africa	P O Box 2121, Bedfordview, 2008
Centre for Health Policy	University of the Witwatersrand, Private Bag 3, Wits, 2050
Centre for Health Systems Research	University of the Orange Free State, P O Box 339, Bloemfontein, 9300
Community Health Association of Southern Africa	P O Box 29375, Sunnyside, 0132
Dental Association of South Africa	Private Bag 1, Houghton, 2041
Environmental Health Officers' Association of Southern Africa	P O Box 17174, Sunward Park, 1470
Natal Branch	P O Box 2520, Pietermaritzburg, 3200
Epidemiological Society of Southern Africa	c/o Medical Research Council, P O Box 19070, Tygerberg, 7505

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Gaia Research Institute	P O Box 2147, Knysna, 6570
Hans Snyckers Institute	Faculty of Medicine, University of Pretoria, P O Box 2034, Pretoria, 0001
Health Foundation	P O Box 10051, Caledon Square, 7905
Health Systems Trust	P O Box 808, Durban, 4000
Infectious Diseases Society of Southern Africa	c/o South African Institute for Medical Research, P O Box 1038, Johannesburg, 2000
Institute for Urban Primary Health Care	P O Box 175, Bergvlei, 2012
Institute of Public Health	P O Box 1633, Edenvale, 1610
Medical Association of South Africa (Committees: Health Policy; Parliamentary; Science and Education)	P O Box 20272, Alkantrant, 0005
<u>Medical Research Council</u>	P O Box 19070, Tygerberg, 7505
AIDS Virus Research Unit	National Institute for Virology, Private Bag X4, Sandringham, 2131
Bio-energetics of Exercise Research Unit	Medical School, University of Cape Town, Observatory, 7925
Biomembrane Research Unit	Medical School, University of Cape Town, Observatory, 7925
Centre for Molecular and Cellular Biology	Medical School, University of Stellenbosch, P O Box 19063, Tygerberg, 7505
Circulation Research Unit	Medical School, University of the Witwatersrand, 7 York Road, Parktown, 2193
Cytogenetics Research Unit	Medical School, University of Stellenbosch, P O Box 19063, Tygerberg, 7505
Dental Research Institute	Faculty of Dentistry, University of the Witwatersrand, 7 York Road, Parktown, 2193
Emergent Pathogen Research Unit	South African Institute for Medical Research, P O Box 1038, Johannesburg, 2000
Human Ecogenetics Research Unit	South African Institute for Medical Research, P O Box 1038, Johannesburg, 2000
Institute for Biomedical Communication (IBC)	P O Box 19070, Tygerberg, 7505
Institute for Biostatistics (IB)	P O Box 19070, Tygerberg, 7505

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Ischaemic Heart Disease Research Unit	Medical School, University of Cape Town, Observatory, 7925
Laboratory Animal Unit	Private Bag X06, Kuils River, 7579
Liver Research Centre	Medical School, University of Cape Town, Observatory, 7925
Metabolic Research Group	Tygerberg Hospital, P O Box 19063, Tygerberg, 7505
Mineral Metabolism Research Unit	Medical School, University of the Witwatersrand, 7 York Road, Parktown, 2193
Perinatal Mortality Research Unit	Medical School, University of Stellenbosch, P O Box 19063, Tygerberg, 7505
Regulatory Peptides Research Unit	Medical School, University of Cape Town, Observatory, 7925
Research Institute for Diseases in a Tropical Environment (RIDTE)	P O Box 17120, Congella, 4013
Research Institute for Diseases in a Tropical Environment Branch Laboratory	P O Box 634, Nelspruit, 1200
Research Institute for Environmental Diseases (RIED)	Private Bag X385, Pretoria, 0001
Research Institute for Medical Biophysics (RIMB)	P O Box 19070, Tygerberg, 7505
Research Institute for Nutritional Diseases (RIND)	P O Box 19070, Tygerberg, 7505
Research Unit for the Cell Biology of Atherosclerosis	Medical School, University of Cape Town, Observatory, 7925
Research Unit for Human Cell Biology	Medical School, University of Cape Town, Observatory, 7925
Research Unit for Inherited Skeletal Disorders	Medical School, University of Cape Town, Observatory, 7925
Research Unit for the Neurochemistry of Mental Diseases	Medical School, University of Stellenbosch, P O Box 19063, Tygerberg, 7505
Research Unit for the Study of Phagocyte Function	Faculty of Medicine, University of Pretoria, P O Box 2034, Pretoria, 0001
Transplantation Research Unit	Medical School, University of the Witwatersrand, 7 York Road, Parktown, 2193
Tuberculosis Research Institute (TBRI)	Private Bag X385, Pretoria, 0001
National Centre for Occupational Health	P O Box 4788, Johannesburg, 2000
National Occupational Safety Association	P O Box 26434, Arcadia, 0007

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
National Progressive Primary Health Care Network	P O Box 3840, Durban, 4000/P O Box 32095, Braamfontein, 2017
Occupational Hygiene Association of South Africa	P O Box 1722, Johannesburg, 2000
Pharmaceutical and Chemical Manufacturers' Association of South Africa	c/o Northern Transvaal Chamber of Industries, P O Box 933, Pretoria, 0001
Pharmaceutical Society of South Africa	P O Box 31360, Braamfontein, 2017
Regional Health Organization for Southern Africa	Private Bag X181, Pretoria, 0001
South African Academy of Family Practice/Primary Care	P O Box 3172, Cramerview, 2060
South African Association Against Painful Experiments on Animals	P O Box 85228, Emmarentia, 2029
South African Institute for Environmental Health	P O Box 54077, Wierdapark, 0149
South African Medical and Dental Council	P O Box 205, Pretoria, 0001
South African Pharmacological Society	Department of Pharmacology, Rhodes University, P O Box 94, Grahamstown, 6140
South African Pharmacy Council	P O Box 40040, Arcadia, 0007
South African Radiation Protection Society	c/o S. Van der Woude, Council for Nuclear Safety, P O Box 7106, Centurion, 0046
South African Red Cross Society Natal Region	P O Box 2829, Parklands, 2121 P O Box 1680, Durban, 4000
South African Society of Occupational Medicine	P O Box 783854, Sandton, 2146
South African Veterinary Council	P O Box 40510, Arcadia, 0007
Transvaal (now the Thusano) School of Public Health	Private Bag X385, Pretoria, 0001
Human sciences research Consortium of Human Sciences Societies of Southern Africa	P O Box 717, Irene, 1675
<u>Human Sciences Research Council</u> Centre for Policy Studies Centre for Science Development Research Group: Education Research Group: Human Resources Research Group: Social Dynamics Natal Regional Office	Private Bag X41, Pretoria, 0001 P O Box 16488, Doornfontein, 2028 Private Bag X41, Pretoria, 0001 Private Bag X41, Pretoria, 0001 Private Bag X41, Pretoria, 0001 Private Bag X41, Pretoria, 0001 P O Box 17302, Congella, 4013

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Law	
Association of Law Societies of South Africa	P O Box 36626, Menlo Park, 0102
Maritime Law Association/Environmental Law Association	c/o Shepstone and Wylie, P O Box 205, Durban, 4000
Natal Law Society	P O Box 1454, Pietermaritzburg, 3200
Southern African Society for Legislative Drafting	Faculty of Law, University of Zululand, Private Bag X1001, KwaDlangezwa, 3886
Packaging and purchasing	
Institute of Packaging (South Africa) Natal Region	P O Box 56145, Pinegowrie, 2123 P O Box 4624, Durban, 4000
Institute of Purchasing South Africa Natal Midlands Region	P O Box 82112, Southdale, 2135 P O Box 100108, Scottsville, 3209
Packaging Council of South Africa	P O Box 782205, Sandton, 2146
Plastics and rubber	
Plastics Federation of South Africa/Plastics Manufacturer's Association of South Africa	Private Bag X68, Halfway House, 1685
Plastics Institute of Southern Africa	P O Box 1265, Alberton, 1450
Plastics and Rubber Institute	P O Box 31169, Braamfontein, 2017
Population	
Demographic Association of Southern Africa	c/o Human Sciences Research Council, Private Bag X41, Pretoria, 0001
Planned Parenthood Association of South Africa Natal Region Office	P O Box 1008, Melville, 2109 P O Box 177, Hilton, 3245
Population Development Council, Department of National Health and Population Development	Private Bag X828, Pretoria, 0001
Sapler Population Trust	P O Box 51446, Raedene, 2124
South African Institute of Race Relations	P O Box 31044, Braamfontein, 2017
Public administration	
Institute for Local Government Management of South Africa	P O Box 23507, Port Elizabeth, 6000
South African Institute of Public Administration Natal Region	P O Box 2752, Pretoria, 0001 c/o Director-General, Natal Provincial Administration, Private Bag X9037, Pietermaritzburg, 3200

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
South African Local Government Association	P O Box 2094, Pretoria, 0001
KwaZulu/Natal Local Government Association	P O Box 1525, Durban, 4000
Rural and industrial development	
Africa Co-operative Action Trust - Southern Africa	P O Box 2763, Pietermaritzburg, 3200
Association for Rural Advancement	P O Box 2517, Pietermaritzburg, 3200
Centre for Low Input Agricultural Research and Development	University of Zululand, Private Bag X1001, KwaDlangezwa, 3886
Community Agency for Social Enquiry	P O Box 32882, Braamfontein, 2017
Community Organization, Research and Development (CORD)	University of Natal, Private Bag X10, Dalbridge, 4014
Development Bank of Southern Africa	P O Box 1234, Halfway House, 1685
Development Resources Centre	P O Box 6079, Johannesburg, 2000
Development Society of Southern Africa	P O Box 11607, Queenswood, 0121
Environmental and Development Agency Trust	P O Box 15840, Doornfontein, 2028
Independent Development Trust	P O Box 16114, Vlaeberg, 8018
Natal Region	P O Box 2637, Durban, 4000
Industrial Development Corporation of South Africa Ltd	P O Box 784055, Sandton, 2146
Institute for African Alternatives	4th Floor, Sable Centre, 41 De Korte Street, Braamfontein, 2001
Institute for Indigenous Theory and Practice	P O Box 2335, Cape Town, 8000
Institute for Local Governance and Development	P O Box 2096, Cape Town, 8000
Institute of Natural Resources	University of Natal, Private Bag X01, Scottsville, 3209
Kagiso Trust	P O Box 1878, Johannesburg, 2000
KwaZulu-Natal Regional Economic Forum	P O Box 30886, Mayville, 4058
KwaZulu Training Trust (part of the KwaZulu Finance and Investment Corporation Ltd)	P O Box 10094, Ashwood, 3605
Land and Agricultural Bank of South Africa	P O Box 375, Pretoria, 0001
Land and Agriculture Policy Centre	P O Box 243, Wits, 2050
Lima Rural Development Foundation	P O Box 93, Umzumbe, 4225
Midlands Rural Development Network	P O Box 101045, Scottsville, 3209
National Rural Development Forum	P O Box 32434, Braamfontein, 2017

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Natal/KwaZulu Regional Consultative Forum on Rural Development	1st Floor, ICL House, 480 Smith Street, Durban, 4001
Olive Information Service	21 Sycamore Road, Durban, 4001
Operation Hunger	P O Box 37352, Overport, 4067
Permaculture Association of South Africa	P O Box 68929, Bryanston, 2021
Rural Foundation	P O Box 388, Stellenbosch, 7599
Natal/KwaZulu Region	P O Box 931, Vryheid, 3100
Social Change Assistance Trust	13b Kloofnek Road, Tamboerskloof, 8001
South African National NGO Coalition	P O Box 31471, Braamfontein, 2017
Transkei Appropriate Technology Unit	Private Bag X5029, Umtata, 5100
Turn Table Trust	P O Box 176, Himeville, 3256
Valley Trust	P O Box 33, Botha's Hill, 3660
Wits Rural Facility (University of the Witwatersrand)	P O Box 7, Klaserie, 1381
World Vision of Southern Africa	P O Box 17364, Congella, 4013
Scientific/agricultural research and similar organizations	
Africa Institute of South Africa	P O Box 630, Pretoria, 0001
Agricultural Economics Association of South Africa	P O Box 12986, Hatfield, 0028
<u>Agricultural Research Council</u>	P O Box 8783, Pretoria, 0001
Institute for Soil, Climate and Water	Private Bag X79, Pretoria, 0001
Onderstepoort Veterinary Institute	Private Bag X05, Onderstepoort, 0110
Plant Protection Research Institute	Private Bag X134, Pretoria, 0001
Roodeplaat Grassland Institute (now the Range and Forage Institute)	Private Bag X05, Lynn East, 0039
Associated Scientific and Technical Societies of South Africa	P O Box 93480, Yeoville, 2143
Astronomical Society of Southern Africa	c/o the South African Astronomical Observatory, P O Box 9, Observatory, 7935
Centre for Indigenous Plant Use Research	Department of Biology, University of Natal, Private Bag X10, Dalbridge, 4014
<u>CSIR</u>	P O Box 395, Pretoria, 0001
Centre for Advanced Computing and Decision Support	P O Box 395, Pretoria, 0001

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
CSIR Environmental Services	P O Box 395, Pretoria, 0001
Division of Aeronautical Systems Technology	P O Box 395, Pretoria, 0001
Division of Building Technology	P O Box 395, Pretoria, 0001
Division of Earth, Marine and Atmospheric Science and Technology	P O Box 320, Stellenbosch, 7599/ P O Box 395, Pretoria, 0001
Division of Energy Technology	P O Box 395, Pretoria, 0001
Division of Food Science and Technology	P O Box 395, Pretoria, 0001
Division of Forest Science and Technology	P O Box 395, Pretoria, 0001
Division of Information Services	P O Box 395, Pretoria, 0001
Division of Materials Science and Technology	P O Box 395, Pretoria, 0001
Division of Microelectronics and Communications Technology	P O Box 395, Pretoria, 0001
Division of Production Technology	P O Box 395, Pretoria, 0001
Division of Roads and Transport Technology	P O Box 395, Pretoria, 0001
Division of Textile Technology	P O Box 395, Pretoria, 0001
Division of Water Technology	P O Box 395, Pretoria, 0001
Environmental Earth-Science Group	P O Box 97124, Petervale, 2151
Fertilizer Society of South Africa	P O Box 7438, Centurion, 0046
Forest Owners' Association	P O Box 1553, Rivonia, 2128
Foundation for Education, Science and Technology	P O Box 1758, Pretoria, 0001
Foundation for Research Development	P O Box 2600, Pretoria, 0001
Geological Society of South Africa (including the Ground Water Division)	P O Box 44283, Linden, 2104
Grassland Society of Southern Africa	P O Box 10327, Scottsville, 3209
Hydrographic Society of South Africa	P O Box 109, Simonstown, 7995
Institute for Maritime Technology	P O Box 181, Simonstown, 7995
International Geosphere-Biosphere Programme (South African Secretariat)	c/o Foundation for Research Development, P O Box 2600, Pretoria, 0001
J L B Smith Institute of Ichthyology	Rhodes University, Private Bag 1015, Grahamstown, 6140
Marine Science Society of Southern Africa	c/o Oceanographic Research Institute, P O Box 10712, Marine Parade, 4056
Natal Agricultural Union	P O Box 186, Pietermaritzburg, 3200
Natal Association of Historical Societies	P O Box 49, Pinetown, 3600

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Natal Evolutionary Biology Society	Department of Zoology and Entomology, University of Natal, Private Bag X01, Scottsville, 3209
National Science and Technology Forum	P O Box 9823, Pretoria, 0001
Nematological Society of Southern Africa	c/o Grain Crops Institute, Private Bag X1251, Potchefstroom, 2520
Organic Agricultural Association of South Africa	P O Box 98347, Sloane Park, 2152
Organic Soil Association of Southern Africa	P O Box 2966, Cape Town, 8000
Publishers' Association of South Africa	Private Bag 91932, Auckland Park, 2006
Royal Society of South Africa	P O Box 594, Cape Town, 8000
Social Workers' Association of South Africa	c/o P O Box 223, Stellenbosch, 7599
Society of South African Geographers	P O Box 128, Wits, 2050
Soil Science Society of South Africa	P O Box 30030, Sunnyside, 0132
South Africa Foundation	P O Box 7006, Johannesburg, 2000
South African Agricultural Machinery Association	P O Box 1159, Edenvale, 1610
South African Association for Marine Biological Research (Oceanographic Research Institute)	P O Box 10712, Marine Parade, 4056
South African Association of Botanists/Southern African Botanical Diversity Network	c/o National Botanical Institute, Private Bag X101, Pretoria, 0001
South African Biological Society	P O Box 820, Pretoria, 0001
South African Council for Natural Scientific Professions	Private Bag X540, Silverton, 0127
South African Forestry Association	P O Box 1022, Pretoria, 0001
South African Historical Society (rotating secretariat)	Department of History, Rhodes University, P O Box 94, Grahamstown, 6140
South African Institute for Librarianship and Information Science	P O Box 36575, Menlo Park, 0102
South African Institute for Medical Research	P O Box 1038, Johannesburg, 2000
South African Institute of International Affairs	P O Box 31596, Braamfontein, 2017
South African Mathematical Society	c/o Department of Mathematics, University of Pretoria, Pretoria, 0002
South African National Committee of the International Cartographic Association	c/o Department of Geography, University of Natal, Private Bag X01, Scottsville, 3209

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
South African National Committee of the International Union for Quaternary Research	c/o Department of Geology, University of the Witwatersrand, Private Bag 3, Wits, 2050
South African Photogrammetry and Geo-information Society	P O Box 69, Newlands, 7725
South African Society for Agricultural Extension	Department of Agrarian Extension, University of Pretoria, Pretoria, 0002
South African Society for Atmospheric Sciences	c/o Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 395, Pretoria, 0001
South African Society for Cultural History	P O Box 11403, Hatfield, 0028
South African Society of Archivists	P O Box 866, River Club, 2149
South African Sociological Association	Human Sciences Research Council, Private Bag X41, Pretoria, 0001
South African Statistical Association	c/o Department of Statistics and Actuarial Science, University of the Witwatersrand, Private Bag 3, Wits, 2050
South African Timber Growers Association	P O Box 803, Pietermaritzburg, 3200
South African Veterinary Association	c/o Onderstepoort Veterinary Institute, Private Bag X05, Onderstepoort, 0110
South African Wattle Growers Union	P O Box 633, Pietermaritzburg, 3200
Southern Africa Association for the Advancement of Science	P O Box 366, Irene, 1675
Southern African Association for Farming Systems Research-Extension	Faculty of Agriculture, University of Pretoria, Pretoria, 0002
Southern African Association of Geomorphologists	Department of Geography, University of Durban-Westville, Private Bag X54001, Durban, 4000
Southern African Institute of Forestry	P O Box 1022, Pretoria, 0001
Southern African Society of Aquatic Scientists (rotating secretariat)	Freshwater Research Unit, Department of Zoology, University of Cape Town, Private Bag, Rondebosch, 7701
Southern African Weed Science Society	P O Box 27552, Sunnyside, 0132
Suid-Afrikaanse Akademie vir Wetenskap en Kuns	P O Box 538, Pretoria, 0001
Techno-economic Society of South Africa/Technology Marketing Foundation	P O Box 279, Florida, 1710

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Security and fire	
Fire Fighting Equipment Traders Association	P O Box 2212, Primrose, 1416
Fire Protection Association of Southern Africa	P O Box 61697, Marshalltown, 2107
Fire Protection Industries Association of South Africa	P O Box 1338, Johannesburg, 2000
Institute for Security Studies	P O Box 4167, Halfway House, 1685
Institute of Loss Adjusters of Southern Africa	P O Box 11536, Brooklyn, 0011
Institution of Fire Engineers (South Africa)	P O Box 1033, Houghton, 2041
Insurance Surveyors Association	P O Box 2285, Randburg, 2125
South African Fire Services Institute	P O Box 613, Krugersdorp, 1740
South African Security Federation/Security Association of South Africa	P O Box 2212, Primrose, 1416
Standards	
<u>South African Bureau of Standards</u>	Private Bag X191, Pretoria, 0001
Department of Biological Services (Food standards and inspections; microbiology and mycology; pesticides; pharmaceutical and food chemistry; biological sciences assessment services)	Private Bag X191, Pretoria, 0001
Department of Chemical Technology (Industrial chemistry and explosives; general chemistry; physical chemistry and microfilm; metallurgy; water; paints and sealants; rubber and plastics; petroleum; chemical technology assessment services; coal)	Private Bag X191, Pretoria, 0001
Department of Civil Engineering and Packaging (Civil engineering and materials technology; structural engineering; fire engineering and quality management assessments; building science and regulations; packaging and furniture)	Private Bag X191, Pretoria, 0001
Department of Electrical Engineering (Electrical distribution; electricity utilization; electrical engineering assessment services; electrical engineering standards; explosion prevention technology)	Private Bag X191, Pretoria, 0001
Department of Electronic Engineering and Physics (Laboratory for vibration and acoustics; electronics and appliances; electronic engineering and physics assessment services; physics)	Private Bag X191, Pretoria, 0001
Department of Fibre Technology (Leather and footwear; timber; textile testing services and textile technology; textile inspectorate; clothing; paper)	Private Bag X191, Pretoria, 0001

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
Department of Mechanical Engineering (Hydraulic engineering and firearm proofing; general mechanical engineering; fire fighting equipment; air and gas flow technology including metrology calibration; fabrication technology including welding and non-destructive testing; mechanical assessment services; automotive engineering; mechanical engineering standards)	Private Bag X191, Pretoria, 0001
Design Institute	Private Bag X191, Pretoria, 0001
Richards Bay Coal Laboratory	P O Box 413, Richards Bay, 3900
Technical Services	Private Bag X191, Pretoria, 0001
Trade Metrology	Private Bag X191, Pretoria, 0001
Natal Regional Office	P O Box 30087, Mayville, 4058
Urbanization	
Cato Manor Development Association	P O Box 30230, Mayville, 4058
Centre for Development and Enterprise	P O Box 1936, Johannesburg, 2000
Consultative Business Movement (incorporating the defunct Urban Foundation)	P O Box 3895, Durban, 4000
Waste management	
Institute of Waste Management (Southern Africa)	P O Box 1378, Pinetown, 2123
Natal Branch	P O Box 53, Cramond, 3220
Road Freight Association (Hazardous Chemicals Committee)	P O Box 4660, Randburg, 2125
Natal Branch	P O Box 1664, Durban, 4000
Water	
Albany Coast Water	P O Box 51, Boesmansriviermond, 6190
Aquaculture Association of Southern Africa	c/o Department of Agriculture, Private Bag, Elsenburg, 7607
Bloem Water	P O Box 856, Bloemfontein, 9300
Borehole Water Association of Southern Africa	P O Box 2178, Southdale, 2135
[Capricorn] Water Board	Private Bag X01014, Phalaborwa, 1390
East Rand Water Care Company	P O Box 13106, Norkem Park, 1631
Emergency and Disaster Management Association of Southern Africa	P O Box 1703, Krugersdorp, 1740
Goldfields Water	Private Bag X5, Bothaville, 9660
Groundwater Association of KwaZulu-Natal	P O Box 52042, Berea Road, 4007

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
International Association for Hydraulic Research (African Division)	c/o Water Systems Research Group, Department of Civil Engineering, University of the Witwatersrand, Private Bag 3, Wits, 2050
International Association on Water Quality (South African National Committee - IAWQ)	Division of Water Technology, CSIR, P O Box 395, Pretoria, 0001
IAWQ Membrane Technology Specialist Group	Institute for Polymer Science, University of Stellenbosch, Private Bag X1, Matieland, 7602
Kalahari East Water Board	P O Box 1331, Upington, 8800
Kalahari West Water Board	P O Box 1331, Upington, 8800
Karos-Geelkoppan Water Board	P O Box 1759, Upington, 8800
Lesotho Highlands Development Authority	P O Box 7332, Maseru, 100, Lesotho
Magalies Water	P O Box 1161, Rustenburg, 0300
Mhlatuze Water	P O Box 1264, Richards Bay, 3900
Mvula Trust	P O Box 32351, Braamfontein, 2017
Namakwa Water Board	P O Box 17, Nababeep, 8265
National Community Water and Sanitation Training Institute	University of the North, Private Bag X1106, Sovenga, 0727
North-West Water Supply Authority	P O Box 4500, Mmabatho, 2735
Overberg Water	P O Box 277, Heidelberg, 6665
Pelladri Water Board	c/o Goldfields of South Africa Ltd, P O Box 61525, Marshalltown, 2107
Rand Water	P O Box 1127, Johannesburg, 2000
South African Association of Water Boards	c/o Umgeni Water, P O Box 9, Pietermaritzburg, 3200
South African Irrigation Institute	P O Box 834, Strand, 7139
South African National Committee for the International Association of Hydrological Sciences (SANC-IAHS)	c/o Water Research Commission, P O Box 824, Pretoria, 0001
South African National Committee of the International Commission on Irrigation and Drainage (SANCID)	c/o Department of Agriculture, Private Bag X250, Pretoria, 0001/Water Research Commission, P O Box 824, Pretoria, 0001
South African National Committee of the International Hydrological Programme of UNESCO	c/o Water Research Commission, P O Box 824, Pretoria, 0001
South African National Committee on Large Dams (SANCOLD)	P O Box 3404, Pretoria, 0001

Table B5: Selected statutory, quasi-government and private organizations in South Africa, 1993 (continued).

Organization	Address
South African Water Information Centre	Division of Information Services, CSIR, P O Box 395, Pretoria, 0001
Southern Africa Action Geographical Committee of the International Water Resources Association (SAAGC-IWRA)	c/o P O Box 785813, Sandton, 2146
Southern African Industrial Water Association	P O Box 35, Brakpan, 1540
Standing Committee on Water Supply and Sanitation (SCOWSAS)	P O Box 32351, Braamfontein, 2017
Trans-Caledon Tunnel Authority	P O Box 10335, Centurion, 0146
Umgeni Water	P O Box 9, Pietermaritzburg, 3200
Vaal River Catchment Association	c/o Rand Water, P O Box 1127, Johannesburg, 2000
Water Institute of Southern Africa (WISA)	P O Box 6011, Halfway House, 1685
Water Research Commission	P O Box 824, Pretoria, 0001
Western Transvaal Regional Water Company	P O Box 31, Stilfontein, 2550

- Source:**
- (i) After Trinco, O.M. and Valente, A.M., 1992. Direct Access to Key People in Southern Africa 1992, Penrose Publishers, Johannesburg, 312 p.
 - (ii) After De Bont, I. and Abbott, J., 1993. Directory of South African associations, Division of Information Services, CSIR, Pretoria, 488 p. + app.
 - (iii) Fieldwork.

- Note:**
- (i) The information in the above table mainly applies to 1993, and does not reflect later changes. Readers should therefore always confirm the current status of a particular organization.
 - (ii) The various research institutes of the Medical Research Council have subsequently been consolidated into six national research programmes. See Footnote (viii) of Table B4.
 - (iii) Three current water boards, namely: Bosveld Water Board, Northern Transvaal Water Board, and the Phalaborwa Water Board will soon be amalgamated to form one large board. The new organization will possibly be known as the Capricorn Water Board. Another new board (Amatola Water) is to be established in the eastern Cape.
 - (iv) Relevant addresses are also presented in Tables B1 - B4, B6 and B7 as well as at the end of a number of other chapters.

Table B6: Universities in southern Africa.

University	Address
Copperbelt University	P O Box 21692, Kitwe, Zambia
Medical University of Southern Africa	P O Medunsa, 0204
National University of Lesotho	P O Roma 180, Lesotho
National University of Science and Technology	P O Box 346, Bulawayo, Zimbabwe
Potchefstroom University for Christian Higher Education	Private Bag X6001, Potchefstroom, 2520
Vaal Triangle Campus	P O Box 1174, Vanderbijlpark, 1900
Rand Afrikaans University	P O Box 524, Auckland Park, 2006
Rhodes University	P O Box 94, Grahamstown, 6140
East London Division	P O Box 7426, East London, 5200
University of Bophuthatswana (now the University of North-West)	Private Bag X2046, Mmabatho, 2735
University of Botswana	Private Bag X0022, Gaborone, Botswana
University of Cape Town	Private Bag, Rondebosch, 7701
University of Durban-Westville	Private Bag X54001, Durban, 4000
University of Fort Hare	Private Bag X1314, Alice, 5700
University of Malawi	P O Box 278, Zomba, Malawi
University of Namibia	Private Bag 13301, Windhoek, Namibia
University of Natal (Durban)	Private Bag X10, Dalbridge, 4014
University of Natal (Pietermaritzburg)	Private Bag X01, Scottsville, 3209
University of the North	Private Bag X1106, Sovenga, 0727
Gazankulu Campus	Private Bag 9604, Giyani, 0826
QwaQwa Campus	Private Bag X13, Phuthaditjhaba, 9866
University of the Orange Free State	P O Box 339, Bloemfontein, 9300
University of Port Elizabeth	P O Box 1600, Port Elizabeth, 6000
University of Pretoria	Pretoria, 0002
University of South Africa	P O Box 392, Pretoria, 0001
University of Stellenbosch	Private Bag X1, Matieland, 7602
University of Swaziland	Private Bag 4, Kwaluseni, Swaziland
University of Transkei	Private Bag X1, Unitra, 5117
Butterworth Campus	Private Bag X3031, Butterworth, 4960

Table B6: Universities in southern Africa (continued).

University	Address
University of Venda	Private Bag X5050, Thohoyandou, 0950
University of the Western Cape	Private Bag X17, Bellville, 7535
University of the Witwatersrand	Private Bag 3, Wits, 2050
University of Zambia	P O Box 32379, Lusaka, Zambia
University of Zimbabwe	P O Box MP167, Mount Pleasant, Harare, Zimbabwe
University of Zululand	Private Bag X1001, KwaDlangezwa, 3886
Umlazi Extramural Division	Private Bag X10, Isipingo, 4110
Vista University	Private Bag X634, Pretoria, 0001
Further Training Campus	Private Bag X641, Pretoria, 0001
Mamelodi Campus	Private Bag X03, Mamelodi, 0101
Soweto Campus	Private Bag X03, Tshiawelo, 1817
East Rand Campus	Private Bag X025, Benoni, 1500
Sebokeng Campus	Private Bag X050, Vanderbijlpark, 1900
Bloemfontein Campus/Kimberley Teaching Centre	P O Box 380, Bloemfontein, 9300
Welkom Campus	P O Box 1881, Welkom, 9460
Port Elizabeth Campus	Private Bag X613, Port Elizabeth, 6000

Source: After Sukram, P., undated. Universities in southern Africa, Cecil Renaud Library, University of Natal, Pietermaritzburg, 2 p.

Note: (i) The addresses of the various technikons in South Africa are as follows. Certain technikons have more than one campus, although only the main address is given below:

Natal/KwaZulu

- Mangosuthu Technikon, P O Box 12363, Jacobs, 4026.
- M L Sultan Technikon, P O Box 1334, Durban, 4000.
- Technikon Natal, P O Box 953, Durban, 4000.

Transvaal

- Technikon North West (previously Setlogelo Technikon), P O Box 9111263, Rosslyn, 0200.

- Technikon Northern Transvaal, Private Bag X07, Pretoria North, 0116.
- Technikon Pretoria, Private Bag X680, Pretoria, 0001.
- Technikon SA, Private Bag X6, Florida, 1710.
- Technikon Witwatersrand, P O Box 17011, Doornfontein, 2028.
- Vaal Triangle Technikon, Private Bag X021, Vanderbijlpark, 1900.

Orange Free State

- Technikon Free State, Private Bag X20539, Bloemfontein, 9300.

Cape

- Border Technikon, P O Box 1421, East London, 5200.
- Cape Technikon, P O Box 652, Cape Town, 8000.
- Eastern Cape Technikon (previously Transkei Technikon), Private Bag X3182, Butterworth, 4960.
- Peninsula Technikon, P O Box 1906, Bellville, 7535.
- Port Elizabeth Technikon, Private Bag X6011, Port Elizabeth, 6000.

Committee of Technikon Principals

CTP, Private Bag X680, Pretoria, 0001.

- (ii) The 24 technical colleges in Natal/KwaZulu are listed in the chapter on water supply planning, elsewhere in this publication. (See the section on Some training agencies in Natal/KwaZulu, with relevance to water and sanitation in black settled areas).

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases.

Name and address of database	Acronym and time span	Details
AGRICULTURE Bibliography of agricultural literature on the Karoo Region : Grootfontein Agricultural Development Institute Library, Private Bag X529, Middelburg, 5900	1900 - current	Bibliographic database covering agricultural literature of the Karoo Region: approximately 2 540 records, 20 records added annually
BUSINESS DATA RSA-Business : Business Information Service, Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	RSA-BUSINESS Current	Textual database covering South African financial and business publications, later possibly also South African business intelligence: approximately 1 000 entries, 1 200 entries added annually
CHEMISTRY Chemdata : Technometric Services, Centre for Advanced Computing and Decision Support, CSIR, P O Box 395, Pretoria, 0001	1988 - current	Printed directory (as well as a computerized database) of chemicals available locally from South African and international manufacturers: approximately 6 000 entries
Chemical information service : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	Current	Textual/bibliographic databases on chemical literature (international and South African) as well as patents
Fluor Engineers South Africa Technical Library : Fluor Engineers South Africa Ltd, P O Box 784850, Sandton, 2146	1960 - current	Textual database covering the holdings of Fluor Engineers South Africa Library: approximately 10 000 records, 2 000 records added annually
Sasolib : Sasol Sastech Technical Library, P O Box 1, Sasolburg, 9570	1960 - current	Bibliographic database covering the holdings of the Sastech Library (chemical, technical and management information): approximately 14 000 records, 3 000 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
CLIMATE AND METEOROLOGY Air pollution and boundary layer : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 395, Pretoria, 0001	Mid 1970 - current	Numeric database relating to meteorological measurements within the boundary layer in South Africa (wind, temperature, humidity); quantitative measurements of certain air pollutants
Climate UOFS : Department of Agrometeorology, University of the Orange Free State, P O Box 339, Bloemfontein, 9300	1971 - current	Hourly, daily and monthly means of weather elements
Climatology database : Weather Bureau, Private Bag X097, Pretoria, 0001	Rainfall data 1820 - current; the remainder 1940 - current	Climatological and weather related data in a numeric database: approximately 12 Gb, 2,5% added annually
Hailfalls : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 395, Pretoria, 0001	1962 - current	Numeric database of hail observations from the Pretoria-Witwatersrand area: approximately 60 000 records, 3 000 records added annually
Lightning flashes : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 1327, Honeydew, 2040	1979 - 1989	Numeric database providing information on paths of lightning flashes: approximately 1 400 Mb
List of South African spatio-temporal databases of relevance to the International Geosphere-Biosphere Programme : Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Private Bag, Rondebosch, 7701	Variable	Database listing 284 spatio-temporal databases housed in South African institutions and of relevance to the South African International Geosphere-Biosphere Programme (IGBP). The purpose of this database is to promote inter-disciplinary interaction

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
NOAA catalogue : Satellite Applications Centre, Division of Microelectronics and Communications Technology, CSIR, P O Box 395, Pretoria, 0001	1984 - current	Numeric database containing all environmental/meteorological data on southern Africa as obtained from the NOAA meteorological satellite: approximately 5 000 records, 712 records added annually
PTA100 hail intensity : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 395, Pretoria, 0001	PTA100 1980 - current	Numeric database providing hail data for Pretoria, for example, the size distribution of hail stones, the energy and mass of the hailstorm: approximately 14 000 records, numerous records added annually
SA100 hail intensity : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 395, Pretoria, 0001	SA100 1982 - current	Numeric database providing hail data for South Africa, for example, the size distribution of hail stones, the energy and mass of the hailstorm: approximately 141 000 records, a few thousand records added annually
SADCO - marine climatology : South African Data Centre for Oceanography, Division of Information Services, CSIR, P O Box 320, Stellenbosch, 7599	SADCO MARCLIM 1900 - 1985	Numeric/textual database on the marine climate collected by ships as a voluntary service: approximately 2 100 000 records, 100 000 records added annually
Thunderstorms (radar data) : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 395, Pretoria, 0001	1975 - current	Numeric database of precipitation (mostly convective) measured by radar; more recently also airflow in thunderstorms
Vertical dopplar rainfall : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 1327, Honeydew, 2040	VEDRAD 1987 - 1988	Numeric database providing vertically pointing dopplex radar data of drop size distributions in rainfall: approximately 10 Mb
Wind data : Department of Geographical and Environmental Sciences, University of Natal, Private Bag X10, Dalbridge, 4014	1960 - current	Numeric database on wind and wind energy - frequency distribution, direction, wind speed and wind power: still in a developmental phase

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
XGRID; XRAINTMP : Computing Centre for Water Research, University of Natal, Private Bag X01, Scottsville, 3209	As per data source	Geographic information system providing surfaces of mean annual and mean monthly rainfall, patched (or infilled) monthly rainfall for South Africa, and altitude (1-minute grid)
CONSTRUCTION AND HOUSING Building industry statistical information systems : Division of Building Technology, CSIR, P O Box 395, Pretoria, 0001	BISIS Current	Numeric/textual database on housing. Covers aspects such as production, housing availability, affordability, financing and demographic distribution: still in a developmental phase - growing steadily
Buildnet - Infoview : Division of Building Technology, CSIR, P O Box 395, Pretoria, 0001	Current	Textual database on the building and construction industry. The database includes directories of professional and trade organizations, as well as abstracts of selected South African Bureau of Standards specifications and codes of practice. Also listed are current tender documents of relevance to the civil construction industry. Details of certain building products (including trade brochures and catalogues), plus manufacturer/supplier addresses, are likewise available on the database. The database has a program which enables users to search a number of international computerized bibliographic databases which deal with building/construction and similar topics. The database is being updated on a continuous basis
Cape Town building research : Division of Building Technology, CSIR, P O Box 395, Pretoria, 0001	CTBR 1970 - current	Numeric/textual database providing information on building technology, both local and overseas: approximately 8 000 entries, 100 entries added annually
Cement database : Portland Cement Institute, P O Box 168, Halfway House, 1685	CEMDB 1986 - current	Numeric database on strength results of cement samples according to the concrete cube method, the ISO method or the VMC method: approximately 3 510 entries, 2 340 entries added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Concrete technology : Portland Cement Institute, P O Box 168, Halfway House, 1685	CONTEC 1989 - current	Bibliographic database covering the entire field of concrete technology such as concrete production, cement technology and materials for concrete: approximately 3 000 records, numerous records added annually
Housing delivery system database : Division of Building Technology, CSIR, P O Box 395, Pretoria, 0001	1987 - current	Information on the performance of different housing delivery systems and costs: approximately 600 records, 200 records added annually
Keyword system for retrieval of building science information : Department of Architecture, University of Pretoria, Pretoria, 0002	TOBI 1976 - current	Bibliographic database covering literature on all aspects of the building industry: approximately 26 000 records, 2 000 records added annually
Konstrukt : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	1987 - current	Bibliographic database covering journal articles on planning and physical construction in the building and construction industry: approximately 1 800 records, 1 200 records added annually
ENERGY Erieng research : Energy Research Institute, P O Box 207, Plumstead, 7801	ERIENGRES Approximately 1970 - current	Bibliographic database providing information on energy, energy related subjects and engineering: approximately 14 000 records, 2 000 records added annually
South African energy information system : Department of Mineral and Energy Affairs, Private Bag X03, Lynnwood Ridge, 0040	SAEIS	Bibliographic database providing South African and overseas information on energy and related subjects
ENVIRONMENT Aliens : Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Private Bag, Rondebosch, 7701	1981 - 1984	Geographic information database listing alien plant invasions and their control in southern African protected areas. Covers South Africa, Lesotho and Namibia (all ecological and managerial aspects of vascular plants)

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Botany database : Department of Botany, Rhodes University, P O Box 94, Grahamstown, 6140	1978 - current	Bibliographic database on literature in the field of botany, covering plant anatomy, gas exchange, histochemistry and ecophysiology: approximately 4 000 records, 500 records added annually
Cape Peninsula geographical information system : Department of Surveying, University of Cape Town, Private Bag, Rondebosch, 7701	1960 - current	Geographic information system on the environment and natural resources of the Cape Peninsula, including the history of fire in this region: approximately 8 Mb, 1 Mb added annually
City, environmental and regional planning articles : Department of Town and Regional Planning, University of Stellenbosch, Private Bag X1, Matieland, 7602	CERPA 1988 - current	Bibliographic database covering articles on city, environmental and regional planning: approximately 500 records, 400 records added annually
Ecological studies : Directorate of Agricultural Information, Department of Agriculture, Private Bag X144, Pretoria, 0001	ESLI 1885 - 1988	Bibliographic database on ecology and plant growth: approximately 6 700 records, 100 records added annually
Environmental education in southern Africa : Department of Environment Affairs, Private Bag X447, Pretoria, 0001	1980 - current	Database listing the activities and aims of approximately 321 State, statutory and private educational organizations: approximately 320 records
Fynbos vegetation database : Department of Botany, University of Stellenbosch, Private Bag X1, Matieland, 7602	FYNBOS 1970 - 1990	Numeric/textual database covering literature and vegetation data for the Cape Province
Herbarium: National Museum Bloemfontein : National Museum, P O Box 266, Bloemfontein, 9300	NMB 1984 - current	Numeric/textual database describing the plant collection of the herbarium: approximately 6 500 records, 1 500 records added annually
HGWJ Schweickerdt-herbarium : Department of Botany, University of Pretoria, Pretoria, 0002	1989 - current	Numeric/textual database which contains data on all the plant specimens in the herbarium. Will eventually cover 80 000 specimens: approximately 3 000 specimens at present

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
National Botanical Institute Library : National Botanical Institute, Private Bag X7, Claremont, 7735	NABOT 1900 - current	Bibliographic database of botanical and horticultural books, journals and pamphlets. Works on ecology, conservation and botanical research are also included: approximately 18 000 entries, 1 500 entries added annually
Pollen : Department of Botany, University of the Orange Free State, P O Box 339, Bloemfontein, 9300	Mainly from the previous 30 000 years	Numeric database of pollen constituents of Quaternary sediments. Aims to provide a reconstruction of environmental changes during the Quaternary period. The distribution of modern pollen is also featured: approximately 500 entries, 10% added annually
Pretoria computerized information system : National Botanical Institute, Private Bag X101, Pretoria, 0001	PRECIS	Numeric/textual database providing checklists of plant species for each quarter degree of South Africa, based on specimens held by the National Herbarium
SANHP site owners database : Department of Environment Affairs, Private Bag X447, Pretoria, 0001	SANHP 1985 - current	Names and address list of owners of South African Natural Heritage Programme sites. Includes a short description of each site: approximately 130 sites, 30 sites added annually
Southern African plan for nature conservation : National Committee for Nature Conservation, Department of Environment Affairs, Private Bag X447, Pretoria, 0001	1983 - current	Textual database pertaining to existing protected areas in South Africa, with the aim of planning for nature conservation. Data on approximately 600 protected areas
FORESTRY Forest fires : Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	1966 - current; 1979 - current	Numeric/textual database on fires in State forests and private plantations since 1966 and 1979 respectively
Forestry research project register : Division of Forest Science and Technology, CSIR, Saasveld Forestry Research Centre, Private Bag X6515, George, 6530	1925 - current	Textual database which covers all records of research undertaken by the former South African Forestry Research Institute

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Plantation statistics : Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	Current	Numeric/textual database listing all plantation owners in South Africa, as well as roundwood processing industries
Saasveld Forestry Research Centre database : Division of Forest Science and Technology, CSIR, Saasveld Forestry Research Centre, Private Bag X6515, George, 6530	SAASVELD 1931 - current	Numeric/textual register of forestry research data incorporating the National Register of Research Data on Indigenous Forests, an index of data for site silviculture and key areas, plus an index of data collected by the Saasveld Ecology Group
Tree and shrub selection guide : Environmentek, CSIR, P O Box 395, Pretoria, 0001		Textual database program which can be used to select trees/shrubs for specific sites and uses in South Africa (in terms of climatic and other parameters). Over 1 200 species are listed, including most species indigenous to this country, as well as many exotics. Potential distribution maps can be generated for 300 species, for which bioclimatic profile data are available. May be updated in the future
GEOLOGY AND MINERALS Bibliographic resources and information : Group Information Centre, Anglo American Corporation, P O Box 61587, Marshalltown, 2107	BRAIN 1977 - current	Bibliographic database covering the holdings of the Anglo American Corporation Information Centre: approximately 50 000 records, 6 000 records added annually
Bibliography of the Bushveld Complex : Institute for Geological Research on the Bushveld Complex, University of Pretoria, Pretoria, 0002	As per holdings	Bibliographic database on the Bushveld Complex. Lists all published information, including theses and dissertations
Borehole database : Geological Survey, Private Bag X112, Pretoria, 0001	As per data source	Geographic information system of exploration boreholes and engineering geological boreholes including analyses and lithologies: still in a developmental phase
FOSKOR Library database : FOSKOR Ltd, P O Box 1, Phalaborwa, 1390	FOSKOR 1987 - current	Bibliographic database on the holdings of the FOSKOR Library: approximately 5 000 records, 800 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Geochemical/geophysical database : Geological Survey, Private Bag X112, Pretoria, 0001	As per data source	Geographic information system containing geophysical/magnetic, gravity and geochemical analyses of rocks in southern Africa
Geological GIS : Geological Survey, Private Bag X112, Pretoria, 0001	As per data source	Contains geological/structural/metamorphic data in a geographic information system, as well as engineering geological data
Gondwana geoscientific indexing database : Geocomputing Centre, Department of Geology, University of Cape Town, Private Bag, Rondebosch, 7701	GOGEOID 1940 - current	Geographic information system of the southern continent, covering 50 years of geological data. A wide spectrum of sub-disciplines is included: approximately 13 Mb
Minerals Bureau literature bank : Minerals Bureau, Department of Mineral and Energy Affairs, Private Bag X4, Braamfontein, 2017	MINE 1975 - current	Textual database on the minerals industry and economy, with relevant statistics: approximately 250 000 records, 5 000 records added annually
Mintek Library catalogue : Mintek, Private Bag X3015, Randburg, 2125	MINCAT 1867 - current	Bibliographic database of the Mintek Library catalogue, covering all aspects of the minerals industry: approximately 27 600 records, 1 000 records added annually
Museum of the Geological Survey database : Museum of the Geological Survey, Private Bag X112, Pretoria, 0001	MGS 1892 - current	Numeric/textual database listing Geological Survey Museum specimens, mineral names, stratigraphic nomenclature, a farm index of the Transvaal and the map holdings of the museum: approximately 28 000 records
National coal database : Geological Survey, Private Bag X112, Pretoria, 0001	COALDABA 1980 - current	Numeric/bibliographic/geographic information system database containing geological and chemical data on the coalfields of South Africa, with the aim of facilitating resource/reserve calculations as well as assessments of environmental/land use problems related to coal utilization: approximately 20 000 records, 3 000 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Powdiff : Mineralogy Section, Mintek, Private Bag X3015, Randburg, 2125	1984 - current	Numeric/bibliographic database providing characteristics of new and existing minerals as approved by the International Minerals Association: approximately 5 000 entries
Rocks and minerals: National Museum Bloemfontein : National Museum, P O Box 266, Bloemfontein, 9300	NMK 1890 - current	Numeric database on various rocks and minerals: approximately 2 362 records
Seismological database : Geological Survey, Private Bag X112, Pretoria, 0001	Printed reports issued 1969 - current	Numeric/geographic information system which contains data on all seismic events in Sub-Saharan Africa. The purpose is for the assessment of seismic risks, and for the evaluation of seismic events for hazard reduction
South African geological literature database : Geological Survey, Private Bag X112, Pretoria, 0001	SAGEOLIT 1978 - current	Bibliographic database containing the abstracts of published and unpublished geological reports - mainly aimed at documenting all African geological literature, but includes wider interests: approximately 30 000 records, 6 000 records added annually
South African geotechnical bibliography : Division of Building Technology, CSIR, P O Box 395, Pretoria, 0001	1947 - current	Bibliographic database containing southern African references on soil mechanics, foundation engineering and engineering geology: several thousand records
South African metals database : Division of Materials Science and Technology, CSIR, Private Bag X28, Auckland Park, 2006	SAMET 1989 - current	Numeric/textual database on the availability and properties of metallic materials in South Africa: approximately 400 entries, 200 entries added annually
South African mineral deposits database : Geological Survey, Private Bag X112, Pretoria, 0001	SAMINDABA 1985 - current	Geographic information system of southern African mineral resources including geological, geochemical, geophysical and economic data: approximately 8 500 records, 2 000 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
GRASSLANDS Grassland Research Centre: ecology section literature index : Grassland Research Centre, National Botanical Institute, Private Bag X101, Pretoria, 0001	ESLI 1859 - 1989	Literature dealing with vegetation ecology and related fields in southern Africa: approximately 6 816 records, 500 records added annually
Phytosociological database - (Braun-Blanquet data) : Department of Botany, University of Pretoria, Pretoria, 0002	1980 - 1990	Numeric/bibliographic database providing botanical names (with percentage covered) for the classification of plants, with special reference to grasslands: approximately 8 000 records, 500 records added annually
HEALTH BMDE educational programme videos : Bureau for Medical and Dental Education, P O Box 19063, Tygerberg, 7505	GENEESKUNDIGE ONDERWYS VIDEO 1981 - current	Textual database listing videos used in medical and dental education including paramedical, associated medical occupations and community health: approximately 72 videos, 7 videos added annually
Hans Snyckers Institute : Hans Snyckers Institute, Faculty of Medicine, University of Pretoria, Pretoria, 0002	HSI 1920 - current	Bibliography on various diseases typical of southern Africa: approximately 12 000 entries, 800 - 1 000 entries added annually
Health care South Africa : Institute for Biomedical Communication, Medical Research Council, P O Box 19070, Tygerberg, 7505	HCSA 1970 - current	Textual database of socio-political aspects of health care in South Africa: approximately 1 000 records, 250 records added annually
Janssen Pharmaceutica South Africa : Janssen Pharmaceutica South Africa, P O Box 785939, Sandton, 2146	As per data source	Textual database of medical information related to Janssen products: approximately 70 000 entries

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
National malaria research programme : Medical Research Council, P O Box 17120, Congella, 4013	1993 - current	Geographic information system database containing the spatial distribution of approximately 600 000 households plus relevant demographic data, in northern KwaZulu (centred on the Makatini Flats). The spatial distribution of schools, clinics, shops, roads, dams, rivers, pans and irrigation schemes is also indicated. The data are primarily for malaria (and other health) control purposes, although the information would be most valuable for any spatial planning project. Additional geographic areas are being added to the database, as part of an on-going programme
National register for malaria notifications in South Africa and Venda : National Institute for Tropical Diseases, Department of National Health and Population Development, P O Box 33, Tzaneen, 0850	NATMAL 1987 - current	Textual/numeric database on the notification of malaria cases in South Africa and Venda: approximately 10 000 entries added annually
Pharmacology library system: drug information database : Ciba-Geigy Medicines Safety Centre, Department of Pharmacology, Medical School, University of Cape Town, Observatory, 7925	TIRSS 1985 - current	Bibliographic database on drug information. Adverse drug reactions, toxicology, therapeutics: approximately 21 000 records, 4 000 records added annually
South African deaths : Centre for Epidemiology, Medical Research Council, P O Box 19070, Tygerberg, 7505	SADEATH 1968 - 1987 whites, Coloureds and Indians; 1979 - 1987 blacks	Computerized collection of all death certificates. All notified deaths by area, cause and age and by date of death. Includes demographic information for each death certificate: approximately 200 000 records added annually
South African medical database : Information Services Division, Medical Research Council, P O Box 19070, Tygerberg, 7505	SAMED 1978 - current	Bibliographic database on South African and international medical literature: approximately 5 000 entries, 2 000 entries added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
University of Cape Town poison information system : Institute of Child Health, Department of Paediatrics and Child Health, University of Cape Town, Private Bag, Rondebosch, 7701	1971 - current	Relational database containing comprehensive information on local products and poisons: approximately 2 Mb
HELMINTHOLOGY National freshwater snail collection : Department of Zoology, Potchefstroom University for Christian Higher Education, Private Bag X6001, Potchefstroom, 2520	SLAK 1952 - 1988	Geographic information system covering freshwater snails. Provides ecological information, location and snail species: approximately 19 000 records
Veterinary Research Institute helminthological literature database : Onderstepoort Veterinary Institute, Private Bag X05, Onderstepoort, 0110	HEMLIT 1850 - current	Bibliographic database on veterinary helminthology: approximately 25 000 records, 500 records added annually
INFORMATION SOURCES Africa Institute of South Africa Library : Africa Institute of South Africa, P O Box 630, Pretoria, 0001	AI Library 1960 - current	Bibliographic database covering the holdings of the Africa Institute Library. Material pertains to all aspects of Africa, with an emphasis on politics and economics (53 000 books and 25 000 journal articles): approximately 78 000 records, 5 000 records added annually
Cataloguing network in Pietermaritzburg : Cecil Renaud Library, University of Natal, Private Bag X01, Scottsville, 3209	CATNIP Current	Bibliographic database covering the holdings of numerous libraries in the Natal Midlands. Included are several libraries situated on the campus of the University of Natal, Pietermaritzburg, as well as the Cedara Agricultural Development Institute Library, the Natal Law Society Library, the Natal Society Library and Umgeni Water Library: approximately 365 000 records, with continuous updating

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Centre for Social Research database : Centre for Social Research Data, Human Sciences Research Council, Private Bag X41, Pretoria, 0001	SSN 1970 - current	Social research numeric/textual database which includes data from questionnaires on various social research projects: approximately 15 000 records, 400 records added annually. (See SADA below)
Cooperative indexing database : SABINET, P O Box 617, Pretoria, 0001	KID/CID	Bibliographic database covering periodical articles, pamphlets and grey literature (all subjects) indexed on a cooperative basis by members of SABINET: 10 000 records added annually
Database of South African training and capacity building providers : Programme for Development Research, Human Sciences Research Council, P O Box 32410, Braamfontein, 2017	Current	Textual database listing organizations providing training courses for adult basic education, development programmes/ project skills, technical skills, business/ management and administrative skills, as well as training for trainers. The database contains a wide range of information for each organization including address, the type of organization, and the training facilities available: updated on a continuous basis
Directory of southern African libraries : State Library, P O Box 397, Pretoria, 0001	Current	Database listing southern African libraries: approximately 1 200 records, updated every five years
Electronic reference network for industrial information : ERNII Ltd, P O Box 631, Rivonia, 2128	ERNII Current	Numeric/textual database which provides information on industrial suppliers for example, company name, brand name, location and product/service description: approximately 20 000 companies, 10 000 company records added annually
Forthcoming conferences worldwide : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	ALLCONF 1991 - 1999	Textual database which contains details of forthcoming conferences, seminars and exhibitions (worldwide) in the fields of science, engineering and general management: approximately 1 200 records, remains relatively constant
HSRC Centre for Library and Information Services database : Centre for Library and Information Services, Human Sciences Research Council, Private Bag X41, Pretoria, 0001	CLI 1985 - current	Bibliographic database of articles from South African journals in the human sciences, and of the Centre's book collection: approximately 90 000 records, 10 000 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Inch press cuttings service : Institute for Contemporary History, P O Box 2320, Bloemfontein, 9300	INCH/INEG 1978 - current	Approximately 500 press cuttings are taken daily from 85 South African newspapers and journals, analysed according to 32 subject headings, and processed in an extensive keyword list: approximately 2 000 000 cuttings, 130 000 cuttings added annually
Index to South African literature on library and information science : Library, University of South Africa, P O Box 392, Pretoria, 0001	ISALLIS/ISALBI 1900 - current	Textual database on library and information science in South Africa, about <i>South Africa or by South Africans</i> : approximately 10 000 records, 800 records added annually
Index to South African periodicals : State Library, P O Box 397, Pretoria, 0001	ISAP/RSAT 1987 - current	Bibliographic database covering selected articles from South African periodicals - all subjects: approximately 30 000 records, 10 000 records added annually
Information science and technology literature : Institute for Biomedical Communication, Medical Research Council, P O Box 19070, Tygerberg, 7505	MRC INFO 1980 - current	Bibliographic database covering information science and technology literature: approximately 1 500 records, 250 records added annually
Interlending address list of southern African libraries : State Library, P O Box 397, Pretoria, 0001	IL MANUAL Current	Database listing libraries which participate in the interlending scheme, with addresses and library codes: approximately 800 records, updated twice a year
Kovsidex : Library and Information Service, University of the Orange Free State, P O Box 301, Bloemfontein, 9300	Some entries 1975 - 1986; mainly 1987 - onwards	Bibliographic database covering indexed periodical articles and portions of books on the humanities, the economic and social sciences, medicine, theology, agriculture and popular science: approximately 15 000 records, 10 000 records added annually
Kovsi reviews : Library and Information Service, University of the Orange Free State, P O Box 301, Bloemfontein, 9300	1988 - current	Bibliographic database of book reviews from South African and international journals: approximately 700 records, 300 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Natal Provincial Administration Chief Directorate: Works drawings : Natal Provincial Administration Chief Directorate: Works, Private Bag X9041, Pietermaritzburg, 3200	1987 - current	Numeric/textual database of architectural and engineering drawings microfilmed by the Chief Directorate: Works approximately 20 000 entries
National register of manuscripts : State Archives Service, Private Bag X236, Pretoria, 0001	NAREM Variable	Bibliographic database of manuscripts (Government documents and reports), as well as material (including books and monographs) available in university and private archives. Special permission may be required to examine Government documents (dated after 1965), held in State Archives Service depots
National register of research projects : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	NPRO 1980 - ?1992	Textual database which lists South African research projects and all publications resulting from such projects in the natural sciences including medicine, dentistry and engineering. A comprehensive coverage with surveys of all universities, Government, semi-government and private organizations known to undertake research: approximately 22 000 records. Since discontinued
NAVO database : Institute for Research Development, Human Sciences Research Council, Private Bag X270, Pretoria, 0001	NAVO 1969 - current	Textual database listing research in the human sciences including Masters', Ph.D. and non-degree purposes research: approximately 40 141 projects, 2 000 projects added annually
Ninham Shand Library information database : Ninham Shand Inc., P O Box 1347, Cape Town, 8000	Library holdings since 1950	Bibliographic database covering the holdings of the Ninham Shand Library: approximately 3 800 records, 1 000 records added annually
Periodicals in southern African libraries : State Library, P O Box 397, Pretoria, 0001	PISAL Current	Database listing periodicals in southern African libraries - indicating holdings. Used primarily for interlibrary lending: approximately 84 198 records, 77 microfiches, 0,6% added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Prodder NGO database : Programme for Development Research, Human Sciences Research Council, P O Box 32410, Braamfontein, 2017	PRODDER Current	Textual database on non-government organizations (NGOs) involved with development work, across southern Africa
South African conferences, meetings, seminars and exhibitions : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	SACONF 1991 - current	Textual database listing forthcoming South African events: approximately 350 entries, remains relatively constant
South African cooperative database : SABINET, P O Box 617, Pretoria, 0001	SACD No date restriction	Comprehensive database of information sources housed in South African libraries. All subject fields: approximately 1 100 000 records, 15 000 records added annually
South African data archive : Human Sciences Research Council, Private Bag X270, Pretoria, 0001	SADA On-going	Numeric/textual database containing documentation and data from some 110 human and social sciences surveys undertaken by South African and overseas research agencies. The data can be used for secondary analyses, and longitudinal/comparative studies as well as for multi-disciplinary purposes. The information can also be used for training in research methodology. Data are available for a wide range of topics such as demography, sociology, social work, economics and health-related studies. Useful local surveys include the 1980, 1985 and 1991 population census, the Central Statistical Service October household surveys (1993 and 1994), and birth statistics (1994). Also available is household data for 1993 derived by the Southern Africa Labour and Development Research Unit at the University of Cape Town (Project for Statistics on Living Standards and Development). Further data from local and overseas sources will be added to SADA on an on-going basis
South African joint catalogue of monographs : State Library, P O Box 397, Pretoria, 0001	JC Current	Bibliographic database listing monographs available in southern African libraries which are members of the national interlending scheme: approximately 911 900 bibliographic entries, 680 author and title microfiches, 20% added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
South African national bibliography : State Library, P O Box 397, Pretoria, 0001	SANB 1959 - current	Bibliography of South African publications received in terms of the Legal Deposit of Publications Act No. 17 of 1982: approximately 30 volumes, 1 volume (some 8 000 records) added annually
Southern African research, documentation, information user service : Jan Smuts House Library, University of the Witwatersrand, P O Box 31596, Braamfontein, 2017	SARDIUS 1976 - current	Bibliographic database covering publications on political and economic aspects of southern Africa - encompassing all shades of political opinion: approximately 26 000 records, 1 500 records added annually
TALK database for local and international conferences in the human sciences : Institute for Research Development, Human Sciences Research Council, Private Bag X270, Pretoria, 0001	TALK Current, up to three years in advance	Information on national and international conferences and exhibitions: approximately 600 records (old records discarded)
Union catalogue of theses and dissertations of South African universities since 1918 : Ferdinand Postma Library, Potchefstroom University for Christian Higher Education, Private Bag X05, Noordbrug, 2522	GKPV 1918 - current	Bibliographic database covering theses and dissertations completed at South African universities since 1918: approximately 42 000 records, 2 000 records added annually
University of Natal departmental publications : Publications Committee, University of Natal, Private Bag X10, Dalbridge, 4014	UNDP 1980 - 1991	Bibliographic database of the departmental publications of the University of Natal, concentrating mainly on grey literature and miscellaneous publications: approximately 1 000 titles
Wits Business School MBA research reports : Wits Business School Library, University of the Witwatersrand, P O Box 98, Wits, 2050	As per holdings	Bibliographic database covering all Master of Business Administration research reports completed at the Wits Business School: approximately 1 200 records, 100 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
LAW Government Gazette Index : State Library, P O Box 397, Pretoria, 0001	GGI 1979 - 1989	Indexes of the <u>Government Gazette of the Republic of South Africa</u> : updated quarterly and annually until December 1989
Jutalex : Juta and Company Ltd, P O Box 14373, Kenwyn, 7790	1984 - current	On-line legal information encompassing case and statute law: approximately 14 400 prestel (videotex) frames, 1 600 frames added annually
Jutastat's South African statutes : Jutastat Ltd, P O Box 14373, Kenwyn, 7790	1910 - current	Textual database covering (extant) South African statutes, and wording of sections prior to amendment from 1968 to-date: approximately 121 Mb, 1 - 10% added annually
Jutastat's Tax Library : Jutastat Ltd, P O Box 14373, Kenwyn, 7790	1926 - current	Textual database covering South African taxation law, tax cases reports, tax and related legislation, the Margo Commission report, double taxation agreements, and Government White Paper and practice notes: approximately 68 Mb, 1 - 10% added annually
Kovsilaw : Library and Information Service, University of the Orange Free State, P O Box 301, Bloemfontein, 9300	1987 - current	Bibliographic database covering periodical articles and portions of books on law: approximately 440 records, 300 records added annually
Krueger Du Rand Library : Krueger Du Rand Inc., P O Box 559, Halfway House, 1685	As per holdings	Bibliographic database covering the holdings of the Krueger Du Rand Library: approximately 8 000 records
Legal information retrieval committee : Department of Criminal and Procedural Law, University of South Africa, P O Box 392, Pretoria, 0001	RIHK 1985 - current	Hypertext database covering South African law reports and legislation. Hierarchical thesaurus and summaries: approximately 500 records, 6 000 descriptors, 120 records added annually
Old legal sources : Centre for the Documentation of Old Legal Sources, Faculty of Law, University of Pretoria, Pretoria, 0002	Sources from 1900 onwards	Bibliographic database of the old legal sources of the Merensky Library (University of Pretoria) as well as other law libraries: approximately 4 000 records, 300 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Private law periodical index : Department of Private Law, Potchefstroom University for Christian Higher Education, Private Bag X6001, Potchefstroom, 2520	PURTYDIN 1960 - current	Bibliographic database listing journal articles in private law: approximately 18 000 records, 1 500 records added annually
Social justice resource project : Institute of Criminology, University of Cape Town, Private Bag, Rondebosch, 7701	SJRP 1980 - current	Textual database on criminal and social justice: approximately 2 000 records, 25% added annually
MAPPING Census information system : GIS Unit, Human Sciences Research Council, P O Box 17302, Congella, 4013	CENSUS 1985; 1991	Geographic information system covering Natal/KwaZulu. Data span includes the 1985 and 1991 census with reference to population statistics and other socio-economic characteristics: approximately 10 030 enumerator areas, updated per census
Kovsimap : Library and Information Service, University of the Orange Free State, P O Box 301, Bloemfontein, 9300	1980 - current	Bibliographic database which contains references to maps in books and periodicals: approximately 579 records, 400 records added annually
LANDSAT information system : Satellite Applications Centre, Division of Microelectronics and Communications Technology, CSIR, P O Box 395, Pretoria, 0001	1972 - current	Numeric data for southern Africa obtained from the LANDSAT earth observation satellite
Natal/KwaZulu resource atlas : Institute of Natural Resources, University of Natal, Private Bag X01, Scottsville, 3209	1970 - 1987, but mainly 1985 - 1987	Geographic information system which provides resource maps of the physical, census and infrastructural features of Natal/KwaZulu. Output is on any scale, but is mapped formally at a 1 : 1 000 000 scale: approximately 25 Mb

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Place names database : Names Society of Southern Africa, Human Sciences Research Council, Private Bag X41, Pretoria, 0001	NAAMNET 1957 - current	Information on southern African place names according to nine information fields, for example, origin, language, locality and source: approximately 88 000 entries, 1 000 entries added annually
Quarry database : Division of Building Technology, CSIR, P O Box 395, Pretoria, 0001	QUARRY 1988 - current	Geographic information system listing registered quarries in South Africa, with physical properties of aggregates: approximately 250 records, 10 records added annually
PLANNING Central Statistical Service databank : Central Statistical Service, Private Bag X44, Pretoria, 0001	SSS/SSD 1970 - current	Numeric database which contains the statistics of the Central Statistical Service - mainly short term statistics: approximately 50 Mb, 2,5 Mb added annually
Informal settlements database : Department of Surveying and Mapping, University of Natal, Private Bag X10, Dalbridge, 4014	HUTCOUNT 1979 - 1990	Geographic information system providing coordinates of dwelling units and other point features in the informal settlements of the Durban Functional Region: approximately 12 Mb, 5 Mb added annually
KwaZulu Finance and Investment Corporation information resource centre catalogue : KwaZulu Finance and Investment Corporation Ltd, P O Box 2801, Durban, 4000	KFC IRC 1960 - current	Bibliographic database of the KwaZulu Finance and Investment Corporation Library - includes all aspects of social and economic development: approximately 3 500 records, 500 records added annually
National land information system : Chief Directorate: Surveys and Land Information, Department of Regional and Land Affairs, Private Bag, Mowbray, 7705	NLIS Current	Geographic information system on land holdings: still in a developmental phase

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Regional Development Advisory Committee database : KwaZulu-Natal Regional Economic Forum, P O Box 30886, Mayville, 4058	1993 - current	The Regional Development Advisory Committee (reconstituted as the KwaZulu-Natal Regional Economic Forum), has a textual database containing the names and addresses of a wide variety of development, industrial, housing and other organizations concerned with the upgrading of rural and urban settlements in the province. The database has over 3 500 entries. Updating is continuous
South African census : Centre for Epidemiology, Medical Research Council, P O Box 19070, Tygerberg, 7505	SAPOP 1985; 1991	Numeric database covering all census information for 1985: approximately 30 000 000 records, updated per census
South African regional statistical database : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	Latest available statistics	Numeric database of regional economic statistics. All available statistics per magisterial district: approximately 3 000 records, remains constant
PROFESSIONAL ORGANIZATIONS Appropriate technology expertise register : Appropriate Technology Information Centre, Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	ATEX Current	Textual database of Who's who in appropriate technology in southern Africa: approximately 500 records
Certificated engineers register : Board of Control for Registered Certificated Engineers, P O Box 93420, Yeoville, 2143	1987 - current	Textual database providing the names, qualifications and other personal information of all registered certificated engineers
CSIR expertise register : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	EXPERT Current	Textual database which lists the scientific expertise of CSIR professional staff: approximately 900 records, remains relatively constant
Engineering : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	1981 - current	Bibliographic database pertaining to engineering, manufacturing and materials information: approximately 23 000 records, 5 000 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Engineering technicians register : Board of Control for Engineering Technicians, P O Box 61081, Marshalltown, 2107	1983 - current	Textual database providing the names, qualifications and other personal information of all engineering technicians
Human sciences professional societies database : Institute for Research Development, Human Sciences Research Council, Private Bag X270, Pretoria, 0001	VAKV 1987 - current	Information on human sciences professional societies: approximately 160 records, 40% added annually
Institute for Indigenous Theory and Practice and the South African Resource Centre for Indigenous Knowledge database : Institute for Indigenous Theory and Practice, P O Box 2335, Cape Town, 8000	SARCIK 80% of references are dated after 1980 - current	Bibliographic database on indigenous knowledge ranging from social to biological phenomena in Botswana, Lesotho, Swaziland and South Africa: approximately 629 records
Professional engineering technologists register : Board of Control for Professional Technologists (Engineering), P O Box 93420, Yeoville, 2143	1985 - current	Textual database providing the names, qualifications and other personal information of all professional engineering technologists registered with the Board
Professional engineers register : South African Council for Professional Engineers, P O Box 93420, Yeoville, 2143	1969 - current	Textual database providing the names, qualifications and other personal information of all professional engineers registered with the Council
South African associations directory : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	ASS Current	Textual database providing information on addresses, telephone numbers, office bearers and activities of South African associations, for example, scientific, technical, social and human sciences, trade and environmental (national and provincial), not local. No political parties: approximately 1 400 records, 100 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
South African research organizations and facilities : Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	RESORG Current	Textual database listing Government, statutory and private organizations involved in, or offering facilities for research in the medical, natural, engineering and economic sciences: approximately 420 entries
SOILS National inventory : Institute for Soil, Climate and Water, Private Bag X79, Pretoria, 0001	NATIN Early 1900s - current	Numeric/textual and bibliographic database on literature (especially unpublished reports and maps), as well as data on soils, climate and topography in South Africa
TRANSPORT Road and transport technology database : Division of Roads and Transport Technology, CSIR, P O Box 395, Pretoria, 0001	1900 - current	Bibliographic database covering all road and transport technology publications received by the Divisions's information centre: approximately 17 500 records, 1 000 records added annually
Transnet information services : Transnet, P O Box 12, Johannesburg Station, 2000	TRANSNET 1987 - current	Textual database covering transport related publications: approximately 20 000 entries, 10 000 entries added annually
WASTE MANAGEMENT Pacsa packaging abstracts : Packaging Council of South Africa, P O Box 782205, Sandton, 2146	PACSA As per holdings	Bibliographic (abstracts) database on waste management. Contains both South African and overseas literature
WATER RESOURCES INCLUDING THE SEA AEC groundwater data : Atomic Energy Corporation of South Africa Ltd, P O Box 582, Pretoria, 0001	1960s - current	Numeric/textual database on groundwater quality as well as other parameters such as depth, lithology and water yield. Older water quality data usually consist of a few samples only per site. Data are available for selected areas in South Africa, as required by the Atomic Energy Corporation for environmental monitoring, or as a result of contract research: several thousand samples, on-going. Most (but not all) of the information is also available from the Directorate of Geohydrology of the Department of Water Affairs and Forestry - see below

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Catalogue of hydrological gauging stations : Institute for Water Quality Studies, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	STASIEKATALOGUS Varies according to station. First observations date from approximately 1903 - current	Numeric/textual database of gauging stations and observation points in southern Africa (more than 3 000 gauging stations), with geographical information, descriptions and applicable dates: approximately 20 000 records, 100 records added annually
FISHLIT : J L B Smith Institute of Ichthyology, Rhodes University, Private Bag 1015, Grahamstown, 6140	1985 - current	Bibliographic database covering all aspects of marine, freshwater and estuarine fish in southern Africa: approximately 36 000 records, 6 000 records added annually. <u>Note:</u> FISHLIT is available on CD-ROM which includes the databases of the US Fish and Wildlife Service, the US National Oceanic and Atmospheric Administration, and the US National Fisheries Research Center
Freshwater Research Unit biological/chemical database : Freshwater Research Unit, Department of Zoology, University of Cape Town, Private Bag, Rondebosch, 7701	BCD 1951 - current	Numeric database containing approximately 97 000 records for 1 830 taxa and up to 48 water quality variables per study, drawn from unpublished and published work on South African rivers, where both biological (invertebrate) and physical/chemical riverine data were concurrently collected. Still in a developmental phase. A literature database of some 1 000 international and South African references examined for the project, is also available. The literature database is being updated on a continuous basis
Hartbeespoort Dam water quality : Water Quality Information System, Division of Water Technology, CSIR, P O Box 395, Pretoria, 0001	HBPD 1980 - 1988	Numeric database which contains water quality data for the Hartbeespoort Dam: approximately 50 Mb
Hydrological evaporation data : Institute for Water Quality Studies, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	VERDAMPINGSDATA Varies according to station. First observations date from 1925 - current	Numeric database on evaporation and sediment data in southern Africa: approximately 1 000 000 records, 10% added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Hydrological water levels and flow data : Institute for Water Quality Studies, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	VLOEIDATA Varies according to station. Oldest records 1903 - current	Numeric database on water levels against time for dams, rivers and canals, with high level/time, calibration and flow/time data for flow gauging stations in southern Africa: data from approximately 1 700 points, 1 Mb added annually
Hydrological water quality (now known as the Chemical database, the Water Quality database or the National Water Quality database) : Institute for Water Quality Studies, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	KWALITEITSBANK Varies according to monitoring point. Approximately 1960 - current	Numeric database on analytical results (chemical, physical, limnological and sediment) of water samples taken in southern Africa: approximately 3 000 000 results, 25 000 results added annually
IAEA database : International Atomic Energy Agency, Vienna International Centre, POB 100, A-1400, Vienna, Austria	MALAN IAEA Station 6881600 1962 - 1974	Numeric database of the oxygen and hydrogen isotope composition of weighted monthly rainfall samples taken at D.F. Malan (now Cape Town International) Airport. The database can be examined on the Internet: 125 monthly samples
INTERWATER : Department of Civil Engineering, University of Durban-Westville, Private Bag X54001, Durban, 4000/Pollution Research Group, Department of Chemical Engineering, University of Natal, Private Bag X10, Dalbridge, 4014	Current	Textual database previously known as WENDY (Water Supply and Environmental Sanitation Services Electronic Network for Developing Country Needs). The aim of the database is to improve the delivery of water and sanitation services in developing countries, through the exchange of practical experience and knowledge. The system operates electronically via the Internet, and is a collaborative partnership of water and sanitation agencies in many parts of the world. Considerable interest, both local and international, has been expressed in INTERWATER which is still in a developmental phase. Actual example: a water agency in South Africa was experiencing difficulties with iron and manganese in the raw water intake. A low cost solution, for various technical and socio-economic reasons, was required. Through the use of INTERWATER, a possible solution was found based on experience in Bangladesh, India and Sri Lanka

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Johannesburg Municipality water pollution database : City Health Department, Johannesburg Municipality, P O Box 1477, Johannesburg, 2000	1978 - current	Numeric/textual database on water quality in relation to water pollution: approximately 100 Mb, 10 Mb added annually
Kruger National Park rivers research programme : Private Bag X402, Skukuza (Letaba), 1350/ Institute of Natural Resources, University of Natal, Private Bag X01, Scottsville, 3209	KNPRRP DATA CATALOGUE 1995 (Data span mainly 1986 - current)	The database contains information on a wide range of topics for rivers flowing through the Kruger National Park. Data are available on hydrology and catchment studies, geomorphology and hydraulics, water quality, biota (riparian vegetation/ invertebrates/fish), instream flow requirements, and decision support systems. Information is likewise available on social, conservation and legal issues. The database encompasses both numeric/ textual and bibliographic material. GIS data are similarly available. The database is being updated on a continuous basis. Access is possible via the Computing Centre for Water Research, University of Natal, Pietermaritzburg. The database is also available in hard copy or on computer diskettes
Marine and coastal research database : Department of Environment Affairs, Private Bag X2, Rogge Bay, 8012	1975 - 1991	Bibliographic database covering many aspects of marine and coastal research in South Africa: approximately 950 records
Marine encyclopedia : Fisheries Centre, P O Box 4239, Cape Town, 8000	EMMY Current	Numeric/textual database in the form of a marine encyclopedia covering topical material on the sea and its resources: approximately 1 024 Kb, 2 000 records added annually
Natal estuarine and coastal research survey data : Division of Water Technology, CSIR, P O Box 17001, Congella, 4013	NECRU surveys 1978 - 1990	Numeric database listing fish, invertebrate and physico/chemical data collected from 71 Natal and Transkei rivers and "estuaries" between 1978 and 1990: approximately 2 800 records

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
National collection of freshwater invertebrates : Albany Museum, Somerset Street, Grahamstown, 6139	1890s - current	The collection consists of approximately 1,5 million specimens, mainly with reference to southern Africa (including all major river ecosystems). There are 86 separate catalogues, over half of which, have been computerized. The collection can be used for a number of purposes such as water quality studies, and for the assessment of changes in river flow regimes. The collection can also be used to identify areas vulnerable to invasion by alien species, as well as areas with an important conservation status. The data can likewise be used to estimate the in-stream flow requirements of aquatic communities
National groundwater database : Directorate of Geohydrology, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	As per data source	Numeric database containing groundwater data for South Africa (boreholes, wells, springs, sinkholes, tunnels, shafts or drains and seepage ponds). More than 200 different parameters per site can be stored in 32 data-sets. The database was recently re-organized. The input of data from Natal/KwaZulu (especially KwaZulu) is currently underway
Oceanographic environmental database : Department of Oceanography, University of Port Elizabeth, P O Box 1600, Port Elizabeth, 6000	1984 - current	Numeric/textual database containing the research results of M.Sc. and Ph.D. students of the Department. The database covers a wide spectrum of environmental data
ORI database : Oceanographic Research Institute, P O Box 10712, Marine Parade, 4056	ORID 1988 - current	Bibliographic database covering literature on marine biology including "estuaries": approximately 7 000 records, 2 000 records added annually
SADCO - marine pollution : South African Data Centre for Oceanography, Division of Information Services, CSIR, P O Box 320, Stellenbosch, 7599	SADCO MP-DATA 1974 - current	Numeric/textual database on marine pollution: approximately 40 000 records, 2 000 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
SADCO - oceanic physical nutrients : South African Data Centre for Oceanography, Division of Information Services, CSIR, P O Box 320, Stellenbosch, 7599	SADCO-OCEANIC 1906 - 1986 (to be upgraded to current)	Semi-relational marine physical nutrient database. Includes marine biological data with physical oceanography, sediment, meteorological, environmental and pollution data: approximately 1 300 000 records, 50 000 records added annually
Sea Fisheries Research Institute database : Chief Directorate: Sea Fisheries, Department of Environment Affairs, Private Bag X2, Rogge Bay, 8012	1960 - current	Fisheries database covering biological, chemical and physical aspects of oceanography
Shipwrecks : South African Library, P O Box 496, Cape Town, 8000	1550 - current	Textual database on shipwrecks along the South African coast: approximately 3 000 entries
South African Marine Corporation Library : South African Marine Corporation, P O Box 27, Cape Town, 8000	SAFMARINE LIBRARY Current	Bibliographic database of the shipping industry: approximately 1 500 records
South African water-related research projects database : South African Water Information Centre, Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	1992 - current	Textual database listing details of some 530 research projects which deal with any aspect of water in South Africa. The purpose of the database is <i>inter alia</i> to advise research workers of others active in a given field or sub-discipline. The data are available in the form of computer print-outs or on floppy diskettes. The information can also be examined as a read-only text file at the Computing Centre for Water Research, University of Natal, Pietermaritzburg. The database is constantly updated
WATERLIT : South African Water Information Centre, Division of Information Services, CSIR, P O Box 395, Pretoria, 0001	1975 - current	Bibliographic database (available on CD-ROM) covering water-related topics including freshwater, wastewater, groundwater, "estuaries", water pollution and sanitation. The database lists southern African and international literature: approximately 220 000 records, 12 000 records added annually

Table B7: Some relevant (computerized) South African bibliographic, numeric, textual and Geographic Information System databases (continued).

Name and address of database	Acronym and time span	Details
Water pollution control management information system : Directorate of Water Quality Management, Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001	POLMON Current	Numeric/textual database on water pollution listing pollution source, locality, owner and characteristics of source for several thousand sites
Waves : Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 320, Stellenbosch, 7599	1976 - current	Geographic information system pertaining to marine wave data: approximately 80 000 records, 8 500 records added annually
WETLANDS Wetlands south western Cape database : Freshwater Research Unit, Department of Zoology, University of Cape Town, Private Bag, Rondebosch, 7701	1987 - 1989	Numeric/textual database on the wetlands of the south western Cape Province. Covers the chemistry and biology of the wetlands

Source: (i) After McGillivray, R., Op't Hoff, M. and Schnugh, L., 1991. Directory of South African databases, Division of Information Services, CSIR, Pretoria, no pagination.

(ii) Fieldwork.

See also: (i) Brain, C.K., 1994. Research collections in South African natural history museums: their scope, relevance and co-ordination, South African Journal of Science, VOL 90(8/9), p. 439 - 442.

(ii) Coates, P.R. and Kerkham, A.S., 1994. The South African Library, South African Journal of Science, VOL 90(8/9), p. 445 - 446.

(iii) De Beer, M., Van der Walt, H. and De Klerk, M.A.D., 1994. ISAP: Index to South African Periodicals, South African Journal of Science, VOL 90(8/9), p. 444 - 445.

(iv) Drinkrow, D.R., Cherry, M.I. and Siegfried, W.R., 1994. The role of natural history museums in preserving biodiversity in South Africa, South African Journal of Science, VOL 90(8/9), p. 470 - 479.

- (v) Lor, P.J. and De Beer, J.F., 1994. The State Library in the service of South African science and scholarship, South African Journal of Science, VOL 90(8/9), p. 462 - 466. (Some other papers in the journal issue are also of interest).
- (vi) Willemse, J., 1983. SABINET - Die Suid-Afrikaanse Bibliografiese en Inligtingsnetwerk en die invloed daarvan op biblioteek- en inligtingsdienste, RSA 2000, VOL 5(2), p. 25 - 34.

Note:

- (i) The information in the above table essentially applies to 1990/1991 (updated in a few cases), and does not reflect later changes. Readers should therefore always confirm the current status of a particular organization and database.
- (ii) Forthcoming conferences and symposia (both local and overseas), on water and sanitation as well as related topics are listed in the SA Waterbulletin. The newsletter is published six times a year by the Water Research Commission, Pretoria.
- (iii) A separate database on the peat resources of South Africa is being compiled by the Geological Survey (now the Council for Geoscience), Pretoria.

2.2 Some primary source documents of relevance (see Table B7 where necessary)

2.2.1 Individual expertise/relevant organizations/suppliers and manufacturers of commodities

(a) Agricultural expertise

- Anonymous, 1988. Official list of professional and research workers, lecturing staff, extension and other workers in the agricultural field, Department of Agriculture and Water Supply, Pretoria, 74 p. (The publication is a most useful contact source document and is periodically updated).
- Anonymous, 1989. Professional societies concerned with agriculture: liaison document, Liaison Committee of Professional Societies Concerned with Agriculture, [Pretoria], 19 p. (Available in the Department of Agriculture Library, Cedara).
- Anonymous, 1991. Agricultural digest of South Africa 1990/91, Department of Agricultural Development, Pretoria, 23 p. (The publication, which is periodically updated, provides background data on the various regions, directorates and research institutes/centres. Other information includes Acts of Parliament relating

to agriculture, and faculties of agriculture at South African universities, as well as various useful addresses. Readers should note that some of the information in the above example is out of date, given inter alia the transfer of certain research centres and institutes to the Agricultural Research Council).

(b) Business data and product information

- Anonymous, undated. Prolit Product Promotions: construction information index of building elements, materials and services, VOL 1 - 4, various pages, Randburg.
- Anonymous, 1984 (on-going). SABS buyers' guide/SABS-koopgids, South African Bureau of Standards, Pretoria, 139 p. (The publication lists manufacturers producing SABS mark-bearing products).
- Anonymous, 1989. Concrete pipe handbook, Concrete Pipe Division, Concrete Society of Southern Africa, Halfway House, 23 p.
- Anonymous, 1989. Specifile compendium: building products, Specifile Ltd, Johannesburg, 458 p. (The publication lists suppliers/manufacturers of certain items of technology (water and sanitation) which might be of interest to the reader. Note that Specifile mainly refers to the architectural, building and civil engineering construction sectors. See also individual files, especially: 6 Plumbing services 70-73: Civil library manual No. 1, containing Sections C-99 and 5, Roof finishes 59-62).
- Anonymous, 1990. South African steel construction handbook, South African Institute of Steel Construction, Johannesburg, various pages.
- Anonymous, 1991. 1991/92 National Trade Index of South Africa Incorporating the Afrikaanse Handelsindeks, Intratex, Midrand, 448 p. (The publication lists numerous companies - mainly manufacturing concerns - as well as their products or activities, and is regularly updated).
- Anonymous, 1991. Ezee-Dex: a catalogue of mining and industrial product brochures, Ezee-Dex Publications, Johannesburg, various pages.

- Carstens, P-A. du T., 1985. Companies in South Africa: designing, constructing, manufacturing or selling installations, equipment and chemicals for the treatment of water, wastewater and solids, [Report No. IWAT 13], National Institute for Water Research, CSIR, Pretoria, 32 p.
- De Vries, R., 1989. Business information: directory of sources, Division of Information Services, CSIR, Pretoria, 126 p.
- Du Toit, I., 1992. Irri info, Directorate of Irrigation Engineering, Department of Agricultural Development, Silverton, 132 p. (This publication lists various items of irrigation equipment and also provides details of manufacturers/suppliers).
- Sadzik, P., 1986. 1986 international catalogue of equipment for small water supplies, CSIR Technical Guide No. K82, National Institute for Water Research, CSIR, Pretoria, various pages. (The publication contains information on a wide range of equipment including pumps, windmills and filtration/purification devices).
- Schloss, R. (ed), 1989. Merkel's Builders' Pricing and Management Manual 1991, Thomson Publications, Randburg, 1231 p. (The manual is periodically updated).

(c) Chemistry

- Anonymous, 1993. Chemdata: the directory of South African chemicals, CSIR and the Keeble-Prins Company, [Pretoria], 139 p. (The publication which is updated every second year, contains a listing of chemicals available in South Africa. Some 8 500 chemicals and approximately 300 suppliers (local manufacturers/importers), are outlined. Brief data are also given on the Chemical Abstract (CAS) registration, and the United Nations (UN) number which identifies each chemical in cases of accidental spillage or fire).

(d) Development-orientated activities

- Alcock, P., 1990. Data and technology transfer: a strategy for sharing knowledge, Indicator South Africa, VOL 7(4), p. 43 - 48. (The paper lists some 40

organizations involved with water and/or sanitation infrastructure in black settled areas in Natal/KwaZulu).

- Alcock, P.G., 1991. Agricultural/forestry training and extension in Natal/KwaZulu: an overview of development-orientated activities, DSRG Working Paper No. 16, Development Studies Research Group, Department of Economics, University of Natal, Pietermaritzburg, 99 p. (The publication outlines over 50 organizations involved with agricultural and forestry training in Natal/KwaZulu).
- Anonymous, 1990. Business resource directory South Africa - 1990: a tool for the developing business sector, Get Ahead Foundation, Pretoria, 45 p. + app.
- Anonymous, 1991. Bridge 1991, Human Awareness Programme, Grant Park, 308 p. (The publication is regularly updated and lists the names and addresses of various organizations involved with development work. On-line computer access to the database is available. Contact the Bridges Community Information Electronic Network, EduTech-Education Technologies, P O Box 31067, Braamfontein, 2017).
- Anonymous, 1993. Directory of organization development services and related training provision in South Africa: OD and T courses and services, Olive (Organization Development and Training), Durban, 198 p. + app. (The publication lists approximately 90 organizations in South Africa involved with the upgrading of the administrative and managerial skills of non-government organization sector staff. Particular emphasis has been placed on organization development and training skills).
- Anonymous, 1993. The development education directory, Development Contact Network, Durban, 87 p. (The publication provides details of 400 organizations involved with urban and rural development and related activities).
- Barnard, D. (ed), 1993. Prodder's development directory 1992/93: an assessment and comprehensive survey of southern African development agencies and organizations, Programme for Development Research, Human Sciences Research Council, Johannesburg, 614 p. (The publication which is updated annually, provides addresses as well as details of the activities of numerous non-government

and development-orientated organizations in southern Africa. On-line computer access to the database is planned for the near future. It should be noted that the Programme for Development Research also produces a useful overview publication, namely, the Prodder Newsletter. Each issue of the Newsletter is devoted to a different topic. Selected overseas and local literature as well as organizations working in the given field are listed in the Newsletter, with reference to the topic in question. The Newsletter is published four times a year and was first issued as Development Research: Prodder Newsletter, VOL 1(1) in 1988. More recent issues have the format outlined above. Example: Barnard, D. (ed), 1994. Housing: the reconstruction challenge, Prodder Newsletter, VOL 6(4), 56 p.).

- Centre for Policy and Information, 1996. Database of South African training and capacity building providers, Development Paper No. 114, Development Bank of Southern Africa, Halfway House, various pages. (The publication contains details of a wide variety of training organizations in each of the new provinces of South Africa. The types of training listed, range from business to engineering skills).
- De Vries, R., 1992. Who's who in appropriate technology, Appropriate Technology Information Centre, Division of Information Services, CSIR, Pretoria, 413 p.
- Mzimela, T., [1994]. A directory of rural and peri-urban community based organizations in Natal, Maurice Webb Race Relations Unit, Centre for Social and Development Studies, University of Natal, Durban, 32 p. (The publication lists 243 community based organizations (CBOs) - with relevant details).
- Streek, B., 1983. Rural organizations in South Africa: a directory, SALDRU Working Paper No. 57, Southern Africa Labour and Development Research Unit, University of Cape Town, Rondebosch, 90 p.

(e) Energy

- Anonymous, [1978]. Energy-related organizations in South Africa, Energy Research Institute, University of Cape Town, Rondebosch, 51 p.

- Anonymous, 1986. Energie: gids van biblioteek- en inligtingsdienste in Suid-Afrika, Report No. K84, National Institute for Informatics, CSIR, Pretoria, 19 p.
- Anonymous, 1988. Energy technology: compendium of South African energy projects: research, development and demonstration, Report No. 1, 1988, National Energy Council, Pretoria, 179 p.
- Anonymous, 1991. Energy projects 1989 - 1990, No. 2: a compendium of energy research, energy development and energy demonstration projects sponsored by the NEC, National Energy Council, Pretoria, 269 p.
- Eberhard, A.A., 1984. A directory and review of appropriate energy technology programmes in southern Africa, Energy Research Institute, University of Cape Town, Rondebosch, 191 p.
- Law, S.M. and Eberhard, A.A., 1991. Directory of rural energy programmes in southern Africa, ERI Report No. GEN 143, Energy Research Institute, University of Cape Town, Rondebosch, 169 p.

(f) Environment

- Anonymous, 1980. South African national directory for sources of environmental information, Environment Branch, Department of Water Affairs, Forestry and Environmental Conservation, Pretoria, 305 p.
- Anonymous, 1990. Environmental education in South Africa: a directory of informal and non-formal activities, Department of Environment Affairs, Pretoria, 322 p. + app. (The publication provides data on a wide variety of conservation agencies including professional organizations and Government departments).
- Anonymous, 1991. Address list October 1991, Share-Net: people, places and publications for environmental education, Share-Net, Wildlife Society of Southern Africa, Howick, no pagination. (The publication is in the process of being updated).

- Anonymous, 1991. The Green Pages 1991/1992: environmental networking and resource directory for southern Africa, Weekly Mail Publications, Johannesburg, 206 p. (The publication was updated in 1993. The information is also available on a computer database at the Weekly Mail and Guardian, P O Box 260425, Excom, 2023).
- Coetzee, I., 1990. Directory of cultural conservation bodies in South Africa, Pamphlet No. 427, Department of Environment Affairs, Pretoria, 38 p.
- Erasmus, A. and Van der Walt, R., 1996. List of wetland-related expertise in South Africa, Working Document No. 3.2/1996, South African Wetlands Conservation Programme, Department of Environmental Affairs and Tourism, Pretoria, no pagination.
- Greyling, T. and Huntley, B.J. (eds), 1984. Directory of southern African conservation areas, South African National Scientific Programmes Report No. 98, Foundation for Research Development, CSIR, Pretoria, 311 p.
- Hale, J.R., Bunker, A.J. and De Beer, E., 1995. The South African Indigenous Plant Use Forum: network directory, FRD Programme Report Series No. 25, Foundation for Research Development, Pretoria, 241 p.
- Schweizer, C.D., 1983. Environmental and related interest groups in South Africa, M.Sc. Thesis, School of Environmental Studies, University of Cape Town, Rondebosch, 171 p. + app. (The thesis was published as Research Report No. 47 by the School of Environmental Studies).
- Schweizer, C.D., 1983. A listing of environmental interest groups in South Africa: Part 2 of Environmental and Related Interest Groups in South Africa, Research Report No. 48, School of Environmental Studies, University of Cape Town, Rondebosch, 63 p.
- Walmsley, J., 1993. Directory of environmental expertise in South Africa, FRD Programme Report Series No. 4, Foundation for Research Development, Pretoria, 216 p. (The directory lists institutional addresses, and provides an index of 911

individual scientists plus their institutions as well as their main fields of professional interest).

(g) Research organizations and professional associations

- Anonymous, 1985. The 1985/6 Building Index, Avonwold Publishing Company, Johannesburg, 306 p. + app. (The publication lists the names and addresses of members of the Institute of South African Architects; the South African Association of Consulting Engineers; the Engineers' Association of South Africa (Private Practice Group); the South African Council for Professional Land Surveyors and Technical Surveyors; the Institute of Landscape Architects of Southern Africa; the Association of South African Quantity Surveyors; and the South African Institute of Town and Regional Planners. Details are also provided of other institutes, associations, societies and statutory bodies involved with building, construction and related activities).
- Anonymous, 1986. Abbreviations and acronyms: directory of scientific and technical societies in South Africa, supplement, Information and Research Services, CSIR, Pretoria, 23 p.
- Anonymous, 1988. Register of service companies and ancillary services, South African Association of Consulting Engineers, [Johannesburg], 34 p.
- Anonymous, 1990. Institute of South African Architects directory 1990, Professional Promotion Directorate, Institute of South African Architects, Johannesburg, 284 p. (The publication is regularly updated).
- Anonymous, 1991. Register of professional members 1991/1992, South African Institute of Ecologists, Vallyland, 51 p. (Note that more recent editions are available. The Institute is now known as the Southern African Institute of Ecologists and Environmental Scientists).
- Anonymous, 1991. The Professions and Projects Register 1991/1992, Avonwold Publishing Company, Johannesburg, 399 p. (The publication provides information on firms belonging to the South African Association of Consulting Engineers, as

well as firms belonging to the Association of Consulting Town and Regional Planners and the South African Institute of Town and Regional Planners. The publication is updated annually).

- Anonymous, 1991. The South African Association of Consulting Engineers directory of firms 1991, South African Association of Consulting Engineers, Randburg, 191 p. (The publication is updated annually).
- Anonymous, 1993. PASA directory, Publishers' Association of South Africa, Johannesburg, no pagination. (The publication lists the names and addresses of all commercial publishing companies in South Africa).
- Ashwal, L.D., 1992. Directory of academic geoscience departments in South Africa, Department of Geology, Rand Afrikaans University, Johannesburg, 39 p.
- Barton, P. and Bassett, H., 1991. The Help Directory: a Guide to South African Services and Resources, Oxford University Press, Cape Town, 303 p. (The publication lists the address, telephone and fax numbers of numerous associations, societies and institutes in many different fields in South Africa).
- Botha, S. and De Bont, I. (eds), 1991. Directory of research organizations and facilities in South Africa 1991, Division of Information Services, CSIR, Pretoria, 221 p.
- Coutinho, T., 1992. Biotechnology in South Africa: compilation of information by the Foundation for Research Development on industries, academia and research institutes involved in biotechnology in South Africa, Foundation for Research Development, Pretoria, 255 p. See also: Coutinho, T., 1993. Biotechnology in South Africa: information on industries, academia and research institutes involved in biotechnology in South Africa, VOL 2, FRD Programme Report Series No. 8, Foundation for Research Development, Pretoria, 88 p. (The two publications, which are updated on an irregular basis, contain pertinent details of each organization listed).

- De Bont, I. and Abbott, J., 1993. Directory of South African associations, Division of Information Services, CSIR, Pretoria, 488 p. + app.
 - Hattingh, P.S., 1992. Guide to Departments of Geography and Environmental Studies in tertiary education in southern Africa and the South African Geographical Society, 1992, South African Geographical Society, [Johannesburg], 41 p. (The publication is updated from time-to-time).
 - Strydom, L. (ed), 1995. MIMS Services Directory of Health and Welfare Facilities in RSA, 1995/96, fifth edition, Times Media Ltd, Pretoria, 126 p. (The publication includes data on professional and voluntary organizations involved with a variety of health issues).
 - Van der Berg, H., Maree-Snijders, A. and Prinsloo, R. (eds), 1996. South African human sciences research networking directory, HSRC Publishers, Pretoria, 518 p. (The document contains various details including fields of research profiles for over 2 000 researchers in universities, research institutes and State departments).
 - Van der Berg, H., Prinsloo, R. and Pienaar, D. (eds), 1995. Directory of human sciences research organizations and professional associations in South Africa, HSRC Publishers, Pretoria, 372 p. (The publication lists 227 human sciences research organizations and 119 professional associations in South Africa).
- (h) Waste management
- Anonymous, 1990. Operating mines, quarries and mineral processing plants in the Republic of South Africa, Directory No. D1/90, Minerals Bureau, Department of Mineral and Energy Affairs, Johannesburg, no pagination.
 - Anonymous, 1995. 1995 buyers guide and directory for use by: waste contractors, manufacturers, suppliers, consultants, municipal managers, governmental bodies, Institute of Waste Management (Southern Africa), [Johannesburg], 57 p. (The publication, to be updated every two years, contains a list of waste consultants, contractors and product suppliers who are members of

the Institute. A brief inventory of permitted landfill sites in South Africa - as at June 1995 - is also provided).

- Tinney, C.B. and Harding, A.J., 1993. Operating and developing coal mines in the Republic of South Africa, 1993, Directory No. D2/93, Minerals Bureau, Department of Mineral and Energy Affairs, Pretoria, 27 p. + app.

(i) Water and related issues

- Anonymous, 1977. Register of specialists on water and related subjects, South African Water Information Centre, CSIR, Pretoria, 59 p.
- Anonymous, 1996. WRC 25 years: 1971 - 1996, SA Waterbulletin, Special edition, 56 p. (This issue is a concise overview of some important achievements, namely: reports, computer programs and maps funded/published by the Water Research Commission in the 25 years of its existence. Policy is also discussed).
- James, A.G. and Fuller, H.L.M., 1987. Register of southern African hydrological data sources, South African Water Information Centre, CSIR, Pretoria, 287 p.

2.2.2 General information sources

- Alcock, P., 1989. The invisible college: regional literature databases, Indicator South Africa, VOL 6(3), p. 55 - 58. (The paper lists over 33 computerized or printed bibliographies covering a wide range of topics).
- Anonymous, 1990. Union catalogue of theses and dissertations of South African universities 1918 - 1989, Ferdinand Postma Library, Potchefstroom University for Christian Higher Education, Potchefstroom. (Available on microfiche. Now also available on the SABINET database).
- Anonymous, 1993. South African National Bibliography 1992, State Library, Pretoria, 728 p. (Available in hard copy from 1900 onwards, and in its present format from 1926 onwards. Also available on the SABINET database from 1989 onwards).

- Anonymous, 1995. Statibib: list of CSS publications as from 1978, Central Statistical Service, Pretoria, 179 p. (The publication lists all reports and statistical (news) releases produced by the Service in the specified period. The information is also available on diskette. See in addition: Anonymous, 1995. User's guide March 1995, Central Statistical Service, Pretoria, 62 p. The guide is published on a quarterly basis).
- Anonymous, 1995. Summaries of relevant White Papers, Green Papers and discussion documents published by the South African Government, Seneque Maughan-Brown SWK, Durban, 32 p. (The publication mainly refers to the period 1994 - 1995. Topics covered include agriculture, the environment, housing and water as well as sanitation).
- Cooper, C., Hamilton, R., Mashabela, H., Mackay, S., Sidiropoulos, E., Gordon-Brown, C., Murphy, S. and Markham, C., 1993. Race relations survey 1992/93, South African Institute of Race Relations, Johannesburg, 708 p. (This annual publication, first issued in 1936, contains useful overall statistics and data on numerous topics relating inter alia to the environment, housing, population and agriculture. Note that the name of the publication was changed with effect from the 1995/96 edition. The new title is: South Africa survey [date]).
- Index to South African Periodicals, is compiled by the State Library and is available on microfiche from 1940 - 1986, and on the SABINET database plus CD-ROM from 1987 onwards.
- Keyter, E. (ed), 1992. Official Yearbook of the Republic of South Africa 1992, eighteenth edition, South African Communication Service, Pretoria, 267 p. (The yearbook is published annually, and is a useful general reference for broad South African statistics and data).
- Meyer, P. and Dobson, M., 1990. Directory of human sciences: indexes and abstracts in southern Africa, Index Project, Cape Town, 140 p. (The directory describes 320 indexing and abstracting publications which can be used to find original material on subjects in the humanities, the social sciences, commerce and law).

- Periodicals in Southern African Libraries, is compiled by the State Library and lists the periodical holdings of southern African libraries. (The directory is available on microfiche and on the SABINET database. It should be noted that the South African Cooperative Database lists both periodicals and books in South African libraries. The database is available on SABINET).
- Pitman, D., Wooldridge, J. and Hensley, J., 1992. Book collections in southern African museums, Southern African Museums Association Library Group, Port Elizabeth Museum, Port Elizabeth, 50 p.
- Prozesky, L.M., 1992. Research record: twelve years of University of Natal departmental publications, 1980 - 1991, Publications Committee, University of Natal, Durban, 108 p.
- South African Joint Catalogue of Monographs, is compiled by the State Library and lists monographs available in southern African libraries. (The catalogue is available on microfiche and on the SABINET database).

Note: Most South African universities produce an annual research or Principal's report containing details of all material (journal papers, conference papers, reports, books and theses) produced by staff and students of the university. These annual reports are an important source of scientific information. The annual reports are available from the university in question, and are also found in the five copyright (legal deposit) libraries in South Africa. The libraries of many universities have useful in-house library guides and publications to assist staff and students in finding specific reference information. An example is the following: Bell, R., 1989. Statistical sources at the University of Natal Library, Pietermaritzburg, University of Natal Library Publication Series No. 1, University of Natal, Pietermaritzburg, no pagination.

2.2.3 Sources of local data and information

(a) Municipal records

Unpublished (internal) memoranda of local concern are found inter alia in records of the city engineer's departments of various municipalities. The Pietermaritzburg City Engineer's Department, for example, has numerous files of interest ranging from borehole records for the Pietermaritzburg Municipal Area, to reports dealing with sediment and chemical water quality in the Henley Dam catchment. An example of the latter is the following: Harris, D.V., 1965. Memorandum on the soil conservation measures in the Henley Dam Soil Conservation Area, and the deterioration of the Henley and 'nKwaleni catchment areas serving the City of Pietermaritzburg and peri-urban local authorities, VOL 1, File 3/7/2, City Engineer's Department, Pietermaritzburg Corporation, Pietermaritzburg, 8 p. The report (one of several) refers to a statement of the problem (with data), as well as remedial measures attempted. Further memoranda of interest in the Pietermaritzburg City Engineer's Department include records of the Umgeni Catchment Association (an informal predecessor of the Umgeni Water Board - now known as Umgeni Water), and annual conferences of the Association extending over approximately three decades. (The bulk of the Umgeni Catchment Association records are located in the Natal Archives Depot, State Archives Service, Private Bag X9012, Pietermaritzburg, 3200).

It is important to bear in mind that municipal records are contained in files and are not free-standing documents. Considerable effort is therefore required to search through the relevant files for memoranda of interest. The index to files (compiled by most municipalities), should be consulted.

(b) University departments

Reference is made here to final year undergraduate and Honours theses, projects or seminars, which may deal with local topics. These reports also serve as useful sources of data on minor research issues which are not addressed by the more conventional or advanced literature. An example is work undertaken by final year B.Sc. Mechanical Engineering students at the University of Natal, Durban, on various aspects of an appropriate technology windmill design (for use in rural areas). University departments which are sources of student project information include: history; geography; hydrology;

chemistry; zoology; botany; geology; mechanical/civil/electrical engineering; soil science, and law.

2.2.4 Some printed (or computerized) bibliographies and similar sources available in South Africa

Note: Bibliographies can be found in certain other chapters, as well as in the bibliographic database.

(a) Agriculture

- Anonymous, 1978. Bibliography of South African Government publications, VOL 2, Department of Agricultural Technical Services, Department of Agricultural Economics and Marketing - publications: 1910 - 1972, Department of National Education, Pretoria, 610 p. (See also: Anonymous, 1983. Bibliography of South African Government publications, VOL 2, Department of Agricultural Technical Services and Department of Agricultural Economics and Marketing, Supplement No. 1: 1973 - 1978, Department of National Education, Pretoria. Available on microfiche only).
- Anonymous, 1992. List of available publications of the Directorate of Agricultural Information, 1992, Department of Agricultural Development, Pretoria, 40 p. (The publication is regularly updated and lists printed material - including journals and technical communications - as well as Land Type maps available from the Directorate of Agricultural Information, Private Bag X144, Pretoria, 0001).
- Anonymous, 1993. Cedara biennial report April 1991 - March 1993: Cedara Agricultural Development Institute, Department of Agriculture, Cedara, 57 p. (The report contains details of papers and other material written by staff of the Natal Region of the Department. It should be noted that two previous biennial reports were issued for the period 1987 - 1989 and 1989 - 1991. The first annual report containing a formal bibliography was the following: Abbott, M.A. (ed), 1987. Annual report 1986 - 1987: Department of Agriculture and Water Supply in Natal, Department of Agriculture and Water Supply (Natal Region), Cedara, 45 p. Certain

earlier annual reports also contain bibliographic details of literature written by staff of the Natal Region, although the information is presented in a simplified format).

- Anonymous, 1994. Agricultural research 1993, Department of Agriculture, Pretoria, 226 p. (Each report, first produced in 1959, is published annually and lists various categories of scientific literature written by staff of the Department).
- De Waal, H.O. and Hayes, M.M., 1992. Literatuurlys van proefskrifte, verhandelings, reisverslae, wetenskaplike en semi-wetenskaplike publikasies: Vrystaatstreek 1951 - 1992, Glen Agricultural Development Institute, Department of Agricultural Development, Glen, 40 p.
- Harris, D., 1992. Pasture science research in the Natal Region, 1970 - 1992, Cedara Report No. N/A/92/8, Department of Agricultural Development, Cedara, 118 p. (The publication provides brief details of internal departmental research projects and post graduate theses dealing with the veld and pastures of Natal/KwaZulu. Details of internal departmental research projects for the whole of South Africa are listed by title only, in the Agricultural research series of reports - see above).
- Niemann, P.J., 1983. Bibliography of agricultural literature in the Karoo Region, Karoo Region Agricultural Research Institute, Department of Agriculture, Middelburg, 119 p.

(b) Botany

- Backer, A.P., Killick, D.J.B. and Edwards, D., 1986. A plant ecological bibliography and thesaurus for southern Africa up to 1975, Memoir No. 52, Botanical Survey of South Africa, Botanical Research Institute, Department of Agriculture and Water Supply, Pretoria, 216 p.
- Kerkham, A.S., 1989. Southern African Botanical Literature 1600 - 1988 SABLIT, South African Library, Cape Town, 256 p.

- Moran, V.C. and Moran, P.M., 1982. Alien invasive vascular plants in South African natural and semi-natural environments: bibliography from 1830, South African National Scientific Programmes Report No. 65, Cooperative Scientific Programmes, CSIR, Pretoria, 42 p.

(c) **Energy**

- Blomkamp, Y., 1987. ERI energy thesaurus, ERI Report No. 120, Energy Research Institute, University of Cape Town, Rondebosch, 207 p.
- Blomkamp, Y., 1992. South African renewable energy bibliography: 1975 - 1991, Report No. GER 014, Engineering Research Ltd/Energy Research Institute, University of Cape Town, Rondebosch, various pages.
- Cook, C.E., 1982. Renewable energy technologies: a bibliography, Transkei Development Review, VOL 2(1), p. 117 - 120.

(d) **Environment**

- Bryden, H.B. and De Vos, V., 1994. A scientific bibliography on the national parks of South Africa, Koedoe Supplement 1994, p. 1 - 133. (The bibliography consists of 5 032 entries with reference to the 17 national parks in South Africa controlled by the National Parks Board, primarily in terms of the National Parks Act No. 57 of 1976. The bibliography mainly covers literature from 1944 - 1993).
- Hluhluwe Research Centre Bibliography (lists all bibliographic material of relevance to the Hluhluwe-Umfolozi Game Park), Hluhluwe-Umfolozi Game Park Research Centre, P O Box 25, Mtubatuba, 3935.
- Keep, M.E., 1981. Southern African Wildlife Management Association wildlife bibliography (first supplement: 1972 - 1978), Southern African Wildlife Management Association, [Johannesburg], 78 p.

- Mkuzi Document Collection Bibliography (lists all bibliographic material of relevance to the Mkuzi Game Reserve and environs), Regional Scientist, Mkuzi Game Reserve, Private Bag X550, Mkuze, 3965.
- Speight, A-M., 1972. Game reserves and game protection in Africa (with special reference to South Africa): a bibliography, University of Cape Town Libraries, University of Cape Town, Rondebosch, 32 p.
- Stewart, D.R.M., 1977. Southern African Wildlife Management Association wildlife bibliography, Southern African Wildlife Management Association, Johannesburg, 237 p.
- St Lucia Bibliography (lists all bibliographic material of relevance to the St Lucia Complex including numerical data such as salinity, water levels, wind, rainfall and evaporation), St Lucia Research Laboratory, Private Bag, St Lucia Estuary, 3936. (See Taylor (1987) - below in the section on water bibliographies).

(e) Fire

- Schirge, G.U. and Penderis, A.H., 1978. Fire in South African ecosystems: an annotated bibliography, South African National Scientific Programmes Report No. 33, Cooperative Scientific Programmes, CSIR, Pretoria, 114 p.

(f) Forestry

- Anonymous, 1979. List of publications Aug' 79, Department of Forestry, Pretoria, 44 p.
- Anonymous, 1980. Bibliography of South African Government publications, VOL 6, Department of Forestry 1910 - 1934, 1946 - 1978, Department of National Education, Pretoria. (Available on microfiche only).
- Campbell, B.M., Cowling, R.M., Bond, W. and Kruger, F.J., 1981. Structural characterization of vegetation in the fynbos biome, South African National Scientific Programmes Report No. 52, Cooperative Scientific Programmes, CSIR,

Pretoria, 18 p. (The report examines the structure and classification of fynbos vegetation).

- Geldenhuys, C.J., 1985. Annotated bibliography of South African indigenous Evergreen forest ecology, South African National Scientific Programmes Report No. 107, Foundation for Research Development, CSIR, Pretoria, 125 p.
- Geldenhuys, C.J., Knight, R.S. and Jarman, M.L., 1987. Proforma for structural classification of southern African indigenous forests, Ecosystem Programmes Occasional Report Series No. 21, Foundation for Research Development, CSIR, Pretoria, 15 p. (The report deals with the structure and classification of indigenous forests).
- Geldenhuys, C.J., Knight, R.S., Russell, S. and Jarman, M.L. (eds), 1988. Dictionary of forest structural terminology, South African National Scientific Programmes Report No. 147, Foundation for Research Development, CSIR, Pretoria, 70 p. (The report deals with the structure and classification of indigenous forests).
- Hubbard, J., 1949. South African forestry since 1913: a bibliography, School of Librarianship, University of Cape Town, Rondebosch, 26 p.

(g) General development-orientated activities

- Kok, P., Hagg, G. and Petzsch, E., 1994. Development research in South Africa: an inventory of research activities 1992 - 1994, HSRC Publishers, Pretoria, 56 p. (The publication contains a brief listing of reports and theses written in the survey period. The objective of the publication is to provide a national development research inventory - an as yet embryonic aim not achieved in the document).
- Liebetrau, P., 1994. Publications of the Institute of Natural Resources, Institute of Natural Resources, University of Natal, Pietermaritzburg, 59 p.

(h) Geology

- Anhaeusser, C.R., 1987. Bibliography of theses in the geological sciences submitted to universities in southern Africa 1972 - 1986, Information Circular No. 195, Economic Geology Research Unit, University of the Witwatersrand, Johannesburg, 82 p.
- National Terminology Services of the Department of Arts, Culture, Science and Technology and the Council for Geoscience, 1996. Dictionary of geology: Afrikaans-English, Council for Geoscience of South Africa (Geological Survey), Pretoria, 795 p. (The publication - although not a bibliography - is useful given the technical nature of geological terms).
- Pretorius, D.A., 1972. Bibliography of theses in the geological sciences submitted to universities in southern Africa, Information Circular No. 67, Economic Geology Research Unit, University of the Witwatersrand, Johannesburg, 98 p.

(i) Health

- Anonymous, 1980. Bibliography of South African Government publications, VOL 5, Department of Health 1910 - 1978, Department of National Education, Pretoria. (Available on microfiche only).
- Bowen, J.H., 1995. AIDS/HIV infection: a select bibliography of articles in South African journals; VOL 5: 1993 - 1994, Natal Society Library, Pietermaritzburg, 99 p. (The bibliography was first issued in 1991, in respect of the period 1988 - 1990. The bibliography contains material inter alia on projected disease and death statistics. Deaths in particular, may influence demographic patterns in certain areas and hence the demand for services including water and sanitation. An extensive document collection on AIDS (local and international literature), is housed in the library of the Economic Research Unit, University of Natal, Durban.
- Coetzee, N. and Bourne, D.E., 1996. An atlas of potentially water-related diseases in South Africa, VOL 2: bibliography, WRC Report No. 584/2/96, Water Research Commission, Pretoria, 49 p. (See also, Bourne, D.E. and Coetzee, N., 1996. An

atlas of potentially water-related diseases in South Africa, VOL 1: mortality 1990, WRC Report No. 584/1/96, Water Research Commission, Pretoria, 48 p.).

- Zimmerman, Z., 1967. Bilharzia in Africa south of the Sahara 1958 - 1966: a bibliography compiled by Zea Zimmerman, Department of Bibliography, Librarianship and Typography, University of the Witwatersrand, Johannesburg, 74 p.

(j) **Mining**

- Anonymous, 1989. ICOLD Committee on Mine and Industrial Tailings Dams: tailings dam bibliography, South African National Committee on Large Dams and the International Society of Soil Mechanics and Foundation Engineering, Pretoria, 100 p.

(k) **Non-government organizations**

- Barnard, D.B., 1991. The role of non-governmental organizations in development: a bibliography, Department of Development Administration, University of Stellenbosch, Stellenbosch, 52 p.

(l) **Planning and the urban environment**

- Anonymous, 1972. Planning bibliography, Department of Planning, Pretoria, 347 p. (The publication is a general bibliography covering many aspects including water quality and soil erosion in South Africa).
- Kühn, R., 1994. A guide to the literature on Pietermaritzburg and surrounds, University of Natal Library Publication Series No. 9, University of Natal, Pietermaritzburg, 70 p. (The guide lists unpublished and published material covering a range of topics such as agriculture, the environment, town planning and demography).
- Merrett, C., 1977. A selected annotated bibliography of Natal maps, Natal Society Library, Pietermaritzburg, no pagination.

- Merrett, C.E., 1979. A Selected Bibliography of Natal Maps, 1800 - 1977, G.K. Hall, Boston, 226 p.
- Oosthuizen, A.J.G. and Boon, G.F., 1976. *Bronnelys van navorsing onderneem vir stedelike beplanning en ontwikkeling 1970 tot 1974*, Instituut vir Stedelike Studies, Rand Afrikaans University, Johannesburg, various pages.
- Piper, S.E. and Broderick, D.M., 1989. A preliminary annotated bibliography and directory of remote sensing in southern Africa, Department of Surveying and Mapping, University of Natal, Durban, various pages. (The publication lists maps and images which are available, and is a most useful source document).
- Preston-Whyte, R.A. (ed), [1986]. Urbanization research register for the Greater Durban area, Department of Geographical and Environmental Sciences, University of Natal, Durban, 125 p. (The document lists unpublished and published material including theses and journal papers written by staff and students of the University of Natal, Durban. A broad array of information is covered, ranging from climate to sociology).
- Sutcliffe, M., 1989. Informal settlements in Natal-KwaZulu: a research register, Department of Town and Regional Planning, University of Natal, Durban, 69 p. (The document provides a useful overview of numerous unpublished and a few published reports on urbanization).
- Walker, A., 1988. Urbanization in South Africa, Southern African Update: a Bibliographical Survey, VOL 3(2), p. 13 - 28. (The paper is a useful bibliography on urbanization in South Africa).
- Watts, H.L. (ed), 1991. Urbanization research register relating to urban life and urban problems and processes within the Durban Functional Region, VOL 2, Department of Sociology, University of Natal, Durban, 146 p. (The publication contains a wide range of information, as per Preston-Whyte [1986] - above).

(m) Soil erosion

- Anonymous, 1979. Publications and reports of the Soil and Irrigation Research Institute 1904 - 1979, SIRI Report No. 930/295/79, Soil and Irrigation Research Institute, Department of Agricultural Technical Services, Pretoria, 142 p. (The bibliography was revised and re-issued in 1982 - see below).
- Anonymous, 1982. Publications and reports of the Soil and Irrigation Research Institute 1904 - 1970, SIRI Report No. 985/164/82, Soil and Irrigation Research Institute, Department of Agriculture, Pretoria, 115 p.
- Anonymous, 1982. Publications and reports of the Soil and Irrigation Research Institute 1971 - 1980, SIRI Report No. 986/165/82, Soil and Irrigation Research Institute, Department of Agriculture, Pretoria, 49 p.
- Anonymous, 1982. Supplement to: Publications and reports of the Soil and Irrigation Research Institute 1981 - 1982, SIRI Report No. 986/165/82, Soil and Irrigation Research Institute, Department of Agriculture, Pretoria, 23 p.
- Anonymous, 1992. Supplement to: Publications and reports of the Institute for Soil, Climate and Water 1983 - 1992, Agricultural Research Council, Pretoria, 36 p. (Only available in the form of a computer print-out).
- Burger, P.J. and Düvel, G.H., 1974. Extension research in the Republic of South Africa: summaries of research projects completed in the Department of Agrarian Extension of the University of Pretoria, 1959 - 1972, Department of Agricultural Technical Services, Pretoria, 90 p. (The publication should be consulted for details of higher degree theses undertaken in the Department of Agrarian Extension at the University of Pretoria. The theses listed may contain - as part of a general agronomic survey of a particular area - data relating to soil erosion and associated issues).
- Harmse Von M., H.J., Van der Watt, H. v. H., Van Rooyen, T.H. and Burger, R. du T., 1984. Glossary of soil science terms, Soil Science Society of South Africa,

Pretoria, 140 p. (Although not a bibliography, the publication is highly recommended as a primary source document).

- Hart, E., 1960. Soil conservation in South Africa 1946 - 1959: a bibliography, School of Librarianship, University of Cape Town, Rondebosch, 51 p. + app.
- Hoffman, M.T., 1994. Bibliography of southern Africa's arid zone up to 1993, National Botanical Institute, Cape Town. (The bibliography consists of two diskettes).
- Weaver, A., 1989. Bibliography on soil erosion and sediment production research in southern Africa, S.A.A.G. Occasional Publication No. 1, Department of Geography, Rhodes University, Grahamstown, 29 p.
- Wilcocks, J.R.N. and Tyson, P.D., 1976. Bibliography on desert encroachment in southern Africa, In: Paylore, P. (ed), Desertification: a World Bibliography, Office of Arid Lands Studies, University of Arizona, Tucson, p. 227 - 272.

(n) South African spatio-temporal databases

- Macdonald, I.A.W., Pressinger, F.M. and Tennant, M.A.C., 1989. List of South African spatio-temporal databases of relevance to the International Geosphere-Biosphere Programme, Ecosystem Programmes Occasional Report Series No. 43, Foundation for Research Development, CSIR, Pretoria, 95 p.

(o) Waste disposal

- Anonymous, 1992. Waste management glossary, Institute of Waste Management (Southern Africa), Johannesburg, 81 p. (The publication contains about 500 terms in English and Afrikaans with definitions or descriptions. The information is of use for general scientific and bibliographic purposes).
- Pretorius, M.M., 1989. Selected bibliography on wastes 1986 - 1989, Report No. DIS-A2, Division of Information Services, CSIR, Pretoria, 45 p.

(p) Water in general (including the marine environment, as well as organisms living in or associated with water)

- Addis, B.J. and Bekker, L.C., 1988. Concrete Dictionary/Betonwoordeboek, Portland Cement Institute, Midrand, 161 p. (The publication is useful for construction and engineering reference purposes).
- Alcock, P.G., 1989. The WATSNU literature database, Department of Economics, University of Natal, Pietermaritzburg, 37 p. (A shortened version of the bibliography was published as Alcock, P.G., 1993. Water and sanitation in KwaZulu: the WATSNU literature database, Southern African Update: a Bibliographical Survey, VOL 8(1), p. 58 - 99).
- Anonymous, undated. List of publications - NIWR, [Report No.] A 15, National Institute for Water Research, CSIR, Pretoria, 87 p.
- Anonymous, 1970. Index to CSIR publications 1945 - 1968, CSIR, Pretoria, 455 p.
- Anonymous, 1979. Bibliography of South African Government publications, VOL 3, Department of Water Affairs 1910 - 1978, Department of National Education, Pretoria. (Available on microfiche only).
- Anonymous, 1981. Bibliography of South African Government publications, VOL 11, Sea Fisheries Branch, Department of Industries 1920 - March 1980, Department of National Education, Pretoria. (Available on microfiche only).
- Anonymous, 1990. Directory of wetlands of international importance: sites designated for the List of Wetlands of International Importance, prepared by the World Conservation Monitoring Centre for the Fourth Meeting of the Conference of Contracting Parties to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Montreux, Switzerland, June - July 1990, Ramsar Convention Bureau, IUCN, Gland, Switzerland, 796 p. (The publication is available in the Life Sciences Library, University of Natal, Pietermaritzburg).

- Barraclough, C., 1991. Bibliography of the St Lucia and Maputaland marine reserves: a foundation study, B. Bibl. (Hons) Thesis, Department of Library and Information Science, University of Natal, Pietermaritzburg, 62 p.
- Brown, A.C., 1985. Bibliography of marine biology in South Africa: a supplement to the 1980 edition, South African National Scientific Programmes Report No. 103, Foundation for Research Development, CSIR, Pretoria, 83 p.
- Bruton, M.N. and Merron, S.V., 1985. Alien and translocated aquatic animals in southern Africa: a general introduction, checklist and bibliography, South African National Scientific Programmes Report No. 113, Foundation for Research Development, CSIR, Pretoria, 71 p.
- Burdecka, J.M., 1972. Bibliography of regional meteorological literature: VOL 2, southern Africa, 1948 - 1960, Report No. WB 34, Weather Bureau, Department of Transport, Pretoria, 388 p.
- Burdecka, J.M., 1975. Bibliography of regional meteorological literature: VOL 4, Republic of South Africa and adjacent territories, 1960 - 1972, Report No. WB 37, Weather Bureau, Department of Transport, Pretoria, 249 p.
- Burgis, M.J. and Symoens, J.J. (eds), 1987. African wetlands and shallow water bodies: directory, Collection Travaux et Documents No. 211, Institut Français de Recherche Scientifique pour le Développement en Coopération, Paris, 650 p. (The directory gives brief details of some physical, chemical and biological aspects of important wetlands. See Davies and Gasse (1988) - below. The publication is available in the Life Sciences Library, University of Natal, Pietermaritzburg).
- Coetzer, C.C., 1989. Bibliography on African limnology south of the Sahara, No. 42, Limnological Society of Southern Africa, [Pretoria], 21 p. (This issue is the final in the series, which began some 25 years ago. Part of the bibliography was published in a local journal. See: Jacot Guillarmod, A., 1975. Limnological bibliography for Africa south of the Sahara, Journal of the Limnological Society of Southern Africa, VOL 1(1), p. 37 - 51. The bibliography was subsequently incorporated into the FISHLIT database maintained by the J L B Smith Institute of

Ichthyology, Rhodes University, Grahamstown; and the WATERLIT database of the South African Water Information Centre, Division of Information Services, CSIR, Pretoria. See Table B7).

- Coke, M., 1990. A bibliography of official Natal fisheries reports 1889 - 1989, Natal Parks Board, Pietermaritzburg, 86 p. (The publication contains several references on water quality).
- Darracott, D.A. and Brown, A.C., 1980. Bibliography of marine biology in South Africa, South African National Scientific Programmes Report No. 41, Cooperative Scientific Programmes, CSIR, Pretoria, 239 p.
- Darracott, D.A. and Cloete, C.E., 1976. Bibliography on marine pollution in South Africa, South African National Scientific Programmes Report No. 5, National Scientific Programmes Unit, CSIR, Pretoria, 131 p.
- Davies, B. and Gasse, F. (eds), 1988. African wetlands and shallow water bodies: bibliography, Collection Travaux et Documents No. 211, Institut Français de Recherche Scientifique pour le Développement en Coopération, Paris, 502 p. (The publication is available in the Life Sciences Library, University of Natal, Pietermaritzburg).
- Davies, B.R., Davies, T., Frazer, J. and Chutter, F.M., 1982. A bibliography of African inland water invertebrates (to 1980), South African National Scientific Programmes Report No. 58, Cooperative Scientific Programmes, CSIR, Pretoria, 418 p. (The publication contains references on water quality *inter alia* in southern Africa, as well as material on Schistosoma and schistosomiasis host snails, plus various disease vectors in southern Africa).
- Davies, B.R. and Terry, S., 1979. A selected bibliography of articles and reports pertaining to the ecological impact of man-made lakes in South Africa, Institute for Freshwater Studies, Rhodes University, Grahamstown, 7 p.
- Gerber, A., 1968. Sondistillasie van brakwater: 'n literaturopname met spesiale verwysing na die gebruik van direkte distillasie-eenhede, 28th Meeting of the

Steering Committee for Water Research in S.W.A., Project No. 904, Code No. 6321/9904, S.W.A. Regional Laboratory, National Institute for Water Research, CSIR, Windhoek, various pages.

- Harmse, J.T., Olivier, P.G. and Goudie, A.S., 1990. A bibliography on pans and related deposits, University Press, Rand Afrikaans University, Johannesburg, 60 p. (The publication refers inter alia to pans in southern Africa).
- Kalley, J.A., 1987. South Africa by treaty 1806 - 1986: a chronological and subject index, Bibliographical Series No. 16, South African Institute of International Affairs, Johannesburg, 513 p. (The publication contains brief details of a wide range of treaties entered into by South Africa - including water treaties. See also, Schoeman, E., 1992. South Africa's foreign relations in transition 1985 - 1991: a select and annotated bibliography, Bibliographical Series No. 23, South African Institute of International Affairs, Johannesburg, 398 p., as well as Andor, L.E., 1993. The small and the new in southern Africa - the foreign relations of Botswana, Lesotho, Namibia and Swaziland since their independence: a select and annotated bibliography, Bibliographical Series No. 25, South African Institute of International Affairs, Johannesburg, 526 p.).
- [Kalley, J.A. and Schoeman, E.], 1988. Water resources in select southern African states: Angola, Lesotho, Mozambique, Namibia and Zimbabwe, Southern African Update: a Bibliographical Survey, VOL 3(1), p. 51 - 63. (The paper is a useful bibliography on water issues in southern Africa).
- Kok, T.S., 1981. Bibliography of publications and theses on southern African ground-water subjects, Technical Report No. Gh 3160, Directorate of Geohydrology, Department of Water Affairs, Forestry and Environmental Conservation, Pretoria, 22 p.
- Kok, T.S., 1989. A bibliography of reports and publications relating to ground-water studies in Natal and KwaZulu, Technical Report No. Gh 3661, Directorate of Geohydrology, Department of Water Affairs, Pretoria, 3 p.

- Lancaster, F.H., 1982. Lists of reports and publications, National Research Institute for Oceanology, CSIR, Stellenbosch, 103 p.
- Leistner, O.A., 1986. Flora of southern Africa: register and bibliography of freshwater algae (Chlorophyceae), Project Report No. PL.7111/01/1/15, Department of Agriculture and Water Supply, Pretoria.
- Louw, D.F. (ed), 1981. Watertegnologieterne/Water technology terms, CSIR, Pretoria, 70 p. (Although not a bibliography, the publication is useful for general scientific and bibliographic work. The following may also be relevant: Louw, D.F. (ed), 1991. The new chemistry dictionary/Die nuwe chemiewoordeboek, Part 1 (Engels-Afrikaans), various pages, and Part 2 (Afrikaans-English), various pages, National Terminology Services, Department of National Education, Pretoria. The dictionary contains approximately 32 000 English terms with their Afrikaans equivalents. A list of other technical Afrikaans-English dictionaries is presented in Part 2. It should be noted that the National Terminology Services operates the (computerized) National Term Bank, for the standardization of terminology in many scientific and other disciplines with particular reference to Afrikaans/English).
- McQuaid, C.D., 1989. A bibliography and analysis of trends in marine littoral research in South Africa, 1983 - 1988, South African Journal of Science, VOL 85(7), p. 440 - 446.
- O'Keeffe, J. and Coetzee, Y., 1996. Status report on the Kruger National Park rivers research programme: a synthesis of results and assessment of progress to January 1996, WRC Report No. 711/1/96, Water Research Commission, Pretoria, 63 p. (The publication lists various formal reports and other documents as well as data-sets pertaining to the KNPRRP data catalogue. See Table B7).
- O'Keeffe, J.H. and O'Keeffe, C., 1986. An annotated bibliography of ecological research on South African rivers, Ecosystem Programmes Occasional Report Series No. 10, Foundation for Research Development, CSIR, Pretoria, 184 p.
- Petitjean, M.O.G. and Davies, B.R., 1988. A review of the ecological and environmental impacts of inter-basin water transfer schemes in southern Africa:

synthesis (Part 1) and international bibliography (Part 2), Ecosystem Programmes Occasional Report Series No. 38, Foundation for Research Development, CSIR, Pretoria, 106 p.

- Pretorius, M.M. (ed), 1983. Indexing for the WATERLIT data base: a practical manual, South African Water Information Centre, CSIR, Pretoria, 16 p.
- Taylor, R.H., 1987. Lake St Lucia bibliography, St Lucia Research Series No. 2, Natal Parks Board, St Lucia Estuary, 40 p.
- Thompson, K., Howard-Williams, C. and Mitchell, D., 1985. Chapter 10. A cross-indexed bibliography of African wetland plants and vegetation, In: Denny, P. (ed), The Ecology and Management of African Wetland Vegetation: a Botanical Account of African Swamps and Shallow Waterbodies, GeoBotany VOL 6, W. Junk, Dordrecht, p. 237 - 307.
- Van der Walt, M.M., Cowan, G.I., Erasmus, A. and Marneweck, G.C., 1996. Wetland bibliography for South Africa, South African Wetlands Conservation Programme Series, Department of Environmental Affairs and Tourism, Pretoria, 136 p. (The bibliography contains over 3 300 entries).
- Van Niekerk, J.P., 1984. A bibliographical guide to South African shipping legislation, Modern Business Law, VOL 6(3), p. 176 - 180.
- Van Niekerk, J.P., 1992. An updated bibliographical guide to South African shipping legislation, SA Mercantile Law Journal, VOL 4(1), p. 69 - 83.
- Venter, R.J., 1950. Bibliography of regional meteorological literature: VOL 1, southern Africa, 1486 - 1948, Report No. WB 12, Weather Bureau, Department of Transport, Pretoria, 412 p.
- Whitfield, A.K., 1991. A bibliography of southern African estuarine research (1950 - 1990), Investigational Report No. 36, J.L.B. Smith Institute of Ichthyology, Rhodes University, Grahamstown, 75 p.

- Whitfield, A.K., 1995. Available scientific information on individual South African estuarine systems, WRC Report No. 577/1/95, Water Research Commission, Pretoria, 204 p. (The publication includes a bibliography covering most South African "estuaries". A total of 1 369 entries is listed. The bibliography is also available on a floppy or a stiffy diskette).
- Whitfield, A.K. and Allanson, B.R., 1985. A bibliography of South African estuarine research (1950 - 1984), Institute for Freshwater Studies, Rhodes University, Grahamstown, no pagination.

(q) Other bibliographies

- Anonymous, 1969. Bibliography of South African Government publications, Department of Statistics 1910 - 1968, Department of Cultural Affairs, Pretoria, 123 p. (See also: Anonymous, 1978. Bibliography of South African Government publications, Department of Statistics 1969 - 1977, supplement, Department of National Education, Pretoria. Available on microfiche only).
- Kotze, D.A., 1983. Bibliography of Official Publications of the Black South African Homelands, University of South Africa, Pretoria, 119 p.
- Scott, P.E. and Staff Members of the Department of National Education Library Services Branch, 1979. Bibliography of South African Government publications, VOL 4, Reports of Commissions and Committees of Inquiry 1910 - 1976, Department of National Education, Pretoria, 46 p.

2.2.5 Government reports

Various categories of Government reports are examined below. Table B8 provides information on Commissions and Committees of Inquiry, while Manuscript Annexures to Minutes of Proceedings (of Parliament) are outlined in Table B9. Some Select Committee reports are then listed in Table B10. Certain White Papers are described in Table B11. Details of White Papers specifically concerning water projects in Natal/KwaZulu are provided in Table B12.

Table B8: Some central Government and Natal Provincial Commissions and Committees of Inquiry, 1917 - 1986:

Commission/Committee	Chairman (author)	Date, report number and details
Committee... Administration of Areas Which are Becoming Urbanised But Which are Not Under Local Government Control	Thornton, Sir E.N.	1940; UG 8/1940, Report (includes a chapter on water supplies in Natal), 96 p.
Committee... Afforestation and Water Supplies in South Africa (Department of Forestry)	Malherbe, H.L.	1968; Report of the Inter- departmental Committee of Investigation, 132 p.
Commission... Agriculture	Marais, M.D. Marais, M.D. Du Plessis, S.J.	1968; RP 61/1968, Interim report (on drought), 100 p. and map 1970; RP 84/1970, Second report (includes a chapter on water and irrigation), 234 p. 1972; RP 19/1972, Third (final) report (includes a chapter on State aid to agriculture - drought and flood relief, conservation, etc.), 221 p.
Commission... Air Pollution Prevention Bill (A.B. 29-'61)	Steyn, F.S.	1962; RP 70/1962, Report, 70 p.
Commission... Alleged Threat to Animal and Plant Life in St Lucia Lake (Department of Water Affairs)	Kriel, J.P.	1966; Report, 371 p. and maps
Commission... Allocation of Quotas for the Exploitation of Living Marine Resources (See also: White Paper on the report, No. WP M/1986)	Diemont, M.A.	1986; RP 91/1986, Report, 110 p.
Commission... Conservation and Utilisation of the Living Marine Resources of the Republic of South Africa	Treurnicht, N.F.	1980; RP 93/1980, Report, 59 p.
Committee... Conservation of Mountain Catchments in South Africa (Department of Agricultural Technical Services)	Ross, J.C.	1961; Report of the Interdepart- mental Committee, 79 p. and map

Table B8: Some central Government and Natal Provincial Commissions and Committees of Inquiry, 1917 - 1986 (continued).

Commission/Committee	Chairman (author)	Date, report number and details
Commission... Control and Supply of Water in the Area of the Umgeni Water Board and the Areas of the North Coast and Amanzimtoti Regional Water Services Corporations	Levitt, R.E.	1977; Report, 72 p. + app.
Committee... Creation of Research Facilities for the Pongolapoort-Makatini Flats Area (Department of Agricultural Technical Services)	Adler, E.	1961; Report, various pages and maps
Committee... Desert Encroachment	Van der Merwe, C.R.	1951; UG 59/1951, Report, 27 p. and maps, with supplement
Commission... Disposal of Containers Bill (W111-77)	Hoon, J.H.	1978; RP 121/1978, Report, 18 p.
Committee... Division of Water Between the Black States, the Remainder of the Republic of South Africa and the Republics of Bophuthatswana and Transkei	Kriel, J.P.	1979; RP 109/1979, Report of the Interdepartmental Committee, 227 p. and maps
Commission... Drought Investigation	Davel-du Toit, H.S. Davel-du Toit, H.S.	1922; UG 20/1922, Interim report of the Drought Investigation Commission, 29 p. and map 1923; UG 49/1923, Final report of the Drought Investigation Commission, 222 p. and 33 maps
Commission... Environmental Legislation	Hoon, J.H.	1982; RP 10/1982, Report, 21 p.
Commission... Fishing Industry	Du Plessis, C.G.	1972; RP 47/1972, Report: The utilisation of the fish and other living marine resources of South Africa and South West Africa, 173 p. and map
Commission... Flood and Drought Distress Relief	Gie, J.G. Gie, J.G. Gie, J.G.	First report (Annexure 163 - 1917) Second report (Annexure 482 - 1917) Third report (Annexure 152 - 1918)

Table B8: Some central Government and Natal Provincial Commissions and Committees of Inquiry, 1917 - 1986 (continued).

Commission/Committee	Chairman (author)	Date, report number and details
Commission... Fluoridation	McKenzie, W.J.	1967; RP 17/1967, Report, 174 p. and map
Commission... Game Reserves	Power, W.M.	1935; Report of the Game Reserves Commission, Natal Provincial Administration, Pietermaritzburg, 27 p. and map
Commission... History of the Pongola Settlement and the Future Policy to be Adopted in Regard to That Settlement	Warner, T.A.	1944; UG 11/1944, Report, 6 p.
Committee... Incorporation of East Griqualand into Natal	Steyn, M.T.	1976; Report, Cape Provincial Administration, Cape Town and the Natal Provincial Administration, Pietermaritzburg, 172 p. and map
Commission... Irrigation	Van Reenen, R.J.	1926; UG 30/1926, First report of the Special Irrigation Commission (only report issued), 51 p.
Commission... Irrigation Finance	Fourie, A.P.J. Fourie, A.P.J. Fourie, A.P.J. Cross, G.	1925; UG 29/1925, First report, 27 p. 1925; UG 44/1925, Second report, 108 p. and map 1926; UG 15/1926, Third and final report, 28 p. 1948; UG 40/1948, Report of the Irrigation Finance Commission, 136 p.
Committee... Margate Water Supply	Britten, H.	1938; Report of the Margate Water Supply Enquiry Committee, Natal Provincial Administration, Pietermaritzburg, various pages
Commission... Native Economic Commission, 1930 - 1932	-	1932; UG 22/1932, Report, 345 p.
Committee... Oil Pollution	Mallory, J.E.	Interim report of the Ad Hoc Committee for Oil Pollution (Annexure 1007 - 1968)
Committee... Reconstruction of Agriculture (Department of Agriculture and Forestry)	Viljoen, P.R.	1944; Report of the Reconstruction Committee, 50 p.

Table B8: Some central Government and Natal Provincial Commissions and Committees of Inquiry, 1917 - 1986 (continued).

Commission/Committee	Chairman (author)	Date, report number and details
Committee... Soil Erosion	Lund, C.L.	1918; Report of the Soil Erosion Committee, Natal Provincial Administration, Pietermaritzburg, 7 p.
Committee... Soil Erosion (Department of Agriculture and Forestry)	Cleghorne, J.W.	1941; Report of the Departmental Soil Erosion Committee, 111 p.
Commission... Water Laws of the Union	Hall, C.G.	1952; UG 11/1952, Report, 122 p. and map
Commission... Water Matters	Du Toit Viljoen, S.P.	1970; RP 34/1970, Report, 169 p. and maps
Committee... Zululand Reserves and Parks	Power, W.M.	1937; Report of the Zululand Game Reserves and Parks Committee, Natal Provincial Administration, Pietermaritzburg, 8 p. and map
Conference on Soil Erosion	-	Proceedings and resolutions adopted (Annexure 139 - 1930)
Hluhluwe Game Reserve	Henkel, J.S.	1937; Report on the plant and animal ecology of the Hluhluwe Game Reserve with special reference to tsetse flies, Natal Provincial Administration, Pietermaritzburg, 35 p. and map

Source: After Buckley, D.J., 1991. Unpublished document, Natal Society Library, Pietermaritzburg.

- See also:**
- (i) Scott, P.E. and Staff Members of the Department of National Education Library Services Branch, 1979. Bibliography of South African Government publications, VOL 4, Reports of Commissions and Committees of Inquiry 1910 - 1976, Department of National Education, Pretoria, 46 p.
 - (ii) Anonymous, 1976. Province of Natal: Minutes of the Provincial Council, Natal Provincial Council, Pietermaritzburg, 159 p. + app. (The latest bound issue of the Minutes is provided by way of example). Such Minutes were published annually in the period 1911 - 1976 inclusive. The Minutes give useful background data on Natal Provincial Government departments, as well as budgets and Commissions and Committees of Inquiry. (Refer to the particular year in question for a given Commission or Committee of Inquiry). The relevant Cape Provincial publication (the latest bound example held in the Natal Society Library) is, Anonymous, 1974. Province of

the Cape of Good Hope: Minutes of the Provincial Council, Cape Provincial Council, Cape Town, 148 p.

- (iii) Anonymous, 1963. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, 1910 - 1961, House of Assembly, Cape Town, 631 p.
- (iv) Anonymous, 1975. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, Part 2 1962 - 1971, House of Assembly, Cape Town, 340 p.
- (v) Anonymous, 1981. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, Part 3 1972 - 1980, House of Assembly, Cape Town, 269 p.
- (vi) Anonymous, 1991. Index to the Manuscript Annexures and printed papers of Parliament including Committee reports, Bills, Principal Motions and Resolutions, Commission reports [and] names of Chairmen of Commissions, Part 4 1981 - 1990, Parliament, Cape Town, 344 p.

Note:

- (i) Certain changes have been made to the bibliographic format in the above table, to facilitate layout.
- (ii) Several Commissions and Committees of Inquiry reports are listed in the bibliographic database.
- (iii) Reports with a specific report number were published by the Government Printer, Private Bag X85, Pretoria, 0001. Unpublished Manuscript Annexures can be examined in the Library of Parliament, P O Box 18, Cape Town, 8000. Reports of Committees of Inquiry, which were not published by the Government Printer, or were published in some other form, can be obtained from the department in question, or its successor. Committees of Inquiry are appointed by the relevant Minister, whereas Commissions of Inquiry were appointed by the (then) Governor-General/Prime Minister, and now by the State President.

Table B9: Reports by the Director of Irrigation and the Irrigation Commission on water projects in Natal, submitted to the House of Assembly as Manuscript Annexures to Minutes of Proceedings.

Details	Annexure number
Ivala, Mooi River, Greytown	Annexure 411 - 1942
Mkuzi, Zululand	Annexure 340 - 1935
Mkuzi Falls, Magut (petition of J. Kunzmann and others)	Annexure 252 - 1940/1941
Nkwaleni, Eshowe	Annexure 283 - 1935
Pongola	Annexure 338 - 1931/1932
Umfuli River, Zululand	Annexure 366 - 1943; 379 - 1948

Source: After Buckley, D.J., 1991. Unpublished document, Natal Society Library, Pietermaritzburg.

- See also:**
- (i) Anonymous, 1963. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, 1910 - 1961, House of Assembly, Cape Town, 631 p.
 - (ii) Anonymous, 1975. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, Part 2 1962 - 1971, House of Assembly, Cape Town, 340 p.
 - (iii) Anonymous, 1981. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, Part 3 1972 - 1980, House of Assembly, Cape Town, 269 p.
 - (iv) Anonymous, 1991. Index to the Manuscript Annexures and printed papers of Parliament including Committee reports, Bills, Principal Motions and Resolutions, Commission reports [and] names of Chairmen of Commissions, Part 4 1981 - 1990, Parliament, Cape Town, 344 p.

Note: The irrigation reports were not published. Brief details can be obtained from Anonymous (1963 - 1991, above). The actual Manuscript Annexures can be examined in the Library of Parliament, P O Box 18, Cape Town, 8000.

Table B10: Some Select Committee reports, 1914 - 1984.

Select Committee	Date, report number and details
Select Committee... Atmospheric Pollution Prevention Bill	1961; SC 7/1961, Report, 109 p.
Select Committee... Drought Distress Relief	1916; SC 3/1916, Report, 139 p.
Select Committee... Droughts, Rainfall and Soil Erosion	1914; SC 2/1914, Report, proceedings of the committee, minutes of evidence and appendix, 55 p. + app.
Select Committee... Forest Amendment Bill	1978; SC 12/1978, Proceedings and evidence, 123 p.
Select Committee... Irrigation Matters	1932; SC 10/1932, Report (includes a discussion on the Pongola Irrigation Project, Natal), 107 p.
Select Committee... Water Amendment Bill	1972; SC 7/1972, Original evidence, 42 p. 1975; SC 6/1975, Proceedings and original evidence, 30 p. 1980; SC 8/1980, Proceedings and evidence, 119 p. 1983; SC 14/1983, Report, proceedings and evidence, 33 p. 1984; SC 11/1984, Report, proceedings and evidence, 140 p.
Select Committee... Water Bill	1955; SC 8/1955, Report, 106 p. 1956; SC 7/1956, Report, 39 p.

Source: After Buckley, D.J., 1991. Unpublished document, Natal Society Library, Pietermaritzburg.

- See also:**
- (i) Anonymous, 1963. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, 1910 - 1961, House of Assembly, Cape Town, 631 p.
 - (ii) Anonymous, 1975. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, Part 2 1962 - 1971, House of Assembly, Cape Town, 340 p.
 - (iii) Anonymous, 1981. Index to the Manuscript Annexures and printed papers of the House of Assembly, including Select Committee reports and Bills and also to Principal Motions and Resolutions and Commission reports, Part 3 1972 - 1980, House of Assembly, Cape Town, 269 p.

- (iv) Anonymous, 1991. Index to the Manuscript Annexures and printed papers of Parliament including Committee reports, Bills, Principal Motions and Resolutions, Commission reports [and] names of Chairmen of Commissions, Part 4 1981 - 1990, Parliament, Cape Town, 344 p.

Note:

- (i) Certain changes have been made to the bibliographic format in the above table, to facilitate layout.
- (ii) All reports were published by the Government Printer, Private Bag X85, Pretoria, 0001.

Table B11: Some White Papers on Government policy, 1980 - 1991.

Origin	Title of White Paper and number of pages	Date and report number
Department of Environment Affairs	White Paper on the Policy on Water Tariffs and Related Matters, 16 p.	1984; WP N/1984
	White Paper on Environmental Education, 8 p.	1989; WP F/1989
Department of Mineral and Energy Affairs	Draft White Paper on the Energy Policy of the Republic of South Africa, 30 p.	1985
	White Paper on the Energy Policy of the Republic of South Africa, 14 p.	1986; WP L/1986
Department of Water Affairs, Forestry and Environmental Conservation	White Paper on a National Policy Regarding Environmental Conservation, 13 p.	1980; WP O/1980
Government Printer	White Paper on the Mineral Policy of the Republic of South Africa, 19 p.	1986; WP J/1986
	White Paper on Land Reform, 24 p.	1991; WP B/1991

Source: After Buckley, D.J., 1991. Unpublished document, Natal Society Library, Pietermaritzburg.

See also: Anonymous, 1995. Summaries of relevant White Papers, Green Papers and discussion documents published by the South African Government, Seneque Maughan-Brown SWK, Durban, 32 p. (The publication mainly refers to the period 1994 - 1995. Topics covered include agriculture, the environment, housing and water as well as sanitation).

Note:

- (i) Certain changes have been made to the bibliographic format in the above table, to facilitate layout.
- (ii) All White Papers were published by the Government Printer, Private Bag X85, Pretoria, 0001.

- (iii) Some White Papers as well as relevant President's Council reports are listed in the bibliographic database.

Table B12: Department of Water Affairs and Forestry White Papers on projects in Natal/KwaZulu, 1958 - 1990.

Area/river	Approximate title of White Paper and number of pages	Date and report number
Hammarsdale	Hammarsdale water supply and effluent disposal scheme, 6 p.	1962; WP S/1962
	Hammarsdale water supply and effluent disposal scheme: supplementary report, 4 p.	1965; WP M/1965
	Hammarsdale water supply and effluent disposal scheme: second supplementary report, 4 p.	1966; WP T/1966
	Hammarsdale (Elangeni) effluent disposal works: proposed extension, 6 p.	1975; WP C/1975
	Hammarsdale water supply scheme: extension, 10 p.	1976; WP O/1976
	Hammarsdale (Elangeni) effluent disposal works: phase one extension: supplementary report, 8 p.	1977; WP N/1977
	Hammarsdale (Elangeni) effluent disposal works: extension: second supplementary report, 9 p.	1978; WP M/1978
Hluhluwe	Hluhluwe River Government water work (Hluhluwe Dam), 7 p.	1961; WP U/1961
	Hluhluwe River regional Government water supply scheme, 4 p.	1966; WP Y/1966
Ladysmith	Ladysmith flood control scheme (Mount Pleasant Dam), 17 p.	1990; WP C/1990
Mdloti	Mdloti River Government water work, Hazelmere Dam, 18 p.	1971; WP K/1971
	Mdloti River Government water work, Hazelmere Dam: first supplementary report, 8 p.	1974; WP O/1974
	Mdloti River Government water work, Hazelmere Dam: second supplementary report, 17 p.	1978; WP L/1978

Table B12: Department of Water Affairs and Forestry White Papers on projects in Natal/KwaZulu, 1958 - 1990 (continued).

Area/river	Approximate title of White Paper and number of pages	Date and report number
Mhlatuze	Mhlatuze River Government water scheme, Goedertrouw Dam, 20 p.	1973; WP Q/1973
	Mhlatuze River Government water scheme, Goedertrouw Dam: first supplementary report, 14 p.	1979; WP O/1979
	Mhlatuze River Government water scheme, Goedertrouw Dam: second supplementary report, 6 p.	1982; WP G/1982
Mnyamvubu	Mnyamvubu River Government water scheme, 6 p.	1960; WP G/1960
Mooi-Mgeni	Mooi-Mgeni rivers Government water scheme (emergency augmentation of Mgeni River), 9 p.	1983; WP N/1983
Ngagane	Ngagane Government water scheme, Newcastle District (Chelmsford Dam), [?] p.	1958; WP E/1958
	Ngagane Government regional water supply scheme, 4 p.	1962; WP M/1962
	Ngagane Government regional water supply scheme: supplementary report, 4 p.	1965; WP H/1965
	Ngagane regional water supply scheme (second phase), 4 p. and map	1968; WP DD/1968
	Ngagane Government regional water supply scheme: third phase, 15 p.	1971; WP M/1971
	Ngagane River Government water scheme: fourth phase (raising of the Chelmsford Dam and extension of purification works), 12 p.	1975; WP H/1975
	Ngagane River Government water scheme: fourth phase (raising of the Chelmsford Dam and extension of purification works): first supplementary report, 6 p.	1982; WP H/1982
	Ngagane River Government water scheme (Buffalo River diversion), 8 p.	1983; WP M/1983
Nkwaleni	Nkwaleni Irrigation Board scheme (proposed betterments), 6 p. and map	1961; WP G/1961
Northern Natal	Water pollution control works at abandoned coal mines in northern Natal, 12 p.	1987; WP E/1987
Pongolapoort-Makatini Flats	Pongolapoort-Makatini Flats Government water scheme, 16 p.	1960; WP F/1960

Table B12: Department of Water Affairs and Forestry White Papers on projects in Natal/KwaZulu, 1958 - 1990 (continued).

Area/river	Approximate title of White Paper and number of pages	Date and report number
Slang	Slang River Government water scheme (Zaaihoek Dam), 20 p.	1985; WP F/1985
	Slang River Government water scheme (Zaaihoek Dam): first supplementary report, 20 p.	1986; WP E/1986
Tugela-Vaal	Development of the Tugela River at the proposed Spioenkop Dam, 8 p.	1967; WP X/1967
	Tugela-Vaal Government water work, 10 p.	1969; WP U/1969
	Elands River Government water work (Tugela-Vaal project - Sterkfontein Dam), 6 p.	1970; WP F/1970
	Tugela-Vaal Government water project: supplementary report, 12 p.	1970; WP W/1970
	Tugela-Vaal Government water project: 2nd supplementary report, 10 p.	1974; WP H/1974
	Second phase of the Tugela-Vaal Government water project with the Drakensberg Pumped Storage development, 14 p.	1974; WP R/1974
	Tugela-Vaal Government water project: 3rd supplementary report, 6 p.	1975; WP U/1975
	Tugela-Vaal Government water project: 4th supplementary report, 12 p.	1977; WP R/1977
	Tugela-Vaal Government water project (increased cost of second phase, and proposed raising of Sterkfontein Dam): 5th supplementary report, 43 p.	1980; WP H/1980
	Tugela-Vaal Government water project: 6th supplementary report, 15 p.	1982; WP E/1982
	Tugela-Vaal Government water project (extension of phase II): 7th supplementary report, 11 p.	1984; WP J/1984

Table B12: Department of Water Affairs and Forestry White Papers on projects in Natal/KwaZulu, 1958 - 1990 (continued).

Area/river	Approximate title of White Paper and number of pages	Date and report number
Umgeni	Umgeni Government water scheme (Midmar Dam), 10 p.	1961; WP W/1961
	Umgeni River Government regional water supply scheme (pipeline from Midmar Dam to Pietermaritzburg), 4 p.	1963; WP H/1963
	Umgeni River Government regional water supply scheme: extension (extension of pipeline to Cato Ridge and Hammarsdale), 6 p.	1964; WP L/1964
	Umgeni River Government regional water supply scheme: supplementary report, 4 p.	1966; WP S/1966
	Umgeni River Government regional water supply scheme: supplementary report on the second phase, 4 p.	1967; WP Q/1967
	Umgeni River Government regional water supply scheme: third phase - proposed second pipeline from Pietermaritzburg to Umlaas Road, 15 p.	1970; WP R/1970
	Umgeni River Government water scheme: Albert Falls Dam, 16 p.	1970; WP S/1970
	Umgeni River Government water scheme: Albert Falls Dam: supplementary report, 10 p.	1975; WP N/1975
	Mgeni River Government water scheme (Inanda Dam), 15 p.	1981; WP I/1981
	Mgeni River Government water scheme (Inanda Dam): first supplementary report, 11 p.	1985; WP E/1985
White Mfolozi	White Mfolozi River Government water scheme (Klipfontein Dam), 23 p.	1980; WP L/1980

Source: After Buckley, D.J., 1991. Unpublished document, Natal Society Library, Pietermaritzburg.

- Note:**
- (i) Certain changes have been made to the bibliographic format in the above table, to facilitate layout.
 - (ii) All White Papers were published by the Government Printer, Private Bag X85, Pretoria, 0001.

NOTES:

CHAPTER 3: MAPS, AERIAL PHOTOGRAPHS AND SATELLITE IMAGES AVAILABLE FOR NATAL/KWAZULU

Beginnings...

Entering Table Bay

*Atlantic bows and turns to meet
The Indian lover at her feet,
While gently to the bay's soft hip
Moves the cutlass of our ship.*

* * *

*Here placed by History on these sands,
My fathers dreamed of hinterlands,
Burnt maps of Europe with their boats...*

* * *

*O how this sea-blown symmetry
Proclaims the Africa in me,
And binds me with the year's intent
Heart and mind to this continent.*

R. Macnab, quoted in Dodd, A.D. and Faulding, C.I., [1964]. The Poet Sings: an Anthology of Poetry, Juta, Cape Town, 206 p.

CHAPTER 3: MAPS, AERIAL PHOTOGRAPHS AND SATELLITE IMAGES AVAILABLE FOR NATAL/KWAZULU

<u>Contents</u>	<u>Page</u>
3.1 Introduction	171
3.2 Topographic and other maps covering Natal/KwaZulu	171
3.2.1 Topographic maps scale 1 : 50 000	171
3.2.2 Topographic and topo-cadastral maps scale 1 : 250 000	172
3.2.3 Topographic and administrative maps (indicating magisterial districts) scale 1 : 500 000	173
3.2.4 Other maps	173
3.2.5 Sources of maps	173
3.2.6 Orthophoto maps scale 1 : 10 000	174
3.2.7 Orthophoto maps scale 1 : 2 000	174
3.2.8 Orthophoto maps scale 1 : 1 000	175
3.3 Aerial photographs	175
3.3.1 Colour aerial photos scale 1 : 20 000	176
3.3.2 Ultra small scale aerial photos	176
3.3.3 Medium scale aerial photos scale 1 : 20 000	176
3.3.4 Medium scale aerial photos scale 1 : 30 000	177
3.3.5 Small scale aerial photos scale 1 : 50 000 - 1 : 60 000	177
3.3.6 Sources of orthophoto maps and aerial photographs	178
3.4 Satellite images	184
3.5 Some specialist maps and aerial photographs available for Natal/KwaZulu (mainly separately published items)	187
3.5.1 Agriculture	187
3.5.2 "Estuaries"	188
3.5.3 Priority wetlands	188
3.5.4 Forests	188
3.5.5 Coastal zone vegetation maps	189
3.5.6 M.O.S.S. (Metropolitan Open Space System - urban conservation) maps	189
3.5.7 Water resources	189
3.5.8 Climate	191
3.5.9 Natal Drakensberg	191
3.5.10 KwaZulu catchments maps	192
3.5.11 Natural resources of Maputaland scale 1 : 100 000	192
3.5.12 Natural resources of the Natal South Coast (European owned land) scale 1 : 100 000	193
3.5.13 Soil erosion map of South Africa	193
3.5.14 Natal/KwaZulu resource atlas	193
3.5.15 Topographic/settlement maps scale 1 : 250 000	194

Contents (continued)

Page

3.5.16	Terrain recreation inventory maps of South Africa scale 1 : 250 000	195
3.5.17	Terrain morphological map of southern Africa scale 1 : 2 500 000	196
3.5.18	Geological Survey open file maps	196
3.5.19	Durban Functional Region aerial photographs and maps	196
3.5.20	KwaZulu maps scale 1 : 800 000	198
3.5.21	Natal/KwaZulu maps scale 1 : 1 000 000	198
3.5.22	Population map of South Africa scale 1 : 2 500 000	199
3.5.23	Street/suburb/town maps of Natal/KwaZulu	200
3.5.24	General map of Natal/KwaZulu	200
3.5.25	Magisterial districts of Natal/KwaZulu	200
3.6	Geographic Information Systems in Natal/KwaZulu	201
3.6.1	Some GIS projects undertaken in Natal/KwaZulu	203

Table

Page

Table C1:	Scales and sizes of various satellite images available from the CSIR ..	185
-----------	---	-----

3.1 Introduction

The purpose of the current chapter is to provide an overview of some of the (mainly separately published) maps available in South Africa, which have relevance to water and sanitation planning in the broadest sense. A few maps are described in selected chapters, elsewhere in this publication. The listing of maps is not claimed to be exhaustive. Further additions to the list are possible in the event of a second edition of the source book.

3.2 Topographic and other maps covering Natal/KwaZulu

Several maps are outlined below.

3.2.1 Topographic maps scale 1 : 50 000

A 1° latitude x 1° longitude grid cell has been superimposed over the whole of southern Africa. Each grid cell ("square degree") so formed, is indicated by a four figure number made up of the values of the latitude and longitude at the north west corner of the cell. Every grid cell is divided into four rectangles $\begin{smallmatrix} A & B \\ C & D \end{smallmatrix}$. Rectangles A, B, C and D are again each divided into four rectangles numbered $\begin{smallmatrix} A & B \\ C & D \end{smallmatrix}$ each covering 15' x 15' of land.

The following grid cells cover the whole of Natal/KwaZulu:

North				
				2632
	2729	2730	2731	2732
2828	2829	2830	2831	2832
	2929	2930	2931	
3028	3029	3030		
		3130		
South				

Grid cell 2830, for example, comprises the following individual 1 : 50 000 scale topographic maps:

30°						
28°			A			B
	2830 AA Dundee AB Tayside AC Wasbank AD Helpmekaar			2830 BA Nqutu BB Nondweni BC Rorke's Drift BD Fort Louis		
	2830 CA Jobskop CB Pomeroy CC Weenen CD Muden		C	2830 DA Collessie DB Qudeni DC Nadi DD Kranskop		D

A full list of individual 1 : 50 000 scale topographic maps can be found in the Index to maps of South Africa (see Section 3.2.5)*. There are 1 916 sheets in the 1 : 50 000 scale topographic series (of which 166 sheets refer to Natal/KwaZulu). Each map sheet covers approximately 670 km² and is printed in six colours. The contour interval is 20 m or 50 ft (non-metricated maps - published prior to 1970). It should be noted that all 1 : 50 000 scale topographic maps are also available in the form of "blue pulls", which show only water related features (such as rivers, dams and wetlands). Blue pulls must be obtained from the Department of Regional and Land Affairs, Private Bag, Mowbray, 7705.

3.2.2 Topographic and topo-cadastral maps scale 1 : 250 000

The following maps cover the whole of Natal/KwaZulu:

North		
2728 Frankfort (2728, 2729)	2730 Vryheid (2730, 2731)	2632 Mkuze (2632, 2732)
2828 Harrismith (2828, 2829)	2830 Richards Bay (2830, 2831, 2832)	
2928 Drakensberg (2928, 2929)	2930 Durban (2930, 2931)	
3028 Kokstad (3028, 3029)	3030 Port Shepstone (3030, 3130)	
South		

* See also Merrett, C.E., 1977. Index to the 1 : 50 000 map series, Part 1: Natal, Natal Society Library, Pietermaritzburg, 31 p. + app., as well as Merrett, C.E., 1977. Index to the 1 : 50 000 map series, Part 2: Cape, Orange Free State, Transkei and Transvaal, Natal Society Library, Pietermaritzburg, 48 p.

3.2.3 Topographic and administrative maps (indicating magisterial districts) scale 1 : 500 000

The following maps cover the whole of Natal/KwaZulu:

	North
	2530 Nelspruit
	2726 Kroonstad
	2730 Vryheid
	2928 Durban
	3126 Queenstown
	South

3.2.4 Other maps

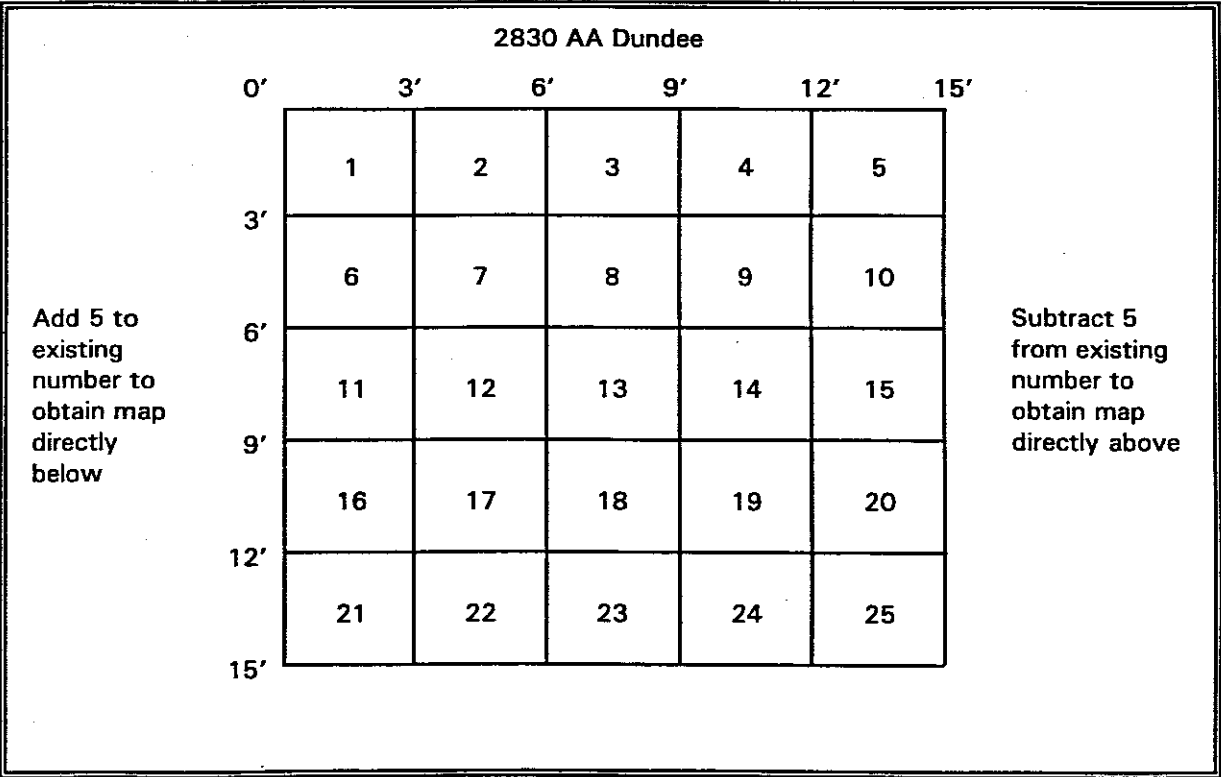
- Southern Africa scale 1 : 2 500 000 covering Africa south of 16°S latitude.
- Africa south of the Sahara scale 1 : 7 500 000 covering Africa south of 18°N latitude.

3.2.5 Sources of maps

- Maps as well as the Index to maps of South Africa can be obtained from the Government Printer, Private Bag X85, Pretoria, 0001.
- Selected maps as well as the Index to maps of South Africa are also available from the Department of Regional and Land Affairs, P O Box 396, Pietermaritzburg, 3200.
- Maps of the Transkei are available from the Surveyor-General, Private Bag X5031, Umtata, 5100.
- The Natal Society Library, P O Box 415, Pietermaritzburg, 3200 (as one of the five copyright (legal deposit) libraries in South Africa), has copies of most maps formally published by South African Government departments. The maps are held in the map collection.

3.2.6 Orthophoto maps scale 1 : 10 000

Each orthophoto map covers 3' x 3' of land area. All of KwaZulu and most of Natal has been mapped in the orthophoto series. Maps covering KwaZulu, including the Mkuze Swamp system, are available from the KwaZulu authorities (see Section 3.3.6). Each 1 : 50 000 scale topographic map can be subdivided into 25 orthophoto maps. The best procedure is to purchase the 1 : 50 000 scale topographic map in question, and then to draw an overlay of 25 "rectangles" each 3' x 3' on tracing paper, thereby covering the 1 : 50 000 map (see below). A specific orthophoto map is labelled as per the example, 2830 AA 25 Dundee or 2830 AA 7 Dundee etc.



3.2.7 Orthophoto maps scale 1 : 2 000

A series of maps covering townships and potential development areas in KwaZulu is available (see Section 3.3.6).

3.2.8 Orthophoto maps scale 1 : 1 000

A few such maps are available for special engineering project requirements in KwaZulu (see Section 3.3.6).

3.3 Aerial photographs*

Aerial photographs are taken by private air survey companies according to specifications of the Chief Directorate: Surveys and Land Information, Department of Regional and Land Affairs, Mowbray. A reference collection and list of all aerial photographs is available at the offices of the Department in Cape Town and Pretoria, where photographs can be purchased, provided that the relevant job and photograph number is specified. By 1964, the whole of South Africa had been photographed from the air. Several areas have been re-photographed a number of times, to keep as up-to-date a record as possible.

The flight path is usually from east to west in the first instance, unless specific landforms such as coastlines require flight paths in a different direction. When an aircraft is flying along the pre-determined flight strip, photographs are taken at regular intervals. Accordingly, each aerial photograph overlaps the preceding one by 60%, thereby providing a stereoscopic or three dimensional image when viewed through a stereoscope. Two adjacent photographs in the same flight strip are known as a stereopair. At the completion of each flight strip, the aircraft turns and flies (west to east) along the next flight strip parallel to the first strip. The distance between the two flight strips must be such that the photographs taken on the second strip, overlap those of the first strip by 30%. Ideally, the aircraft should fly in a straight line at all times, maintaining the camera vertically above the ground. However, cross winds often cause problems and all aerial photographs from a given flight may have to be rejected, due to distortion caused by tilting from the vertical, or due to an incorrect flight path. Besides vertical photographs, oblique photographs are also available, although the latter are not used for photogrammetric or topographic purposes. The first vertical aerial photographs in Natal were flown in 1937.

* Discussion based on Liebenberg, E.C., Rootman, P.J. and Van Huyssteen, M.K.R., 1985. The South African Landscape: Exercise Manual for Map and Air Photo Interpretation, Butterworths, Durban, no pagination.

3.3.1 Colour aerial photos scale 1 : 20 000*

Very few areas in Natal/KwaZulu have been covered by (official) colour aerial photographs. The following jobs were completed up to and including 1984.

Locality	Job number and date
Grid cell 2831; 2832 (Empangeni/Richards Bay area)	879/84
Grid cell 2829; 2929; 3028; 3029 (Drakensberg area along the border with Lesotho)	741/75; 839/80; 851/81

3.3.2 Ultra small scale aerial photos

None in Natal/KwaZulu up to and including 1984.

3.3.3 Medium scale aerial photos scale 1 : 20 000

The following jobs were completed up to and including 1984.

Locality	Job number and date
Grid cell 2731	608/70; 688/71
2732	608/70; 688/71
2831	608/70
2832	608/70
2930	615/68
2931	615/68
3030	615/68

* Data provided in Sections 3.3.1 - 3.3.5 inclusive, were derived from the Index to aerial photography and 1 : 10 000 orthophoto mapping pamphlet produced by the Department of Regional and Land Affairs - see Section 3.3.6.

3.3.4 Medium scale aerial photos scale 1 : 30 000

The following jobs were completed up to and including 1984.

Locality		Job number and date
Grid cell	2729	739/75; 849/81
	2730	773/76; 789/77; 849/81
	2731	733/76
	2732	661/70
	2828	690/72
	2829	756/75; 849/81
	2830	756/75; 849/81
	2831	583/67; 672/70
	2929	877/84
	2930	573/67; 807/78
	2931	573/67
	3030	573/67; 807/78

3.3.5 Small scale aerial photos scale 1 : 50 000 - 1 : 60 000

The following jobs were completed up to and including 1984.

Locality		Job number and date
Grid cell	2729	713/78; 801/78; 822/79
	2730	713/78; 822/79
	2731	780/77
	2732	751/75
	2828	801/78
	2829	713/78; 801/78
	2830	713/78
	2831	752/75
	2832	752/75
	2929	781/77
	2930	717/73
	2931	717/73
	3028	731/75
	3029	731/75
	3030	717/73; 766/76
	3130	766/76

3.3.6 Sources of orthophoto maps and aerial photographs

- Orthophotos and aerial photographs can be obtained from the Department of Regional and Land Affairs, Private Bag, Mowbray, 7705. Selected orthophoto maps and aerial photographs can be obtained from the Department of Regional and Land Affairs, P O Box 396, Pietermaritzburg 3200. An Index to aerial photography and 1 : 10 000 orthophoto mapping pamphlet is available from either office.
- Orthophotos covering KwaZulu areas can be obtained from the KwaZulu Government Survey and Mapping Division, Department of Works, Private Bag X03, Ulundi, 3838.
- Orthophoto maps of the Transkei are available from the Surveyor-General, Private Bag X5031, Umtata, 5100.
- Aerial photographs are also flown by or on behalf of various organizations including university and Government departments. The Natal Town and Regional Planning Commission, Private Bag X9038, Pietermaritzburg, 3200; as well as the Department of Surveying and Mapping, University of Natal, Private Bag X10, Dalbridge, 4014; and the City Engineer's Department, Durban Corporation, P O Box 680, Durban, 4000*, plus the City Engineer's Department, P O Box 205, Pietermaritzburg, 3200, and the Institute of Natural Resources, University of Natal, Private Bag X01, Scottsville, 3209, should be contacted as possible sources of research or project-specific aerial photography and maps.
- Details of aerial photographs flown by private companies operating or possibly operating in Natal/KwaZulu may be obtained from the following:

Aerial Photographic Service, P O Box 212074, Oribi, 3205.

Air Survey Company of Africa Ltd, P O Box 2836, Durban, 4000.

* The Durban City Engineer's Department has been divided into a number of component departments and units. The term "City Engineer's Department" - with reference to Durban - is used here and elsewhere in this publication, in a generic sense.

Aircraft Operating Company Ltd, P O Box 2830, Johannesburg, 2000.

Deltaplan Ltd, P O Box 14529, Sinoville, 0129.

Fotogramensura Ltd, P O Box 710, Pretoria, 0001.

Michel Antelme, P O Box 95242, Waterkloof, 0145.

Orthophoto Maps Ltd, P O Box 31323, Braamfontein, 2017.

Photosurveys Ltd, P O Box 31080, Braamfontein, 2017.

Planning and Mapping cc, P O Box 2048, Randburg, 2125.

Republic Aerial Surveys Ltd, P O Box 1216, Pretoria, 0001.

The Association of Air Survey Companies, P O Box 3923, Johannesburg, 2000.

For further information consult the following:

Maps

- Merrett, C., 1977. A selected annotated bibliography of Natal maps, Natal Society Library, Pietermaritzburg, no pagination.
- Merrett, C.E., 1979. A Selected Bibliography of Natal Maps, 1800 - 1977, G.K. Hall, Boston, 226 p.

Place names

- Anonymous, 1967. River name index, VOL 1, Part 1: river systems, Department of Water Affairs, Pretoria, 51 p.

- Anonymous, 1990. South African place names by magisterial areas/Alphabetical classification of South African place names by magisterial areas, and magisterial areas listing South African place names, Stability Print, Johannesburg, 112 p.
- Botha, C.G., 1917. Place Names in the Cape District: Their Early Origin and History, South African National Society for the Preservation of Places of Historic Interest, Cape Town, 48 p.
- Botha, C.G., 1922. The early history of the Cape Province, as illustrated by Dutch place names, South African Journal of Science, VOL 19, p. 433 - 438.
- Botha, C.G., 1925. The distribution of South African fauna in relation to place names, South African Journal of Science, VOL 22, p. 537 - 539.
- Botha, C.G., 1926. Place Names in the Cape Province, Juta, Cape Town, 186 p.
- Botha, T.J.R., 1977. Watername in Natal: 'n Inleiding tot die Studie van Zoeloeplekname, Onomastics Series No. 8, Human Sciences Research Council, Pretoria, 226 p. + app.
- Du Plessis, E.J., 1973. 'n Onderzoek na die Oorsprong en Betekenis van Suid-Afrikaanse Berg- en Riviername, Tafelberg, Cape Town, 365 p.
- Holt, B., 1959. Place-names in the Transkeian territories, Africana Museum, Johannesburg, 48 p.
- Jenkins, E.R., Raper, P.E. and Möller, L.A., 1996. Changing Place Names, Indicator Press, Durban, 112 p.
- Kingon, J.R.L., 1918 - 1919. A survey of aboriginal place-names, Report of the Sixteenth Annual Meeting of the South African Association for the Advancement of Science, VOL 15, p. 712 - 779. (This journal was the forerunner of the South African Journal of Science).

- Leistner, O.A. and Morris, J.W., 1976. Southern African place names, Annals of the Cape Provincial Museums, VOL 12, p. 1 - 565.
- Lugg, H.C., 1968. Zulu place names in Natal: a list of the more important mountains, rivers, estuaries and other places in Natal and Zululand with their Zulu names and their meanings, also some personal names, Daily News, Durban, 14 p.
- Names Society of Southern Africa, 1994. Concise gazetteer of South Africa: edited in accordance with the recommendations of the United Nations conferences on the standardization of geographical names, Onomastic Research Council, Human Sciences Research Council, Pretoria, 68 p.
- National Place Names Committee, 1991. Official place names in the Republic of South Africa (approved 1978 - 1988), Department of National Education, Pretoria, 37 p.
- Nienaber, G.S. and Raper, P.E., 1983. Hottentot (Khoekhoen) Place Names, Southern African Place Names: 1, Butterworths, Pretoria, 243 p. and map.
- Nienaber, P.J., 1972. Suid-Afrikaanse Pleknaamwoordeboek Deel 1, second edition, Tafelberg, Cape Town, 418 p.
- Norton, W.A., 1916 - 1917. Bantu place names in Africa, Report of the Fourteenth Annual Meeting of the South African Association for the Advancement of Science, VOL 13, p. 264 - 277.
- Pettman, C., 1913. Africanderisms: a Glossary of South African Colloquial Words and Phrases and of Place and Other Names, Longmans Green and Company, London, 579 p.
- Pettman, C., 1914. Notes on South African Place Names, [no publisher stated], Kimberley, 38 p. + app.

- Pettman, C., 1914 - 1915. South African place-names, Report of the Twelfth Annual Meeting of the South African Association for the Advancement of Science, VOL 11, p. 95 - 106.
- Pettman, C., 1915 - 1916. An inquiry into the derivation of certain South African place-names, Report of the Thirteenth Annual Meeting of the South African Association for the Advancement of Science, VOL 12, p. 159 - 170.
- Pettman, C., 1920. An enquiry into the origin and derivation of certain South African place-names - 2, South African Journal of Science, VOL 16(5), p. 432 - 442.
- Pettman, C., 1921. Hottentot place-names, South African Journal of Science, VOL 17(3/4), p. 334 - 352.
- Pettman, C., 1922. Hottentot place names - 2, South African Journal of Science, VOL 19, p. 372 - 382.
- Pettman, C., 1922. Place Names of the Orange Free State, [Daily Representative Ltd], Queenstown, 50 p. + app.
- Pettman, C., 1923. South African Methodist Place Names, Daily Representative Ltd, Queenstown, 42 p. + app.
- Pettman, C., 1985. South African Place Names: Past and Present, Lowry Publishers, Johannesburg, 238 p. (Originally published by the Daily Representative Ltd, Queenstown, in 1931).
- Phillips, E.P., 1933. Some South African place names derived from plants, South African Journal of Science, VOL 30, p. 656 - 671.
- Raper, P.E., 1972. Onomastics Source Guide 1970: Part 1, Onomastics Series No. 2, Tafelberg, Cape Town, 40 p. (The book consists of references to selected South African place names).

- Raper, P.E., 1972. Streekname in Suid-Afrika en Suidwes, Onomastics Series No. 1, Tafelberg, Cape Town, 195 p.
- Raper, P.E., 1975. Source Guide for Toponymy and Topology, Onomastics Series No. 5, Human Sciences Research Council, Pretoria, 478 p. (The book consists of references to selected South African place names).
- Raper, P.E., 1979. Notes on Khoekhoen place names, South African Journal of Science, VOL 75(10), p. 448 - 451.
- Raper, P.E., 1989. Dictionary of Southern African Place Names, second edition, Jonathan Ball, Johannesburg, 608 p.
- Raper, P.E., 1996. United Nations documents on geographical names, Names Research Institute, CAUSE, Pretoria, 150 p. + app.
- Raper, P.E. and Moller, L.A., 1981. Onomastics Source Guide: Part 2, 1971 - 1978, Onomastics Series No. 9, Human Sciences Research Council, Pretoria, 285 p. (The book consists of references to selected South African place names).
- Raper, P.E., Nienaber, G.S. and Marais, J.S.B., 1979. Manual for the giving of place names, Human Sciences Research Council, Pretoria, 12 p.
- Skead, C.J., 1973. Zoo-historical gazetteer, Annals of the Cape Provincial Museums, VOL 10, p. 1 - 259.
- Stayt, D., 1971. Where on earth? A guide to the place names of Natal and Zululand, Daily News, Durban, no pagination.
- Van Warmelo, N.J., 1961. Place names of the Kruger National Park, Ethnological Publication No. 47, Department of Bantu Administration, Pretoria, 61 p.

See also:

- Department of Zulu, University of Natal, Private Bag X01, Scottsville, 3209. (The Department has numerous research papers relating to Zulu place names in Natal/KwaZulu).
- Names Research Institute, CAUSE, Private Bag X12, Lynn East, 0039.
- Names Society of Southern Africa, Human Sciences Research Council, Private Bag X41, Pretoria, 0001.
- National Place Names Committee, Department of Arts, Culture, Science and Technology, Private Bag X894, Pretoria, 0001.

3.4 Satellite images

The use (or potential use) of satellite imagery in South Africa is varied and includes the mapping of settlements; the examination of flood damage; the determination of water quality in impoundments; the assessment of veld fire damage, and the effect of drought on vegetation (in terms inter alia of the proclamation and de-proclamation of disaster drought areas by the Department of Agriculture).

See for example:

- Howman, A.M. and Kempster, P.L., 1988. Quantifying specific water quality conditions in impoundments, South African Journal of Photogrammetry, Remote Sensing and Cartography, VOL 15(1), p. 15 - 21.
- Mander, M. and Piper, S.E., 1992. An investigation into the suitability of panchromatic SPOT satellite imagery for mapping rural land-cover, INR Working Paper No. 78, Institute of Natural Resources, University of Natal, Pietermaritzburg, 30 p.
- Mander, M., Piper, S. and Fincham, R.J., 1994. SPOT satellite imagery as a primary data source for a Geographic Information System of Maputaland: an

evaluation, INR Investigational Report No. 90, Institute of Natural Resources, University of Natal, Pietermaritzburg, 16 p.

- McCarthy, T.S., Franey, N.J., Ellery, W.N. and Ellery, K., 1993. The use of SPOT imagery in the study of environmental processes of the Okavango Delta, Botswana, South African Journal of Science, VOL 89(9), p. 432 - 436.
- Sandham, L.A., Prinsloo, H.B. and Henning, J.J., 1993. Satellite detection of asbestos pollution in Transvaal, South Africa, South African Journal of Science, VOL 89(9), p. 461 - 462.
- Viljoen, M.J., Franey, N.J., Coward, D. and Wedepohl, C., 1993. Classification of vegetation degradation in the north-eastern Transvaal using SPOT imagery, South African Journal of Science, VOL 89(9), p. 429 - 431.

The Satellite Applications Centre of the Division of Microelectronics and Communications Technology, CSIR, P O Box 395, Pretoria, 0001, receives digital data from the earth observation satellites LANDSAT (MSS and TM) (United States) and SPOT (PAN and XS) (France). The data are available on magnetic tape, on floppy diskettes, or in the form of images. The four co-ordinates of the area in question must be provided when ordering tapes, diskettes or images. The latter are available in various sizes and scales (Table C1).

Table C1: Scales and sizes of various satellite images available from the CSIR.

Detail	Full scene			Quarter scene		
Size of image	185 x 185 mm	370 x 370 mm	740 x 740 mm	185 x 185 mm	370 x 370 mm	740 x 740 mm
Imagery type and scale						
LANDSAT MSS	1:1 000 000	1:500 000	1:250 000	N/A	N/A	N/A
LANDSAT TM	1:1 000 000	1:500 000	1:250 000	1:500 000	1:250 000	1:100 000
SPOT PAN	1:400 000	1:200 000	1:100 000	1:200 000	1:100 000	1:50 000
SPOT XS	1:400 000	1:200 000	1:100 000	1:200 000	1:100 000	1:50 000

Source: After the Division of Microelectronics and Communications Technology, CSIR, Pretoria, 1991.

- Note:**
- (i) LANDSAT MSS (multi-spectral scanner) and TM (thematic mapper) = colour based on various wavebands
SPOT PAN = black and white
SPOT XS = colour.
 - (ii) The following index is available: Anonymous, 1982. LANDSAT imagery: description of products available from the CSIR Satellite Remote Sensing Centre, Remote Sensing Centre, National Institute for Telecommunications Research and the Cooperative Scientific Programmes, CSIR, Pretoria, 10 p. and LANDSAT map index. (See also: Botha, W.J., 1982. Satellite remote sensing facilities in the Republic of South Africa, South African Journal of Photogrammetry, Remote Sensing and Cartography, VOL 13(2), p. 89 - 102 and map).
-

For further information consult the following:

- The (former) National Programme for Remote Sensing, now the Division of Microelectronics and Communications Technology, CSIR, Pretoria, maintains a *register of remote sensing projects in southern Africa*. A list of organizations which were or are involved with remote sensing in South Africa can be found in Van der Westhuizen, P.J., 1985. National Programme for Remote Sensing report: 1984, South African National Scientific Programmes Report No. 102, Foundation for Research Development, CSIR, Pretoria, 47 p.
- Piper, S.E. and Broderick, D.M., 1989. A preliminary annotated bibliography and directory of remote sensing in southern Africa, Department of Surveying and Mapping, University of Natal, Durban, various pages. (The publication lists maps and images which are available, and is a most useful source document).

Note: Readers not familiar with the use of aerial photographs, orthophoto and topographic maps as well as satellite imagery, should consult the following high school/college texts:

- (i) Blackbeard, A.D., 1993. Mapwork Made Easy, Heinemann-Centaur Publishers, Pietermaritzburg, 106 p. (See also, Blackbeard, A.D., 1993. Mapwork Made Easy: Teacher's Guide, Heinemann-Centaur Publishers, Pietermaritzburg, 63 p.).

- (ii) Burton, M. and Pitt, I., 1993. South African Mapcraft, Shuter and Shooter, Pietermaritzburg, 156 p. (See also, Burton, M. and Pitt, I., 1993. South African Mapcraft Answer Book, Shuter and Shooter, Pietermaritzburg, 96 p.).
- (iii) Liebenberg, E.C., Rootman, P.J. and Van Huyssteen, M.K.R., 1985. The South African Landscape: Exercise Manual for Map and Air Photo Interpretation, Butterworths, Durban, no pagination.
- (iv) Nicholson, J.M. and Morton, J.G., 1991. Working with Maps, Shuter and Shooter, Pietermaritzburg, 68 p. (See also, Nicholson, J.M. and Morton, J.G., 1989. Working with Maps: Answer Book, Shuter and Shooter, Pietermaritzburg, 40 p.).

3.5 Some specialist maps and aerial photographs available for Natal/KwaZulu (mainly separately published items)

3.5.1 Agriculture

A number of agricultural (soil) maps plus reports and aerial photographs compiled for specific purposes (including irrigation), are retained by the Institute for Soil, Climate and Water, Private Bag X79, Pretoria, 0001. The maps and photographs are listed in the NATIN database. (See Table B7 in Chapter 2)*. Most of the information available for Natal/KwaZulu concerns the environs of Pongola and the Makatini Flats. Contact the office of the Institute at the Cedara Agricultural Development Institute, Private Bag X9059, Pietermaritzburg, 3200. Soil maps for some protected areas are also available at the Natal Parks Board, P O Box 662, Pietermaritzburg, 3200. (Example: Umfolozi Game Reserve soil survey data (1 : 50 000 scale soil map), compiled by P.T. Spear in 1980). The Institute for Soil, Climate and Water has a few maps relating to protected areas in Natal. (Example: McGee, P.A.E. and Duke, R.R., 1972. Soil series and terrain type of Mkuze Game Reserve, SIRI Map No. 10846, Soil and Irrigation Research Institute, Department of Agricultural Technical Services, Pretoria).

* A guide to the NATIN database is available. See: Dohse, T.E. and MacVicar, C.N., 1985. 'n Handleiding vir die gebruik van die Nasionale Register van Kaarte, Verslae en Literatuur van die Natuurlike Landbouhulpbronne: Grond, Klimaat en Terrein, SIRI Report No. GB/A/85/1, Soil and Irrigation Research Institute, Department of Agriculture and Water Supply, Pretoria.

3.5.2 "Estuaries"

A list of aerial photographs relating to "estuaries" in Natal/KwaZulu is available from the Division of Water Technology, CSIR, P O Box 17001, Congella, 4013. The aerial photographs may be examined at the office of the Division in Durban. Various maps and specially commissioned aerial photographs relating to St Lucia and the Mkuze Swamps are available at the Natal Parks Board, Pietermaritzburg. The Department of Surveying and Mapping, University of Natal, Private Bag X10, Dalbridge, 4014, has numerous black and white, colour and infra red photographs of the Siyaya Lagoon and environs, which were flown in the early to mid 1980s. Scales vary from 1 : 5 000 - 1 : 25 000.

3.5.3 Priority wetlands

Three types of maps are available, namely, 1 : 500 000; 1 : 750 000 and 1 : 1 000 000 scale maps (as monochrome or colour composites, or as colour separation sheets). Contact the Natal Town and Regional Planning Commission, Private Bag X9038, Pietermaritzburg, 3200.

3.5.4 Forests

The Natal Branch of the Wildlife Society of Southern Africa, P O Box 2985, Durban, 4000, has 1 : 50 000 scale topographic maps available showing some of the eight types of indigenous forests in Natal/KwaZulu. Generally, only forests larger than 50 ha have been mapped. Natural resource distribution and development/management maps of various Parks Board areas (at several scales), are available from the Natal Parks Board, Pietermaritzburg. Thirty-one 1 : 250 000 scale topo-cadastral forestry maps showing four forest types (commercial pine/gum/wattle plantations and indigenous forests) in South Africa, are available from the Department of Water Affairs and Forestry, Private Bag X313, Pretoria, 0001. See: Van der Zel, D.W., 1988. A forest map of southern Africa with the aid of LANDSAT imagery, South African National Scientific Programmes Report No. 154, Foundation for Research Development, CSIR, Pretoria, 79 p.

3.5.5 Coastal zone vegetation maps

The Division of Earth, Marine and Atmospheric Science and Technology, CSIR, P O Box 320, Stellenbosch, 7599, is currently engaged in mapping vegetation in the coastal zone of Natal/KwaZulu and the Cape Province. The data are being captured by means of a Geographic Information System (GIS). The end product will consist of a series of transparent colour overlays (which can be used with standard 1 : 10 000 scale orthophoto maps), together with descriptions and importance ratings for each vegetation type. The project which was initiated by the Natal Town and Regional Planning Commission and the Cape Provincial Administration, has revealed that the majority of coastal vegetation types have been degraded to some degree, quite apart from the clearing of indigenous vegetation for development purposes. Once the data are available, planners will be able to use the information to identify conservation zones, and to demarcate areas for development in terms of environmental criteria. Maps are already available for the northern Natal/KwaZulu coast between the Tugela River mouth and Sodwana Bay. It should be noted that the Division has colour aerial photographs available of the entire South African coastline.

3.5.6 M.O.S.S. (Metropolitan Open Space System - urban conservation) maps

A M.O.S.S. map of the Durban Metropolitan Area with a 1 : 50 000 scale was compiled in 1986 by G. Nicolson, on behalf of the Natal Branch of the Wildlife Society of Southern Africa, Durban, and the Natal Town and Regional Planning Commission, Pietermaritzburg. A 1 : 50 000 scale map of the Pietermaritzburg M.O.S.S. area can be examined at the City Engineer's Department, P O Box 205, Pietermaritzburg, 3200. Maps will shortly be available for the Empangeni and Richards Bay M.O.S.S. areas.

3.5.7 Water resources

Two overview maps (no scale given), dealing with sediment are available, namely, Revised sediment yield map of southern Africa (1992) - sediment yield regions, and the Revised sediment yield map of southern Africa (1992) - broad scale soils and slopes. Both maps are found in Rooseboom, A., Verster, E., Zietsman, H.L. and Lotriet, H.H., 1992. The development of the new sediment yield map of southern Africa, WRC Report No. 297/2/92, Water Research Commission, Pretoria, various pages and maps. (Larger scale versions of the maps have been produced). A useful map series available at the

Department of Water Affairs and Forestry, Pretoria, is the 1 : 1 500 000 scale Drainage regions of South Africa series, compiled in 1965. A very recent series concerns 1 : 250 000 scale topographic/topo-cadastral maps, also compiled by the Department of Water Affairs and Forestry, which show the location of hydrological gauging stations, as well as catchment area and drainage region boundaries. Maps indicating the catchment areas of various rivers as well as possible dam sites can be found in Ninham Shand and Partners, 1971. Water resources of the Natal South Coast, Natal Town and Regional Planning Commission Report, VOL 18A, 31 p. + app., and VOL 18B, Appendices, various pages, Pietermaritzburg. A map (compiled by J.H. O'Keeffe in 1985) and entitled, The conservation status of South African rivers, scale 1 : 2 500 000, is available from the Department of Regional and Land Affairs, Private Bag, Mowbray, 7705. Aerial photographs are occasionally flown on behalf of the Department of Water Affairs and Forestry for specific planning purposes. Contact the Department of Water Affairs and Forestry, P O Box 1018, Durban, 4000.

An important series of maps dealing with groundwater resources was published in 1995 by the Water Research Commission, P O Box 824, Pretoria, 0001, in conjunction with the Department of Water Affairs and Forestry, Pretoria. Two sheets are available entitled, Groundwater resources of the Republic of South Africa. Sheet 1 (with a scale of 1 : 2 500 000) is entitled, Borehole prospects. Sheet 2 consists of six individual maps as follows: Mean annual recharge (scale 1 : 7 500 000); Groundwater component of river flow (base flow - scale 1 : 7 500 000); Depth to groundwater level (scale 1 : 7 500 000); Groundwater quality (scale 1 : 7 500 000); Hydrochemical types (scale 1 : 7 500 000), and Saturated interstices (scale 1 : 4 000 000). The latter map provides an indication of groundwater storage. A guide is also available: Vegter, J.R., 1995. Groundwater resources of South Africa: an explanation of a set of national groundwater maps, WRC Report No. TT 74/95, Water Research Commission, Pretoria, various pages. Note that the maps depict regional groundwater conditions. The maps cannot be used for borehole siting or for other site specific purposes.

A further map on groundwater resources is also available. The map entitled, Groundwater harvest potential of the Republic of South Africa, was published in 1996 by the Directorate of Geohydrology, Department of Water Affairs and Forestry. The map represents the first attempt at providing quantitative information on sustainable rates of groundwater abstraction in South Africa, on a country-wide basis. The main map with a scale of

1 : 3 000 000, illustrates the maximum volume of groundwater that can be abstracted annually in a given km², without depleting the aquifers. Three inset maps, all with a scale of 1 : 8 500 000, form part of the main map. The first inset map is entitled, Factors restricting harvest potential, namely, mean annual recharge, and the variability of recharge, or the volume of effective storage. The second and third inset maps are entitled, Average borehole yield, and Groundwater quality respectively. Groundwater quality data are provided in terms of electrical conductivity. Note that harvest potential is the maximum rate at which groundwater can be sustainably abstracted. The harvest potential was determined from groundwater recharge and groundwater storage. The map provides a national overview and perspective on sustainable abstraction. The map accordingly, cannot be used for the local planning, development or management of groundwater, where localized investigations are necessary.

3.5.8 Climate

A dated, although still useful series of climatological maps of Africa can be found in the following: Jackson, S.P., 1961. Climatological atlas of Africa, Commission for Technical Co-operation in Africa South of the Sahara Joint Project No. 1, CCTA/CSA, Lagos, various pages. Maps are presented at three scales, namely, 1 : 5 000 000; 1 : 15 000 000 and 1 : 30 000 000. The South African data have been updated by more recent Weather Bureau reports. (See the chapter on rainfall, elsewhere in this publication). The information contained in the atlas can however, be used as a first approximation for other parts of Africa.

3.5.9 Natal Drakensberg

A series of three double-sided maps is available from the Department of Environment Affairs, Private Bag X447, Pretoria, 0001, covering the Natal Drakensberg from north to south. The 1 : 50 000 scale topographic maps also provide hiking data, and show wilderness areas, nature reserves and State forests in an altitude range of approximately 1 370 - 3 350 m. The relevant maps (produced in the period 1982 - 1985) are as follows:

Drakensberg North	Mt. aux Sources to Cathedral Peak/Cathedral Peak to Injasuti
Drakensberg Central	Injasuti-Giant's Castle-Highmoor/Highmoor-Mkhomazi-Loteni
Drakensberg South	Vergelegen-Cobham-Garden Castle/Garden Castle-Boesmansnek-Sehlabathebe

3.5.10 KwaZulu catchments maps

A series of 10 maps of KwaZulu catchments, reduced from a scale of 1 : 250 000 down to 1 : 500 000 (with two exceptions), and contained in the appendix to three volumes of a report are available from Eksteen Van der Walt and Nissen, P O Box 2444, Pietermaritzburg, 3200. The original 1 : 250 000 scale maps can be obtained from the same firm. These maps can be used as overlays on the 1 : 250 000 scale topographic series, the 1 : 250 000 scale Land Type maps (see the chapter on soils and soil erosion), and the 1 : 250 000 scale geological maps (see the chapter on geology). The maps concern infrastructure; transport; the distribution of population; service centres; communal facilities; position of tributaries; location of weather stations; sediment yield; existing land use; agricultural development potential, and the variation of mean annual precipitation. See: Anonymous, 1990. KwaZulu catchments development potential study 1990, VOL 1 - 3, various pages, and Appendix of maps, various pages, Eksteen Van der Walt and Nissen, Pietermaritzburg.

3.5.11 Natural resources of Maputaland scale 1 : 100 000

A series of 11 maps is available on the natural resources of Maputaland, produced in 1969/1970 by R.F. Loxton Hunting and Associates, Johannesburg, for the then Department of Bantu Administration and Development, Pretoria. The maps include physiographic regions; bioclimatic regions; cadastral land tenure and amenities; soils; agricultural communities; geology; underground water and mineral resources; vegetation and grazing potential; dryland arable production potential; recommended land use systems, and afforestation potential. Contact Loxton Venn and Associates, P O Box 39265, Bramley, 2018.

3.5.12 Natural resources of the Natal South Coast (European owned land) scale 1 : 100 000

A series of 10 maps (bioclimatic regions; cadastral and land tenure; pedo-ecological potential; soils; dryland arable potential; recommended land use; present land use; afforestation potential; geology and mineral potential, and underground water potential) was produced in 1971 by R.F. Loxton Hunting and Associates, for the Natal Town and Regional Planning Commission, Pietermaritzburg. The maps accompany a written report with the same general title. (See the chapter on groundwater, elsewhere in this publication).

3.5.13 Soil erosion map of South Africa

A 1 : 2 500 000 scale map was produced by J.L. Schoeman and co-workers in 1986. The map provides an overview of crop production potential and the erodibility of land in South Africa. Contact the Institute for Soil, Climate and Water, Pretoria.

3.5.14 Natal/KwaZulu resource atlas

Several 1 : 1 000 000 scale maps of Natal/KwaZulu including soils, river catchments, bioclimatic and physiographic regions, veld types, rainfall, temperature, forestry areas, urban areas, infrastructure (railways etc.) and the 1980 population census data, are available from the Institute of Natural Resources, University of Natal, Private Bag X01, Scottsville, 3209, and the Natal Town and Regional Planning Commission, Pietermaritzburg. Numerous maps (mainly with a scale of 1 : 1 000 000) dealing with socio-economic aspects, demography and physical features including soils, rivers and climate with reference to Natal/KwaZulu can be found in Thorrrington-Smith, Rosenberg and McCrystal, 1978. Towards a plan for KwaZulu: a preliminary development plan, VOL 2, Atlas of maps and illustrations, KwaZulu Government, Ulundi, various pages. (See also VOL 1, The written report, 341 p.). Some similar maps, including drainage regions in KwaZulu, are presented in Anonymous, 1988. KwaZulu development information, VOL 1 - 2, various pages, Government of KwaZulu and the Development Bank of Southern Africa, Halfway House.

An atlas of environmentally sensitive areas of Natal/KwaZulu is also available, entitled, Environmental atlas for KwaZulu-Natal. The atlas consists of a single overall map at a scale of 1 : 750 000. Some of the background digital information is confidential, and is only available from the Natal Parks Board, Pietermaritzburg. The map per se can be obtained from the Natal Town and Regional Planning Commission, Pietermaritzburg. Much valuable planning and management data are shown on the map including lakes, major rivers, floodplains, "estuaries", wetlands, and certain aquifer recharge areas. Also indicated are river reaches of conservation/scenic importance; formal and informal protected areas; habitats of threatened species; key vegetation communities; areas of high species diversity; breeding areas; sites of scenic value; sites of geological/geomorphological/scientific interest, and historical sites as well as national monuments. The data on the map refer to 1994.

3.5.15 Topographic/settlement maps scale 1 : 250 000

Seven maps (listed below) indicating topography as well as settlement types for Natal/KwaZulu (published in 1987), are available from the Inkatha Institute for South Africa, P O Box 2415, Durban, 4000. Copies of the aerial photographs flown for the project are also available from the Institute.

- Preliminary mapping of settlement distribution KwaZulu/Natal, Sheet No. 1 (covers the Newcastle and Vryheid areas).
- Preliminary mapping of settlement distribution KwaZulu/Natal, Sheet No. 2 (covers the Pongola and Mkuze areas).
- Preliminary mapping of settlement distribution KwaZulu/Natal, Sheet No. 3 (covers the Bergville and Dundee areas).
- Preliminary mapping of settlement distribution KwaZulu/Natal, Sheet No. 4 (covers the Richards Bay area).
- Preliminary mapping of settlement distribution KwaZulu/Natal, Sheet No. 5 (covers the Mooi River and Pietermaritzburg areas).

- Preliminary mapping of settlement distribution KwaZulu/Natal, Sheet No. 6 (covers the Durban area).
- Preliminary mapping of settlement distribution KwaZulu/Natal, Sheet No. 7 (covers the Kokstad and Port Shepstone areas).

See also: Fourie, C., Scogings, D., Aitken, D. and Hillerman, R., 1987. Preliminary mapping of settlement distribution KwaZulu/Natal: a multi-disciplinary technical explanation - the making of a map, Inkatha Institute for South Africa, Durban, 32 p.

3.5.16 Terrain recreation inventory maps of South Africa scale 1 : 250 000

A series of 1 : 250 000 scale topo-cadastral maps was produced by the then Department of Environmental Planning and Energy, now the Department of Environment Affairs, Pretoria, showing five classes of terrain capability for recreational use. The landscape was assessed in terms of recreational terrain units with regard to **activity elements** - both water and land-orientated recreation (for example, climbing, camping, walking, sailing and boating); and **viewing elements** (for example, flora and fauna as well as waterfalls and rapids). Viewing elements were subdivided into three categories, namely: physical landscape elements (such as topographic features); cultural landscape elements (cultural patterns and man-made structures), and historical place elements (for instance, historical and geological sites of interest). The following maps (with year of publication in brackets) are available for Natal/KwaZulu: 2632 Kosi Bay (1984); 27½32 St Lucia (1985); 2828 Harrismith (1984); 2928 Drakensberg (1984); 2930 Durban (1984); 3028 Kokstad (1985), and 3030 Port Shepstone (1984). The maps provide valuable data inter alia for coastal zone management and catchment planning purposes. For further details see: Anonymous, 1980. National outdoor recreation plan terrain capability classification, VOL 3 SATI (South African Terrain Inventory), Department of Environmental Planning and Energy, Pretoria, 82 p.

3.5.17 Terrain morphological map of southern Africa scale 1 : 2 500 000

The map was produced in 1983 by G.P. Kruger. Southern Africa was divided into six broad morphological divisions, which were further subdivided into 30 smaller units. Contact the Institute for Soil, Climate and Water, Pretoria.

3.5.18 Geological Survey open file maps

A series of 1 : 50 000 scale open file geological overlay maps, which can be placed over standard 1 : 50 000 scale topographic maps, is available for most of Natal/KwaZulu. The maps are produced as sepias or prints. The series is currently restricted and special permission is required to obtain copies. Contact Geological Survey, Department of Mineral and Energy Affairs, P O Box 900, Pietermaritzburg, 3200. See: Anonymous, undated. Open file list: reports and maps, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 44 p. and map indexes. (Geological Survey has subsequently become a statutory council and is now known as the Council for Geoscience. Addresses remain the same).

3.5.19 Durban Functional Region aerial photographs and maps

Three sets of black and white aerial photographs, scale 1 : 20 000 are available for the Durban Functional Region. The photographs were flown in 1979, 1983 and 1987 primarily to identify and assess changes in informal settlements in the Durban Functional Region. Some of the data are available on floppy diskettes. Contact the Department of Surveying and Mapping, University of Natal, Durban, or the Inkatha Institute for South Africa, Durban. (Both organizations were involved with the project). Three reports are also available:

- Jenkins, D.P., Scogings, D.A., Margeot, H., Fourie, C. and Perkin, P., 1986. Investigation of the emerging patterns of Zulu land tenure and their implications for the establishment of effective land information and administrative systems as a base for development, Department of Surveying and Mapping, University of Natal, Durban, 100 p.

- Jenkins, D.P. and Marais, M., 1990. Investigation of the emerging patterns of Zulu land tenure and their implications for the establishment of effective land information and administrative systems as a base for development, Part 1: a statistical report for the 1987 survey incorporating the dwelling counts of 1979 and 1983, Department of Surveying and Mapping, University of Natal, Durban, 95 p.
- Jenkins, D.P. and Marais, M., 1990. Investigation of the emerging patterns of Zulu land tenure and their implications for the establishment of effective land information and administrative systems as a base for development, Part 2: the 1987 social surveys and the final format of the data base of the 1979, 1983 and 1987 hut counts, Department of Surveying and Mapping, University of Natal, Durban, 93 p.

A map is similarly available from the Department of Surveying and Mapping entitled, Informal housing survey - black housing density: 1983 (Durban), scale 1 : 200 000.

A further set of aerial photographs was flown on behalf of the Inkatha Institute in 1990. The resulting map produced by the Institute in 1990 (no scale given) is entitled, Black formal and informal settlements in the D.F.R., April 1990. See: George, M.F., 1990. A functional update on the Durban Functional Region, 1990: empirical data accompanying map entitled: "Black formal and informal settlements in the D.F.R., April 1990", Inkatha Institute for South Africa, Durban, no pagination. Another map is also available from the Institute entitled, Shack areas in Greater Durban, 1986 (no scale given). The Urban Foundation (now amalgamated with the Consultative Business Movement), P O Box 3895, Durban, 4000, produced nine map sheets at a scale of 1 : 20 000 entitled, Greater Metropolitan Durban.

The Department of Environment Affairs, Pretoria, has released the first in a series of metropolitan environmental potential (ENPAT) atlases for South Africa. The objective of the GIS atlases is to provide planners and developers (involved in urban areas) with an environmental decision support system. Information such as hydrological data, slope, and existing land use patterns as well as natural and cultural features is presented in a computer-based overlay model. Users must be in possession of dedicated computer equipment. Atlas data are provided on diskettes which are available at cost. Maps can be printed on request, and can be supplied according to the needs of the user. The first metropolitan atlas, available at a 1 : 50 000 scale, covers the Durban Functional Region.

This will be followed by an atlas for the Pretoria-Witwatersrand-Vereeniging area in 1995, Cape Town and Port Elizabeth in 1996, Bloemfontein/Botshabelo in 1997 (all at a 1 : 50 000 scale), and the entire coastal area in 1998. A national environmental potential atlas (with a scale of 1 : 1 000 000), is likewise available and is aimed at macro (overview) scenario planning. The national atlas contains two main data types, namely, environmental data and population data. The potential environmental impacts of broad planning actions or national policy decisions can therefore be modelled and predicted. The national atlas also provides a means of identifying possible conflict areas in terms of the utilization of natural resources. The most important advantage of the environmental potential atlases is that the environmental implications of land use decisions can be modelled, prior to any action on the ground. A whole range of alternatives can accordingly be examined in the planning stages of projects.

3.5.20 KwaZulu maps scale 1 : 800 000

The maps are printed on A2 size paper and are available as ammonia prints or sepia transparencies. The maps were produced by the Centre for Social and Development Studies, University of Natal, Durban.

Map designation

KwaZulu map	A	Distribution of population by enumerator's sub-district - 1985 census
	B	Dot map showing distribution of population - 1985 census
	C	Distribution of children under 15 years by enumerator's sub-district - 1985 census
	D1	KwaZulu hospitals and clinics (relationship to hospital)
	D2	KwaZulu hospitals and clinics (by name)
	E	KwaZulu schools
	F	Comparison of 1980 and 1985 census boundaries.

3.5.21 Natal/KwaZulu maps scale 1 : 1 000 000

The maps are available as ammonia prints or sepia transparencies. The maps can be obtained from the Centre for Social and Development Studies, University of Natal, Durban.

Map designation

Map	1	Natal and KwaZulu: magisterial districts
	2	Natal: spatial distribution of schools for blacks
	3	Natal: spatial distribution of medical facilities for blacks
	4	Natal: post offices, police stations, magistrates' courts and pension points
	5	Natal: local government
	6	Natal: spatial distribution of State services for blacks
	7	Natal: black settlement and local authorities
	8	Natal: roads, railways and local authorities
	9	Natal: urban and rural areas
	A	Spatial distribution of Natal's black population: total population
	B	Spatial distribution of Natal's black population: all persons 0 - 4 years
	C	Spatial distribution of Natal's black population: all persons 5 - 15 years
	D	Spatial distribution of Natal's black population: percentage 20 - 24 age group with no education
	E	Spatial distribution of Natal's black population: percentage 20 - 24 age group with post primary education
	F	Spatial distribution of Natal's black population: females aged 60 + and males aged 65 +.

3.5.22 Population map of South Africa scale 1 : 2 500 000

See: Smit, P., Booysen, J.J. and Cornelius, I., 1983. Population distribution in the RSA, Transkei, Bophuthatswana, Venda and Ciskei: explanatory notes accompanying the 1980 population distribution map (scale 1 : 2 500 000), Report No. GR-W-2, Human Sciences Research Council, Pretoria, 9 p. The map is entitled, Population distribution in the RSA, Transkei, Bophuthatswana, Venda and Ciskei 1980, scale 1 : 2 500 000 and was compiled by I. Cornelius and J.J. Booysen for the Main Committee of the Human Sciences Research Council Investigation into Intergroup Relations. See also: Zietsman, H.L. and Van der Merwe, I.J., 1986. Population census atlas of South Africa, Publication No. 15/1986, Institute for Cartographic Analysis, University of Stellenbosch, Stellenbosch, no pagination. (The Institute is involved with map production and has a specialist collection of various southern African maps).

Useful maps containing demographic, socio-economic and education information can be found in the following: Krige, D., Dove, S., Makalima, B. and Scott, D., 1994. The Education Atlas of South Africa, EGIS Unit, Education Foundation, Durban, 198 p. + app. and maps. (The publication includes maps showing inter alia population density in South Africa; various race groups as a percentage of the total population; population changes; the percentage of urban dwellers; the percentage of the population for given ages; the percentage of households living in poverty, and annual per capita income distribution - all in terms of GIS generated data, based on the 1991 population census).

3.5.23 Street/suburb/town maps of Natal/KwaZulu

The firm A.C. Braby Ltd, P O Box 1426, Pinetown, 3600, publishes a number of relevant maps including maps showing the industrial areas of Pietermaritzburg and the Durban Functional Region. Similar maps are available from Map Studio Ltd, P O Box 624, Bergvlei, 2012.

3.5.24 General map of Natal/KwaZulu

The Automobile Association of South Africa, P O Box 91257, Auckland Park, 2006, has a map available entitled, Natal AA RSA: PM-4, 879/30, scale 1 : 1 050 000. The map, which is regularly updated, illustrates certain roads, game (and other) reserves, major rivers and dams as well as cities, towns and villages. The borders of KwaZulu are clearly indicated. Similar data are provided for provinces/countries adjacent to Natal/KwaZulu. The map is a most useful general source document. Automobile Association maps are also available for the other provinces.

3.5.25 Magisterial districts of Natal/KwaZulu

A new (revised) map showing the latest boundaries of magisterial districts and provinces and entitled, Republic of South Africa magisterial districts and provinces, scale 1 : 2 500 000, was compiled in April 1994 by the (post-1994 election) Department of Land Affairs, Private Bag, Mowbray, 7705. A smaller A3 size map is also available. Both maps were updated in 1995.

3.6 Geographic Information Systems in Natal/KwaZulu

The following list provides addresses of some GIS, CAD (Computer Aided Design) and specialized computer mapping users in Natal/KwaZulu.

- Aerial Photographic Service, P O Box 212074, Oribi, 3205.
- Air Survey Company of Africa Ltd, P O Box 2836, Durban, 4000.
- Chief Directorate: Physical Planning and Development, Natal Provincial Administration, Private Bag X9037, Pietermaritzburg, 3200.
- Computing Centre for Water Research/Department of Agricultural Engineering, University of Natal, Private Bag X01, Scottsville, 3209.
- CSIR, P O Box 17001, Congella, 4013.
- Department of Agriculture, Private Bag X9059, Pietermaritzburg, 3200.
- Department of Geography, University of Natal, Private Bag X01, Scottsville, 3209.
- Department of Geographical and Environmental Sciences/Department of Surveying and Mapping, University of Natal, Private Bag X10, Dalbridge, 4014.
- Department of Hydrology, University of Zululand, Private Bag X1001, KwaDlangezwa, 3886.
- Department of National Health and Population Development, Private Bag X54318, Durban, 4000.
- Department of Regional and Land Affairs, P O Box 396, Pietermaritzburg, 3200.
- Department of Water Affairs and Forestry, P O Box 1018, Durban, 4000.
- Education Foundation, P O Box 2925, Durban, 4000.

- ESKOM, P O Box 66, New Germany, 3620.
- Human Sciences Research Council, P O Box 17302, Congella, 4013.
- Institute for Commercial Forestry Research, P O Box 100281, Scottsville, 3209.
- Institute for Social and Economic Research/Department of Geography, University of Durban-Westville, Private Bag X54001, Durban, 4000.
- Institute of Natural Resources, University of Natal, Private Bag X01, Scottsville, 3209.
- KwaZulu Government Survey and Mapping Division, Department of Works, Private Bag X03, Ulundi, 3838.
- Mondi Forests (South), P O Box 39, Pietermaritzburg, 3200.
- Natal Parks Board, P O Box 662, Pietermaritzburg, 3200.
- National Malaria Research Programme, Medical Research Council, P O Box 17120, Congella, 4013.
- Roads Branch, Natal Provincial Administration, Private Bag X9043, Pietermaritzburg, 3200.
- South African Sugar Association Experiment Station, Private Bag X02, Mount Edgecombe, 4300.
- Southern Natal Joint Services Board, P O Box 33, Port Shepstone, 4240.
- Umgeni Water, P O Box 9, Pietermaritzburg, 3200.
- Several local authorities in Natal/KwaZulu such as the Durban and Pietermaritzburg city engineer's departments, make use of Geographic Information Systems inter alia in the form of a Land Information System (LIS). The system is specifically designed

for urban management purposes and incorporates title deed information, town planning data, and "as-built" engineering drawings.

3.6.1 Some GIS projects undertaken in Natal/KwaZulu

Examples of projects with direct or indirect relevance to water resources planning include: the mapping of elevation data for southern Africa; the spatial distribution of rainfall, temperature, evaporation and runoff across southern Africa; the distribution of rivers, wetlands and surface water bodies in Maputaland; the distribution of roads and rivers in the Durban Functional Region, and the distribution of bioclimatic regions in Natal/KwaZulu. Other projects include the digitising of the Acocks veld type maps for southern Africa, the development of a groundwater vulnerability-to-pollution map for southern Africa, and the digitising of the 1 : 4 000 000 scale geological map of Africa south of the Equator. Further work has involved the modelling of possible global climate changes with reference to southern Africa, and the mapping of environmental degradation (natural vegetation and soil erosion) across Natal/KwaZulu. The primary productivity of indigenous vegetation in southern Africa has likewise been assessed using GIS. Land use categories in the Durban Functional Region - including existing and planned industrial sites - have been examined, while GIS has been used to map the location of towns in the Mfolozi River catchment. Land use, Land Types, rivers and farm dams in the Mgeni River catchment, plus conservation priority areas in various game/nature reserves have also received attention. LANDSAT imagery for use in GIS is available for the whole of Natal/KwaZulu, while SPOT imagery has been used, for instance, to map road networks.

In terms of socio-economic data (with reference to the 1991 census), the spatial distribution of the population in Natal/KwaZulu as well as age statistics and dependency ratios, plus the distribution of schools, clinics and hospitals have all been digitised at census enumerator district level. Similar data are available at magisterial district level. GIS has also been used to provide spatial planning data with regard to informal settlements in the Durban Functional Region.

The use of GIS is still relatively new in South Africa and further refinements can be expected. The number and variety of the final products available is rapidly increasing - which in turn implies that constant efforts are required to ensure the comprehensive listing

of such data for Natal/KwaZulu*. It should be noted that the Chief Directorate: Surveys and Land Information, Department of Regional and Land Affairs, Mowbray, maintains the Central Register of Available Digital Geo-referenced Information which lists sources of GIS-type data.

The following references (for example) provide some overview details on the use of GIS in Natal/KwaZulu

Catchments

- Fincham, R.J. and Berjak, M., 1990. Development of a planning and management GIS for Maputaland: report to the Department of Development Aid, INR Investigational Report No. 47, Institute of Natural Resources, University of Natal, Pietermaritzburg, 41 p.
- Fincham, R.J., Berjak, M. and Cairns, S., 1990. Mfolozi catchment: development of a Geographic Information Systems programme, Phases one and two: report to the Department of Development Aid, INR Investigational Report No. 56, Institute of Natural Resources, University of Natal, Pietermaritzburg, 52 p. + app.
- Fincham, R.J., Mander, J.J. and Martin, C., 1991. ESKOM workshop proceedings: assessment of information needs for strategic planning in Natal/KwaZulu, Wednesday, 7 November 1990, INR Occasional Paper No. 106, Institute of Natural Resources, University of Natal, Pietermaritzburg, 84 p. (The publication briefly outlines some important sources of mapped environmental and planning data - including GIS data).

* A partial listing is available in Anonymous, 1994. Geographical Information System policy for the Town and Regional Planning Commission, GIMS Ltd, [Durban], 28 p. + app. See also, Clarke, D.G., Cooper, A.K., Liebenberg, E.C. and Van Rooyen, M.H., 1988. On proposing a national standard for the exchange of digital geo-referenced information, South African Journal of Photogrammetry, Remote Sensing and Cartography, VOL 15(1), p. 35 - 41.

Local authorities

- Poolman, J.P.J., 1990. GIS as a management information system in a civil engineering environment, Civil Engineer in South Africa, VOL 32(10), p. 407 - 408, 463.
- Szecsei, Z., 1990. Implementing the water network component of a municipal GIS, Water Sewage and Effluent, VOL 10(3), p. 37 - 38.
- Van den Berg, M.N., 1989. Incorporating GIS and related technologies into local authority structures: the Pietermaritzburg City Engineer's experience, South African Journal of Photogrammetry, Remote Sensing and Cartography, VOL 15(3), p. 126 - 131.
- Zietsman, H.L., 1992. Geographical Information Systems and their applicability to Regional Services Councils in the Republic of South Africa, South African Journal of Geo-information, VOL 16(3), p. 76 - 83.

Natal Parks Board

- Colvin, I., 1990. A short history of the Natal Parks Board GIS, Nagis News, No. 2, January 1990, p. 3 - 4.
- Colvin, I., 1990. Review of GIS development in the Natal Parks Board, Nagis News, No. 2, January 1990, p. 5.
- Colvin, I., 1991. GIS technology needs of the Natal Parks Board, Pietermaritzburg, 7 p.
- Colvin, I., 1991. The Natal Parks Board and GIS, Natal Parks Board, Pietermaritzburg, 6 p.
- Colvin, I.S., 1987. CSIR-FRD Project FAA-15: the mapping of degraded landscapes in Natal - a pilot project, Natal Parks Board, Pietermaritzburg, 10 p. + app.

Planning in the Durban Functional Region - including a few papers providing general background statistics on KwaZulu

- Ardington, L., 1991. Education for all: spatial dimensions, Indicator South Africa, VOL 8(2), p. 79 - 82.
- Bekker, S., 1991. Demographic scenarios: monitoring migration, Indicator South Africa, VOL 8(2), p. 36 - 37.
- Fincham, R. and Piper, S., 1991. (D)urbanisation data: testing a new technology, Indicator South Africa, VOL 8(2), p. 51 - 54.
- Hambridge, M. and Krige, D., 1991. Health care: in search of a cure, Indicator South Africa, VOL 8(2), p. 67 - 70.
- Krige, D., 1991. Job creation: making the region work, Indicator South Africa, VOL 8(2), p. 33 - 35.
- Krige, D. and Fincham, R., 1991. Data for development: meeting basic needs, Indicator South Africa, VOL 8(2), p. 65 - 66.
- Moulder, J., 1991. Unequal inequalities, teacher: pupil ratios, Indicator South Africa, VOL 8(2), p. 76 - 78.
- Piper, S.E., 1989. Developing Geographic Information Systems in southern Africa: the University of Natal's role, South African Journal of Photogrammetry, Remote Sensing and Cartography, VOL 15(3), p. 149 - 156.
- For a brief, general overview of some population and other statistics on KwaZulu see: Muthien, Y., 1991. The fragmented state: KwaZulu in profile, Indicator South Africa, VOL 8(2), p. 38 - 43.

Water resources planning

- Pulles, W., Howie, D., Otto, D. and Easton, J., 1996. A manual on mine water treatment and management practices in South Africa, Appendix, VOL 1: Literature reviews, WRC Report No. 527/1/96, Water Research Commission, Pretoria, various pages. (A brief although useful overview of information management for water projects, with reference to GIS and remote sensing, can be found at the end of the report. See pages 28.1 - 28.10).
- Schulze, R.E., Schäfer, N.W. and Lynch, S.D., 1989. An assessment of regional runoff production in Qwa Qwa: a GIS application of the "ACRU" modelling system, South African Journal of Photogrammetry, Remote Sensing and Cartography, VOL 15(3), p. 141 - 148.
- Van Riet, W. and Vosloo, P., 1990. The role of Geographic Information Systems and Integrated Environmental Management in the landscape planning of catchments, WRC Report No. KV 24/90, Water Research Commission, Pretoria, 277 p.

For further information consult the following:

- Computer Graphics, VOL 1(1) April 1990 (on-going), published by Technique Publishing Ltd, P O Box 626, Kloof, 3640.
- Contagis News, published by the then Department of Surveying (now Mining Engineering), University of the Witwatersrand, Private Bag 3, Wits, 2050.
- Nagis News, No. 1 June 1989 (on-going), published by Nagis, P O Box 100650, Scottsville, 3209.
- South African Journal of Photogrammetry, Remote Sensing and Cartography/South African Journal of Geo-information, VOL 1(1) May 1959 (on-going), published by the South African Photogrammetry and Geo-information Society, P O Box 69, Newlands, 7725. Note that the name of the journal changed with effect from VOL 16(1) March 1991 - as indicated above.

NOTES:

NOTES:

NOTES:

CHAPTER 4: GEOLOGY

The importance of geology...

I will open rivers in high places and fountains in the midst of the valleys. I will make the wilderness a pool of water and the dry land springs of water.

Isaiah, 41:18

CHAPTER 4: GEOLOGY

<u>Contents</u>	<u>Page</u>
4.1 Overview of the chapter	212
4.2 South African stratigraphy	214
4.2.1 Official geological bibliographies of the Union/Republic of South Africa	217
4.2.2 The 1 : 1 000 000 scale geological map (and explanation) of southern Africa	218
4.2.3 Geological Survey reports specifically on Natal/KwaZulu (1 : 250 000 scale map series)	219
4.3 Geology and soils in Natal/KwaZulu	222

<u>Table</u>	<u>Page</u>
Table D1: Summary of principal geomorphic events in southern Africa since the Mesozoic	212

4.1 Overview of the chapter

The chapter on geology provides certain background data for the present publication. Only a summarized core of source information is presented. Geological data have relevance *inter alia* for the study of landforms (see the chapter on catchments), groundwater and groundwater quality (see the chapters on groundwater and water quality), as well as for the study of soils and soil erosion (see the relevant chapter), and waste disposal (see the chapter on solid waste management). Data provided in the chapter on geology concern (a) principal geomorphic events in southern Africa (Table D1), (b) the South African stratigraphic classification system, (c) official (and other) geological bibliographies for South Africa, (d) the 1 : 1 000 000 scale geological map and memoir of southern Africa, and (e) the 1 : 250 000 scale maps and reports covering Natal/KwaZulu. Further sources of geological information and some texts useful for primary reference purposes are listed. A brief outline of geology and soils in Natal/KwaZulu completes the chapter. Note that the Geological Survey of the Department of Mineral and Energy Affairs has partly been privatised, and is now known as the Council for Geoscience. The old name has been retained in this publication in order to avoid confusion.

Table D1: Summary of principal geomorphic events in southern Africa since the Mesozoic.

Event	Geomorphic manifestation	Offshore sedimentation	Age
Climatic oscillations and glacio-eustatic sea-level changes (most pronounced during middle and late Pleistocene)	Low-level marine benches, coastal dune deposits, river terraces, Kalahari sands	Accumulation of cones off mouths of major rivers. Widespread erosion elsewhere following the development of near-shore current circulations. Renewed sedimentation in deep ocean basins	Late Pliocene to Holocene
Post-African II cycle of major valley incision, especially in the south eastern coastal hinterland	Incision of coastal gorges, downcutting and formation of higher terraces along interior rivers, formation of Post-African II erosion surface (with planation restricted to the eastern Lowveld region)		

Table D1: Summary of principal geomorphic events in southern Africa since the Mesozoic (continued).

Event	Geomorphic manifestation	Offshore sedimentation	Age
Major uplift (up to 900 m in the eastern marginal areas)	Asymmetrical uplift of the subcontinent and major westward tilting of previous land surfaces of the interior, with monoclinical warping along the southern and eastern coastal margins		Late Pliocene ($\approx 2,5$ Ma)
Post-African I cycle of erosion	Development of imperfectly planed Post-African I erosion surface. Major deposition in the Kalahari Basin	Renewed sedimentation giving rise to Uloa Formation (south eastern coast), upper Alexandria Formation (southern coast), Bredasdorp Formation (southern and western coasts), and Elandsfontyn and Varswater formations (western coast). Major resurgence of sedimentation in deep ocean basins	Early mid-Miocene to late Pliocene
Moderate uplift of 150 - 300 m	Slight westward tilting of the African surface with limited coastal monoclinical warping. Subsidence of the Bushveld Basin		End of early Miocene (≈ 18 Ma)
African cycle of erosion (polycyclic)	Advanced planation throughout subcontinent. Surface at two levels above and below Great Escarpment. Development of deep-weathered laterite and silcrete profiles. Development of the Kalahari Basin with concomitant onset of sedimentation towards the end of the Cretaceous	Widespread epeirogenic sedimentation in several pulses, as exemplified by offshore Alphard Formation, Mzinene and St Lucia formations of the south eastern coast, and lower Alexandria Formation of the southern coast. General slowing of shelf sedimentation from end-Cretaceous, culminating in major Oligocene unconformity	Late Jurassic/ early Cretaceous to end of early Miocene
Break up of Gondwanaland through rift faulting	Initiation of Great Escarpment owing to high absolute elevation of the southern African portion of Gondwanaland. Deposition of Enon Conglomerate Formation	Rapid, localized taphrogenic sedimentation producing <u>inter alia</u> Uitenhage Group of the southern coast	Late Jurassic/ early Cretaceous

Source: After Partridge, T.C. and Maud, R.R., 1987. Geomorphic evolution of southern Africa since the Mesozoic, South African Journal of Geology, VOL 90(2), p. 179 - 208. (The paper contains a detailed explanation of events, with a useful synopsis).

- See also:**
- (i) Moon, B.P. and Dardis, G.F., 1988. Chapter 1. Introduction, In: Moon, B.P. and Dardis, G.F. (eds), The Geomorphology of Southern Africa, Southern Book Publishers, Johannesburg, p. 1 - 11. (The chapter provides a useful overview of geological and geomorphological events in southern Africa for the non-specialist).
 - (ii) Moore, J., 1994. The South African landscape: evolution and exploration, South African Mining World, VOL 13(1), p. 21 - 24. (The paper provides a general overview of events).
 - (iii) Partridge, T.C. and Maud, R.R., 1988. The geomorphic evolution of southern Africa: a comparative review, In: Dardis, G.F. and Moon, B.P. (eds), Geomorphological Studies in Southern Africa, A.A. Balkema, Rotterdam, p. 5 - 15.
 - (iv) Tankard, A.J., Jackson, M.P.A., Eriksson, K.A., Hobday, D.K., Hunter, D.R. and Minter, W.E.L., 1982. Crustal Evolution of Southern Africa: 3.8 Billion Years of Earth History, Springer-Verlag, New York, 523 p.
-

4.2 South African stratigraphy

After many years, the South African stratigraphic classification system was revised in 1980, by the South African Committee for Stratigraphy. Stratigraphic classification into units can be done on a lithostratigraphic basis (according to the character of the rocks); a biostratigraphic basis (according to the fossil content or palaeontological character), and on a chronostratigraphic basis (according to age). The new lithostratigraphic terms are as follows:

- (i) A formation is the fundamental unit. The next lowest in rank namely, a member (an entity within a formation), differs from the other parts of a formation in respect of lithologic character. A bed is a distinctive layer within a member.
- (ii) Two or more successive formations make up a group. A subgroup is used when there is a need to differentiate an assemblage of successive formations from the rest of the group. A supergroup refers to several successive groups, or groups and formations with significant lithologic features in common.

- (iii) Sequence is used for stratigraphic units of greater rank than supergroup, which are traceable over large areas, and which are generally bounded by major unconformities. It should be noted that the term "sequence" is now (June 1994), no longer acceptable.
- (iv) A complex is a rock unit composed of igneous, metamorphic or even sedimentary rocks characterized by a complicated structure.
- (v) A suite is the fundamental rock unit in intrusive igneous and high-grade metamorphic terrains. A complex may include one or more suites or even formations.

In the old system (based on chronostratigraphic features), the various subdivisions were respectively: **era** (for example, Mesozoic Era), **system** (for example, Karoo System), and **series** (for example, Beaufort Series). In the latest lithostratigraphic subdivision, supergroup replaces "system", with group replacing "series". The respective changes were outlined by the South African Committee for Stratigraphy (1980 - see below). Some of the changes include Natal Group (previously Table Mountain Series), Dwyka Group (previously Dwyka Series), Beaufort Group (previously Beaufort Series), Ecca Group (previously Ecca Series), Molteno Formation (previously Molteno Beds), Clarens Formation (previously Cave Sandstone), and Elliot Formation (the Nyoka Formation in north eastern Natal/KwaZulu) - previously known as the Red Beds. These changes will result in confusion on the part of non-experts, given that the stratigraphic classification system is being continuously updated and expanded. Accordingly, a senior geologist should be consulted where necessary. Some assistance is possible through examination of the 1 : 1 000 000 scale and 1 : 250 000 scale geological map series (see below).

In summary:

Era					
System	Supergroup/sequence (the latter now in disuse)				
Series	Group	Subgroup 1	Formation A	Member 1	Bed a Bed b
			Formation B	Member 2	Bed c Bed d
				Member 3	Bed e Bed f
				Member 4 Member 5	
		Subgroup 2	Formation C		
			Formation D		

- See also:**
- (i) Lurie, J., 1989. South African Geology for Mining, Metallurgical, Hydrological and Civil Engineering, Lexicon Publishers, Johannesburg, 342 p.
 - (ii) South African Committee for Stratigraphy, 1980. Stratigraphy of South Africa, Part 1 (Kent, L.E., compiler): Lithostratigraphy of the Republic of South Africa, South West Africa/Namibia and the Republics of Bophuthatswana, Transkei and Venda, Handbook No. 8, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 690 p. Certain errata were corrected in the following: Walraven, F. and Johnson, M.R., undated. Errata for Handbook 8, Stratigraphy of South Africa, Part 1: Lithostratigraphy of the Republic of South Africa, South West Africa/Namibia and the Republics of Bophuthatswana, Transkei and Venda, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, various pages.
 - (iii) Johnson, M.R., 1987. Guidelines for standardised lithostratigraphic descriptions, South African Committee for Stratigraphy Circular No. 1, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 18 p. + app.
 - (iv) Johnson, M.R. (ed), 1989. Catalogue of South African lithostratigraphic units, South African Committee for Stratigraphy, VOL 1, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, various pages.
 - (v) Johnson, M.R. (ed), 1990. Catalogue of South African lithostratigraphic units, South African Committee for Stratigraphy, VOL 2, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 50 p. + app.

- (vi) Johnson, M.R. (ed), 1991. Catalogue of South African lithostratigraphic units, South African Committee for Stratigraphy, VOL 3, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 52 p. + app.
 - (vii) Johnson, M.R. (ed), 1992. Catalogue of South African lithostratigraphic units, South African Committee for Stratigraphy, VOL 4, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 44 p. + app.
-

4.2.1 Official geological bibliographies of the Union/Republic of South Africa

Hall, A.L., 1922. A bibliography of South African geology to the end of 1920: authors' index, Memoir No. 18, Geological Survey, Department of Mines and Industries, Pretoria, 376 p.

Hall, A.L., 1924. A subject index to the literature on the geology and mineral resources of South Africa, Memoir No. 22, Geological Survey, Department of Mines and Industries, Pretoria, 384 p.

Hall, A.L., 1927. A bibliography of South African geology for the years 1921 to 1925 (inclusive): authors' index, Memoir No. 25, Geological Survey, Department of Mines and Industries, Pretoria, 117 p.

Hall, A.L., 1931. A bibliography of South African geology for the years 1926 to 1930 (inclusive): authors' index, Memoir No. 27, Geological Survey, Department of Mines and Industries, Pretoria, 160 p.

Hall, A.L., 1937. A bibliography of South African geology for the years 1931 to 1935 (inclusive): authors' index, Memoir No. 30, Geological Survey, Department of Mines, Pretoria, 168 p.

Hall, A.L., 1939. A subject index to the literature of South African geology and mineral resources for the years 1921 to 1935 (inclusive), Memoir No. 37, Geological Survey, Department of Mines, Pretoria, 288 p.

Haughton, S.H., 1973. Bibliography of South African geology 1936 - 1956: subject index, Geological Survey, Department of Mines, Pretoria, 72 p.

Wilson, P.T., 1972. Bibliography of South African geology 1936 - 1956: index of authors, Geological Survey, Department of Mines, Pretoria, 72 p.

An annual bibliography is published by the Department, the first of which was released in 1957. All the bibliographies have the same title (although authors, date of publication and the year covered, differ). An example is as follows: Cain, A.C., Vermeulen, E.E. and Van Romburgh, C.E., 1989. Bibliography and subject index of South African geology 1987, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 139 p.

It should be noted that the Economic Geology Research Unit at the University of the Witwatersrand has produced two (and possibly more), useful bibliographies of geological theses. See: Anhaeusser, C.R., 1987. Bibliography of theses in the geological sciences submitted to universities in southern Africa 1972 - 1986, Information Circular No. 195, Economic Geology Research Unit, University of the Witwatersrand, Johannesburg, 82 p., as well as Pretorius, D.A., 1972. Bibliography of theses in the geological sciences submitted to universities in southern Africa, Information Circular No. 67, Economic Geology Research Unit, University of the Witwatersrand, Johannesburg, 98 p.

4.2.2 The 1 : 1 000 000 scale geological map (and explanation) of southern Africa

The map is entitled, Geological map of the Republics of South Africa, Transkei, Bophuthatswana, Venda and Ciskei and the Kingdoms of Lesotho and Swaziland. (The map was compiled by D.J.L. Visser (and others) and was published as four separate sheets in 1984 by Geological Survey, Department of Mineral and Energy Affairs, Pretoria). The relevant explanation (memoir) is: Visser, D.J.L., 1989. Explanation of the 1 : 1 000 000 geological map, fourth edition, 1984: the geology of the Republics of South Africa, Transkei, Bophuthatswana, Venda and Ciskei and the Kingdoms of Lesotho and Swaziland, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 491 p. (It should be noted that details of mines in production - shown on the map - are provided in the explanation). The map is being revised. The new map will be released in due course.

4.2.3 Geological Survey reports specifically on Natal/KwaZulu (1 : 250 000 scale map series)

- De Decker, R.H., 1981. Geology of the Kokstad area: explanation of sheet 3028 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 22 p.
- Du Preez, J.W. and Wolmarans, L.G., 1986. Die geologie van die gebied Kosibaai: toeligting van blad 2632 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 19 p.
- Linström, W., 1981. Die geologie van die gebied Drakensberg: toeligting van blad 2928 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 33 p.
- Linström, W., 1987. Die geologie van die gebied Durban: toeligting van blad 2930 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 33 p.
- Linström, W., 1987. Die geologie van die gebied Vryheid: toeligting van blad 2730 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 48 p.
- Linström, W., 1987. The geology of the Dundee area: explanation of sheet 2830 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 52 p.
- Thomas, R.J., 1988. The geology of the Port Shepstone area: explanation of sheet 3030 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 136 p.
- Wolmarans, L.G. and Du Preez, J.W., 1986. The geology of the St Lucia area: explanation of sheet 27½32 (1 : 250 000), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 42 p.

Note: There is a slight difference between the coverage of 1 : 250 000 scale geological maps and 1 : 250 000 scale topographic and topo-cadastral maps. (See the chapter on maps).

Geological Survey publications, maps and reports are listed in the following series:

Example

Anonymous, 1991. Open file catalogue of the S.A. Geological Survey, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 33 p. (Open file maps and reports were previously readily available, but are now restricted).

Anonymous, 1992. Annual technical report of the Geological Survey of South Africa, 1991, Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 121 p. (First published in 1988. Note that the Annals of the Geological Survey previously published separately by the Department, and containing scientific papers, now forms part of the annual technical report).

Anonymous, 1992. Catalogue of publications of the Geological Survey of the Republic of South Africa: (including publications on South West Africa/Namibia up to 1980), Geological Survey, Department of Mineral and Energy Affairs, Pretoria, 88 p. and maps. (Published annually).

See also:

Research digest of the Geological Survey, Geological Survey, Department of Mineral and Energy Affairs, Pretoria. (Published twice a year in the period January 1986 to December 1988 inclusive).

The following texts are useful for primary reference:

- Brink, A.B.A., 1979. Engineering Geology of Southern Africa, VOL 1: The First 2 000 Million Years of Geological Time, Building Publications, Pretoria, 319 p. and maps.

- Brink, A.B.A., 1981. Engineering Geology of Southern Africa, VOL 2: Rocks of 2 000 to 300 Million Years in Age, Building Publications, Pretoria, 255 p. and maps.
- Brink, A.B.A., 1983. Engineering Geology of Southern Africa, VOL 3: The Karoo Sequence, Building Publications, Pretoria, 320 p.
- Brink, A.B.A., 1985. Engineering Geology of Southern Africa, VOL 4: Post-Gondwana Deposits, Building Publications, Pretoria, 332 p. and maps.
- Coetzee, C.B. (ed), 1976. Mineral Resources of the Republic of South Africa, fifth edition, Handbook No. 7, Geological Survey, Department of Mines, Pretoria, 478 p. and maps. (The publication is being revised).
- Dingle, R.V., Siesser, W.G. and Newton, A.R., 1983. Mesozoic and Tertiary Geology of Southern Africa, A.A. Balkema, Rotterdam, 375 p.
- Du Toit, A.L., 1954. The Geology of South Africa, third edition, Oliver and Boyd, Edinburgh, 611 p. (Reprinted in 1956 and 1966).
- Hamilton, G.N.G. and Cooke, H.B.S., 1965. Geology for South African Students: an Introductory Text-book, fifth edition revised, Central News Agency, [Johannesburg], 441 p. and maps.
- Haughton, S.H., 1969. Geological History of Southern Africa, Geological Society of South Africa, [Johannesburg], 535 p.
- King, L., 1978. The geomorphology of central and southern Africa, In: Werger, M.J.A. and Van Bruggen, A.C. (eds), Biogeography and Ecology of Southern Africa, Monographiae Biologicae VOL 31, W. Junk, The Hague, p. 1 - 17.
- King, L., 1982. The Natal Monocline: Explaining the Origin and Scenery of Natal, South Africa, University of Natal Press, Pietermaritzburg, 134 p.

- King, L.C., 1963. South African Scenery: a Textbook of Geomorphology, third edition, Oliver and Boyd, Edinburgh, 308 p.
- Lurie, J., 1989. South African Geology for Mining, Metallurgical, Hydrological and Civil Engineering, Lexicon Publishers, Johannesburg, 342 p.
- Macintosh, E.K., 1983. Rocks, Minerals and Gemstones of Southern Africa: a Collector's Guide, C. Struik, Cape Town, 120 p.
- Maud, R.R.M., 1962. The structure and possible origin of the coast of Natal, Ph.D. Thesis, [Department of Geology], University of Natal, Durban, 266 p.
- McIver, J.R., 1966. Gems, Minerals and Rocks in Southern Africa, Purnell, Cape Town, 268 p.
- Mountain, E.D., 1968. Geology of Southern Africa, Books of Africa, Cape Town, 249 p.
- Truswell, J.F., 1970. An Introduction to the Historical Geology of South Africa, Purnell, Cape Town, 167 p. and map.
- Truswell, J.F., 1977. The Geological Evolution of South Africa, Purnell, Cape Town, 218 p.

4.3 Geology and soils in Natal/KwaZulu*

The region has a considerable environmental diversity with a variety of parent rocks (such as granites, sandstones, shales and tillites), and marked differences in climate as well as natural vegetation, often within short distances. The interaction of geology,

* The discussion follows Anonymous, 1986. Natal Region agricultural development programme, Department of Agriculture and Water Supply (Natal Region), Cedara, various pages. (The text refers to the 1977 soil classification system. See the chapter on soils and soil erosion, for details of the latest classification system and for a discussion on soils in Natal/KwaZulu). See also, Van der Eyk, J.J., MacVicar, C.N. and De Villiers, J.M., 1969. Soils of the Tugela Basin: a study in subtropical Africa, Natal Town and Regional Planning Commission Report, VOL 15, Pietermaritzburg, 263 p. and maps, and Anonymous, 1984. Identification of the soils of the sugar industry, Bulletin No. 19 (revised), Experiment Station of the South African Sugar Association, Mount Edgecombe, 112 p., for a further discussion on geology and soils.

geomorphology and climate has resulted in the development of a varied, although often repetitive pattern of a large number of different types of soils. The soil patterns of each bioclimatic group are best described in association with their geology, and with appropriate reference to their climatic regime*.

In bioclimatic group 1, Recent sands cover much of the northern coastal plain, and stretch in a narrow band along the South Coast. In the north, grey Fernwood sands and occasionally Clovelly sands cover upland sites, with Red sands on the prominent dune ridges. Soils of the Shepstone Form are found in the southern coastal zone. Soils of the Champagne Form and of the Warrington Series are present in bottomlands, while sandy and silty clay alluvium occurs in many river mouths.

In the south, granites comprise a large proportion of the Coastal Lowlands and Coastal Hinterland (bioclimatic groups 1 and 2). Shallow, medium- and coarse-textured sandy Glenrosa soils dominate, with varying proportions of red and black clays. Granites exposed in the Dry (northern) Interior Valleys (bioclimatic groups 7, 9 and 10) give rise to similar Glenrosa soils, with duplex soils often found in bottomland positions. Highly-weathered, deep Hutton soils have developed from granite in bioclimatic group 6 in the western Pongola catchment.

Next in the geological stratigraphy are sandstones of the Natal Group, often exposed on characteristic moist Upland Plateau remnants, being parts of bioclimatic groups 2 and 3. Humic top soils are widespread in such landscapes, with Inanda and Nomanci soils dominant. The younger, commonly moderately-steep landscapes often comprise varying proportions of shallow and deep Cartref and Glenrosa soils, with red sandy-clay Hutton soils also evident.

Dwyka Tillite is extensive in many of the river valleys of bioclimatic groups 2, 9 and 10 and stretches to the upland Interior Basins of bioclimatic group 8. Fine- and medium-

* In terms of (pre-1980) stratigraphy, 11 main geological formations occur in Natal/KwaZulu. The most widespread are the Ecca Series (37,5% of Natal/KwaZulu), the Beaufort Series (14,1%), Basement granite (11,6%), Dwyka Series (9,8%), Recent sands (8,9%), and Table Mountain sandstone (6,6% of the province). Dolerite is intrusive throughout Natal/KwaZulu, and in parts occupies 25% of the landscape. Many rocky and non-arable areas are associated with doleritic outcrops (Scotney, D.M., 1983. Agricultural resources of Natal, Symposium on Thought for Food: the 21st Century, South African Society for Agricultural Extension (Natal Branch), 13 May 1983, Pietermaritzburg, 16 p.). Note: The concept of bioclimatic groups is outlined in the chapter on catchments. The term "Dwyka Tillite" *per se* is no longer in common use in the geological literature.

grained sandy loams of the Mispah and Glenrosa forms are widespread in the Dry Interior Valleys. Shallow plinthic soils of the Westleigh and Longlands forms may be present. Bottomlands frequently comprise severely-eroded calcareous duplex soils of the Swartland and Valsrivier forms. Swartland and Valsrivier soils are dominant on Dwyka Tillite in the moderately-moist Coastal Lowlands (bioclimatic group 1). In contrast, deep highly-weathered Griffin soils dominate in the moist Mistbelt (bioclimatic group 3), where Dwyka Tillite is the parent material.

Geology over much of the interior of Natal/KwaZulu comprises shales and sandstones of the Eccca and Beaufort groups, with a variety of soil patterns. Mispah is the dominant soil on shale in the drier zones of bioclimatic groups 2 and 10, but may occur in association with plinthic and duplex soils as well as shallow black clays. Clovelly soils are widespread on shale in the cool moist upland landscapes of bioclimatic groups 3, 4 and 5. Sandstones give rise to a wider spectrum of soils. The Eccca Group is dominated by medium-grained sandstones, while the Beaufort Group sandstones commonly comprise finer sand fractions. The Dry Interior Valleys, bioclimatic groups 9 and 10 and the Dry Interior Basins, plus bioclimatic group 8 areas, are frequently dominated by soils of the Swartland, Valsrivier, Sterkspruit and Estcourt forms. In higher rainfall areas in bioclimatic groups 8a and 8b, these soils may occur together with Longlands soils in varying proportions.

Where dolerite has intruded the sandstones, clays of the Shortlands, Bonheim, Arcadia, Mayo and Rensburg forms are commonly found. Avalon and Longlands soils are dominant in the Moist Interior Basins of bioclimatic group 6. Dystrophic clays and sandy clays of the Clovelly, Griffin, Hutton and Katspruit forms are uniformly widespread over the cool moist Mistbelt, Highland Sourveld and Drakensberg foothills (bioclimatic groups 3, 4 and 5). Red and black clays have formed on basalt of the Lebombo Group (bioclimatic groups 10 and 11), while lithosols are encountered on rhyolite.

In general, where the mean annual precipitation exceeds 900 mm, dystrophic (highly leached) soils have developed. As rainfall decreases so less leaching takes place, giving rise to mesotrophic (moderately leached) and eutrophic (slightly leached) soils, often liable to erosion. Hydromorphic soils (wetlands) in the higher rainfall areas are relatively stable. In the lower rainfall areas, wetland soils are very erodible and in many parts as much as 90% of these soils have been completely eroded.

For further information contact:

- Geological Society of South Africa, P O Box 44283, Linden, 2104.
 - Geological Survey, Department of Mineral and Energy Affairs, P O Box 900, Pietermaritzburg, 3200/Private Bag X112, Pretoria, 0001.
 - Most universities in southern Africa have departments of geology. (See Table B6 in Chapter 2, which lists the addresses of universities in southern Africa). Numerous research reports, articles and theses (including maps where relevant) are produced by these departments.
-

NOTES:

NOTES:

CHAPTER 5: PLANNING REGIONS IN NATAL/KWAZULU

A far away place...

The Night-jar and Inkosazana Yasezulwini
The Princess of the Heavens - Zulu

*There is a grass-house in the hills,
above the coast where sugar spumes,
and lilies sprout, and no storms fly.*

*There, the Princess of the Heavens,
beside her dark as honey feet,
gathers up the dreams which reach her
and stooping to her woven pots
rinses them in rainbow water,
or stores them with the morning mist.*

C. Mann, quoted in Mann, C., 1982. New Shades, David Philip Publisher, Cape Town, 43 p.

CHAPTER 5: PLANNING REGIONS IN NATAL/KWAZULU

<u>Contents</u>	<u>Page</u>
5.1 Planning regions in Natal/KwaZulu	228
5.2 Town and regional planning in Natal/KwaZulu	234
5.2.1 Structure plans in Natal	234
5.2.2 Structure plans in KwaZulu	236
5.3 Regional Development Associations in Natal/KwaZulu (Development Region E)	237

<u>Tables</u>	<u>Page</u>
Table E1: Correlation between statistical regions, census (magisterial) districts and planning regions in Natal/KwaZulu, 1992	228
Table E2: Areas of magisterial districts in Natal, 1993	230
Table E3: Areas of KwaZulu magisterial districts, 1986	232
Table E4: Regional Development Associations in Natal/KwaZulu, 1993	238

5.1 Planning regions in Natal/KwaZulu

South Africa has been divided into nine national development regions (based on economic, political and social parameters), which in turn consist of smaller planning as well as statistical regions. The national development region encompassing Natal, KwaZulu and the northern part of Transkei is referred to as Development Region E. Region E is bounded by latitudes 26°45' - 31°30'S and longitudes 28°00' - 32°30'E*. Statistical regions generally consist of one or more adjoining magisterial districts, where homogeneity with regard to physical characteristics and economic activities is evident (Table E1). The areas of the magisterial districts in Natal and KwaZulu are given in Tables E2 and E3 respectively.

The next section briefly outlines some aspects of town and regional planning in Natal and KwaZulu. Regional Development Associations are then discussed. The present chapter contains background data with special reference to Chapter 6, which deals with a number of broad catchment issues.

Table E1: Correlation between statistical regions, census (magisterial) districts and planning regions in Natal/KwaZulu, 1992.

Statistical region	Census (magisterial) district	Planning region
	Natal	
48	Durban, Inanda, Pinetown, Chatsworth	41
49	Lower Tugela	41
50	Camperdown	41
51	Pietermaritzburg	41
52	Umzinto	36
53	Alfred, Port Shepstone	36
54	Mount Currie	38
55	Polela, Underberg	38

* A useful general (background) publication on Region E is the following: Erasmus, J., 1991. Economic and social memorandum, Region E, Centre for Information Analysis, Development Bank of Southern Africa, Halfway House, 107 p. (The publication includes *inter alia* population data as well as land use patterns, both in terms of magisterial district). See also, Council for the Environment, 1993. Regions for South Africa, Department of Environment Affairs, Pretoria, 16 p. and maps. (The publication briefly outlines various categories of (physical) regional delimitation in South Africa).

Table E1: Correlation between statistical regions, census (magisterial) districts and planning regions in Natal/KwaZulu, 1992 (continued).

Statistical region	Census (magisterial) district	Planning region
56	Ixopo	38
57	Kranskop, Lions River, New Hanover, Richmond, Umvoti	35
58	Mooi River	35
59	Impendle	35
60	Bergville, Estcourt, Klip River, Weenen	37
61	Dannhauser, Dundee, Glencoe, Newcastle, Utrecht	32
62	Babanango, Ngotshe, Paulpietersburg, Vryheid	33
63	Eshowe, Hlabisa, Lower Umfolozi, Mtonjaneni, Mtunzini, Ubombo	34
	KwaZulu	
90	Embumbulu, Empumalanga, Ntuzuma, Umlazi	00
91	Emnambithi, Emzumbi, Enseleni, Ezingolweni, Hlabisa, Hlanganani, Inkanyezi, Ingwavuma, KwaMapumulu, Madadeni, Mahlabathini, Msinga, Ndwedwe, Nkandla, Nongoma, Nqutu, Okhahlamba, Ongoye, Simdlagentsha, Ubombo, Vulamehlo	00
92	Vulindlela	00

Source: After Anonymous, 1992. Population census 1991: age by development region, statistical region and district, CSS Report No. 03-01-03 (1991), Central Statistical Service, Pretoria, 786 p.

See also: Anonymous, 1991. Standard code list for statistical regions, magisterial/census districts, cities, towns and non-urban areas, Report No. 09-90-03 (1991), Central Statistical Service, Pretoria, various pages.

- Note:**
- (i) Various changes to regions are currently under discussion. The data presented here are based on the 1991 census, although published in 1992.
 - (ii) The boundaries of census districts normally coincide with those of magisterial districts. Differences occur in districts bordering KwaZulu and within KwaZulu, where the magisterial districts do not always coincide with census districts.
 - (iii) Part of the Simdlagentsha District is situated in the Transvaal.
 - (iv) The names of the statistical regions (in the same order as the above table) are as follows: Durban Region; Lower Tugela; Camperdown; Pietermaritzburg; Umzinto; South Coast; Mount Currie; Underberg-

Polela; Ixopo; Central Natal; Mooi River; Impendle; Tugela Basin; North-western Natal; North-eastern Natal; North Coast; KwaZulu 1; KwaZulu 2 and KwaZulu 3.

Table E2: Areas of magisterial districts in Natal, 1993.

Magisterial district	Area (km ²)	As of the year
Alfred	1 442	1973
Babanango	1 527	1973
Bergville	2 628	1973
Camperdown	969	1973
Chatsworth	56	1985
Dannhauser	977	1973
Dundee	2 051	1973
Durban	292	1985
Eshowe	1 803	1973
Estcourt	3 541	1973
Glencoe	679	1973
Hlabisa	3 854	1973
Impendle	1 661	1973
Inanda	427	1982
Ixopo	2 475	1973
Klip River	3 589	1973
Kranskop	1 126	1973
Lions River	1 609	1973
Lower Tugela	1 158	1973
Lower Umfolozi	2 720	1973
Mooi River	1 574	1973
Mount Currie	4 084	1985
Mtonjaneni	1 648	1973
Mtunzini	1 129	1973
Newcastle	2 199	1973
New Hanover	1 385	1973

Table E2: Areas of magisterial districts in Natal, 1993 (continued).

Magisterial district	Area (km ²)	As of the year
Ngotshe	3 431	1973
Paulpietersburg	1 432	1973
Pietermaritzburg	1 071	1973
Pinetown	378	1985
Polela	1 192	1973
Port Shepstone	1 350	1973
Richmond	1 335	1973
Ubombo	No reliable data available	
Umvoti	2 198	1973
Umzinto	1 798	1973
Underberg	1 951	1973
Utrecht	3 918	1973
Vryheid	3 860	1973
Weenen	1 057	1973

Source: After Anonymous, 1993. South African statistics, 1993, Central Statistical Service, Pretoria, various pages.

- Note:**
- (i) The names and boundaries of the magisterial districts have changed over the years. A major change occurred with the establishment of self-government for KwaZulu, with the creation of KwaZulu districts.
 - (ii) The area for Ubombo according to the above report is 4 282 km². It is implied however, that this refers to the (KwaZulu) district of Ubombo (see Table E3). Data for 10 other KwaZulu districts are presented in the report. It is likely therefore, that areas for certain Natal districts include KwaZulu territory. The two tables accordingly, must be viewed separately.
 - (iii) The total land area for Natal/KwaZulu is 91 481 km² (including East Griqualand) or 8,1% of the land surface area of South Africa (1 126 880 km²). The portion of Transkei situated within the borders of Natal/KwaZulu is 2 699 km² in extent, with a total geographic area for Natal/KwaZulu/northern Transkei of 94 180 km².

- (iv) A listing of the 51 magisterial districts (but not the respective areas) for the new province of KwaZulu/Natal, is provided in Anonymous, 1994. Provincial statistics 1994, Part 5: KwaZulu/Natal, CSS Report No. 00-90-05 (1994), Central Statistical Service, Pretoria, 99 p. The following former KwaZulu districts are now part of the new province: Ingwavuma, Mahlabatini, Mapumulu, Msinga, Ndwedwe, Nkandla, Nongoma, Nqutu, Simdlagentsha, Umbumbulu and Umlazi. (It is important to note that the Central Statistical Service intends to publish provincial statistics for all the new provinces in South Africa, plus one report on South Africa *per se*, on an annual basis. Such publications contain most useful demographic, socio-economic and economic data. The provincial publication series was first issued in 1994).

Table E3: Areas of KwaZulu magisterial districts, 1986.

Magisterial district	Area (ha)
Emnambithi	125 120
Emzumbe	134 240
Ezingolweni	104 000
Hlabisa	[?192 400]
Hlanganani	119 520
Ingwavuma	406 240
Inkanyezi	136 480
Madadeni	54 720
Mahlabathini	116 880
Maphumulo	166 240
Mpumalanga	55 360
Msinga	172 000
Ndwedwe	89 760
Nkandla	206 240
Nongoma	224 000
Nquthu	173 920
Nseleni	182 720
Ntuzuma	7 200
Okhahlamba	150 880
Ongoye	68 480

Table E3: Areas of KwaZulu magisterial districts, 1986 (continued).

Magisterial district	Area (ha)
Simdlangentsha	112 640
Ubombo	418 880
Umbumbulu	76 960
Umlazi	3 800
Vulamehlo	70 240
Vulindlela	38 400
Total	3 607 320

Source: After Anonymous, 1988. KwaZulu development information, VOL 1 - 2, various pages, Government of KwaZulu and the Development Bank of Southern Africa, Halfway House.

- Note:**
- (i) Part of the Simdlangentsha District is situated in the Transvaal.
 - (ii) The areas listed, reflect additions to KwaZulu territory in excess of the 1975 consolidation proposals. According to the 1975 proposals, the total area of KwaZulu was envisaged as 3 316 100 ha.
 - (iii) Data were not provided for the Hlabisa District in Anonymous (1988). The area of the district is presumed to be 192 400 ha.
 - (iv) KwaZulu consists of 10 main blocks of land as follows:

Main component parts of KwaZulu	KwaZulu area number	Areal extent according to the 1975 consolidation proposals (km ²)
Maputaland	KwaZulu Area No. 1	6 312
Northern Zululand	KwaZulu Area No. 2	7 002
North Coast Hinterland and the Tugela Valley	KwaZulu Area No. 3	11 974
South Coast Hinterland	KwaZulu Area No. 4	3 586
Ezikhawini	KwaZulu Area No. 5	120
Amatikulu Reserve	KwaZulu Area No. 6	140
Buffalo Flats	KwaZulu Area No. 7	618
Drakensberg Block	KwaZulu Area No. 8	965
Swartkop/Impendle/Ili Block	KwaZulu Area No. 9	1 626
Mtamvuna Block	KwaZulu Area No. 10	818
Total		33 161

Source: After Thorrrington-Smith, Rosenberg and McCrystal, 1978. Towards a plan for KwaZulu: a preliminary development plan, VOL 1, The written report, 341 p., and VOL 2, Atlas of maps and illustrations, various pages, KwaZulu Government, Ulundi.

Note: In terms of the KwaZulu Ingonyama Trust Act No. 3 of 1994, that part of KwaZulu traditionally occupied by the various tribes (as set out in the Schedule to the Act), was placed under the custodianship of King Goodwill Zwelithini (with effect from the 25th of April 1994). The sole trustee of the Ingonyama Trust is the King. The King holds the land in trust for the people of KwaZulu. The Act makes provision for an annual budget to assist the King in administering the land. The Act refers to a large part of KwaZulu (some 2 890 000 ha), as previously controlled by the KwaZulu Government. Included are all urban townships as well as Government buildings, commercial/industrial sites, protected conservation areas, forests, public spaces and roads. It is likely that the Act will be amended in due course. For further details see, Anonymous, 1994. Natal's land used as election bargaining chip, Afra News, No. 27, April/May 1994, p. 3 - 5., and Anonymous, 1994. Ingonyama Trust to remain, Afra News, No. 28, June/July 1994, p. 9 - 11. See in addition: Anonymous, 1993. Government transfers Natal State land to KwaZulu Government, Afra News, No. 23, August/September 1993, p. 4 - 8.

5.2 Town and regional planning in Natal/KwaZulu

5.2.1 Structure plans in Natal*

The present (local) structure planning legislation in Natal is the Town Planning Ordinance No. 27 of 1949. In terms of the Ordinance, local authorities may decide to prepare a structure plan, a development plan, or a scheme with respect to land within or outside the area of such a local authority. The development planning process, using the package of plans technique, commences with a structure plan. A structure plan is a policy and planning framework to be applied in the preparation of the scheme. The development plan

* Discussion based on Anonymous, 1991. New Physical Planning Act, Monitor, No. 14, Third Quarter 1991, p. 16., and Coote, D., 1990. Physical Planning Act: town planning, Monitor, No. 10, Second Quarter 1990, p. 6 - 7. See also, Anonymous, 1986. Package of plans: a new approach to urban planning in Natal: a local authority perspective, Natal Town and Regional Planning Commission Supplementary Report, VOL 16, Pietermaritzburg, 41 p., as well as Claassen, P.E. and Van der Bank, J., 1994. A system for rural regional development planning, Development Southern Africa, VOL 11(3), p. 409 - 422. A useful historical and background perspective on town and regional planning in Natal can be found in Scott, D., 1982. A review and analysis of urban planning theory with application in Natal, Natal Town and Regional Planning Commission Report, VOL 50, Pietermaritzburg, 293 p. (The publication contains an extensive bibliography). Examine also, Anonymous, 1972. Town and regional planning in Natal: a study of the Town and Regional Planning Commission in its 21st year, Natal Town and Regional Planning Commission Report, VOL 21, Pietermaritzburg, 54 p.

is based on the ability of the local authority to implement its structure plan strategies. The development plan includes a financial budget, as well as the estimated time framework necessary for the implementation of the scheme. The scheme is then the development control instrument for the proposed project. The general purpose of the plans is to promote health, safety, order, convenience and general welfare, together with economic development. Local authorities must include environmental aspects in their structure plan investigations. All structure plans, development plans and schemes drawn up in terms of the Town Planning Ordinance No. 27 of 1949, must be submitted to the Natal Town and Regional Planning Commission for final approval. Amendments to these schemes however, need not be submitted to the Commission by the local authorities of Umhlanga Rocks, Durban and Pietermaritzburg. The Commission, on the advice of the Chief Directorate: Physical Planning and Development of the Natal Provincial Administration, is accordingly the arbitration body for physical and regional planning in Natal. Ultimate authority over such planning in Natal, in terms of the Ordinance, is vested in the Administrator. The Commission, by virtue of the Ordinance of 1949, is also empowered to make various regulations and to prepare regional plans as well as town planning schemes for areas outside any local authority control. The Commission is, in addition, responsible for the funding of numerous research projects inter alia on wetlands, "estuaries" and urbanization.

The Physical Planning Act No. 125 of 1991 provides for a hierarchy of policy plans from national to local level. These plans include national development plans for the entire country, as well as regional development plans (for a development region or part thereof) - both of which are initiated by the Minister of Regional and Land Affairs. The third category concerns regional structure plans for a planning region or part thereof, which are initiated by the Administrator of the province concerned. The Administrator can also initiate urban structure plans by virtue of the Act. Where the urban structure plan is to be prepared for a given local authority, that local authority becomes the responsible authority in terms of the plan. If the plans include a wider area, then the Joint Services Boards are the responsible authorities. Procedures for preparing urban structure plans are not prescribed by the Act - unlike the three policy plans discussed above. The latter

procedures are determined by regulations prepared by the Administrator and approved by the Minister*.

It should be noted that structure plans etc. are an important source of data for a particular locality. The plans may include information on soils, geology, climate, vegetation and population. Three examples are provided below:

Examples of published plans in Natal:

- Anonymous, 1974. Draft regional plan for the South Coast, Natal Town and Regional Planning Commission Report, VOL 29, Pietermaritzburg, 144 p.
- Anonymous, 1976. Region 36: a supplementary report to the Draft Regional Plan for the South Coast, Natal Town and Regional Planning Commission, Pietermaritzburg, 113 p.
- Anonymous, 1984. Region 38 study area: southern Natal regional survey, Natal Town and Regional Planning Commission, Pietermaritzburg, 191 p.

For further information contact:

- Natal Town and Regional Planning Commission/Chief Directorate: Physical Planning and Development, Natal Provincial Administration, Private Bag X9037, Pietermaritzburg, 3200.

5.2.2 Structure plans in KwaZulu

Sub-regional and regional planning in KwaZulu is undertaken by the KwaZulu Department of Economic Affairs. The KwaZulu Department of Works is largely responsible for planning and development control in unproclaimed and proclaimed townships in KwaZulu. A brief overview of regional planning in KwaZulu can be found in: Forse, W., 1993. Planning and

* For a useful legal background, see Claassen, P.E. and Milton, J.R.L., 1992. Chapter 28. Land-use planning, In: Fuggle, R.F. and Rabie, M.A. (eds), Environmental Management in South Africa, Juta, Cape Town, p. 715 - 738.

development projects: Town and Regional Planning Section of the Department of Economic Affairs, KwaZulu, Monitor, No. 16, December 1993, p. 12 - 13.

For further information contact:

- KwaZulu Department of Works, Private Bag X03, Ulundi, 3838.
- Town and Regional Planning Section, KwaZulu Department of Economic Affairs, 367 Loop Street, Pietermaritzburg, 3201/Private Bag X23, Ulundi, 3838.

5.3 Regional Development Associations in Natal/KwaZulu (Development Region E)

Regional Development Associations (RDAs), initiated in 1981, are autonomous planning organizations funded by the private sector and local government. RDAs have no executive powers and advise the Government and other authorities on matters relating to social, economic (including industrial) and planning issues in their respective areas. The associations are also involved with development programmes in rural and urban areas, which may include water supplies. Information input is received inter alia from the KwaZulu Government as well as from interested persons and organizations. Planning decisions (as required in terms of the relevant legislation), are referred to the Regional Development Association in question for comment. There are 13 Regional Development Associations in Natal/KwaZulu including the Regional Development Advisory Committee which is responsible for overall co-ordination in the province. There is a National Regional Development Advisory Council in Pretoria. The latter two bodies are funded by the Department of Regional and Land Affairs. Regional Development Associations operate in the various planning regions of Natal/KwaZulu (Table E4), with approximately one Regional Development Association for each planning region.

Table E4: Regional Development Associations in Natal/KwaZulu, 1993.

Organization	Address
Regional Development Advisory Committee	P O Box 877, Pietermaritzburg, 3200
East Griqualand Regional Development Association	c/o J.P. Vos, P O Box 188, Kokstad, 4700
Greater-Durban Metropolitan Regional Development Association	c/o P. McGregor, P O Box 1506, Durban, 4000
Greater-Richmond Development Forum (functions as an RDA)	c/o P O Box 877, Pietermaritzburg, 3200
Greytown Regional Development Association	c/o P O Box 877, Pietermaritzburg, 3200
Maroela Regional Development Association	c/o H. Bisschoff, P O Box 27, Hluhluwe, 3960
North Coast Regional Development Association	W.T. Brynes, c/o V. Parkhouse, P O Box 3033, Westbrook, 4400
North-eastern Natal Regional Development Association	c/o A. Delport, P O Box 2021, Vryheid, 3100
Northern Natal Regional Development Association	c/o Town Clerk, Newcastle Municipality, Private Bag X6621, Newcastle, 2940
Regional Development Association 41 West	c/o S. Putterill, P O Box 637, Pietermaritzburg, 3200
Southern KwaNatal Regional Development Association	c/o J. Tulleken, P O Box 1341, Port Shepstone, 4240
Tugela Basin Development Association	c/o A. Pearson, P O Box 22, Colenso, 3360
Zululand Regional Development Association	c/o G. Price-Moor, P O Box 1133, Empangeni, 3880

Source: After the Regional Development Advisory Committee, Pietermaritzburg, 1993.

- See also:**
- (i) Davies, B., 1991. Alphabet soup: RDACs and regional development, Indicator South Africa, VOL 8(2), p. 59 - 62.
 - (ii) Davies, W.J., 1991. Institutions in search of direction: the role of Advisory Committees in the regional development process, Urban Forum, VOL 2(1), p. 1 - 19.
 - (iii) Rootman, P., 1988. The Regional Development Advisory Committee, Region F: a case study of a vehicle for promoting multi-disciplinary development, Development Southern Africa, VOL 5(4), p. 539 - 549.

- Note:**
- (i) The Regional Development Advisory Committee has a database of the names and addresses of a wide variety of development, industrial, housing and other organizations in Natal/KwaZulu. (Refer to Table B7 in Chapter 2). The Committee initiated an economic development strategy for Development Region E, which includes infrastructure services. (See the bibliographic database).
 - (ii) The Regional Development Advisory Committee was recently disbanded. Most of the functions of the Committee (as well as some additional duties), are currently being undertaken by the KwaZulu-Natal Regional Economic Forum, P O Box 30886, Mayville, 4058. Regional Development Associations may (in future), become sub-structures of the KwaZulu-Natal Regional Economic Forum.
-

NOTES:

NOTES: