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DEPARTMENT OF WATER AFFAIRS
AND FORESTRY

in association with

UMGENI WATER
Corporate Services Division

MKOMAZI/MOOI-MGENI TRANSFER SCHEME PRE-FEASIBILITY STUDY

MKOMAZI-MGENI TRANSFER SCHEME

SUPPORTING REPORT No 5

ENVIRONMENTAL

VOLUME 4

Report No 2787H/7856
May 1999

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CONSULTING ENGINEERS

MKOMAZI/MOOI-MGENI TRANSFER SCHEME PRE-FEASIBILITY STUDY

SUPPORTING REPORT NO 5: ENVIRONMENTAL

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PRE-FEASIBILITY REPORT
SOCIAL IMPACT ASSESMENT OF PROPOSED MKOMAZI-MGENI TRANSFER SCHEME

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EXECUTIVE SUMMARY

This reports considers the socio-economic impacts of the proposed Mkomazi Dam sites (Impendle and Smithfield) and associated conveyance infrastructure. As such the report forms part of a wider pre-feasibility study that looks at the technical, economic and environmental implications of the proposed project. The social impact study concerned itself with:

- Identifying the parties likely to be directly affected by the proposed schemes.
- Ensuring that representatives of directly affected parties in the target areas were informed about the proposed programme. Public involvement was commensurate with the level required of "pre-feasibility" level studies.
- Soliciting concerns claims and issues from the representatives of the directly affected parties.
- Analysing these, concerns claims and issues.
- Generating a cost benefit matrix with social benefits and dis-benefits quantified where possible.
- Assessing the cost of mitigation including resettlement, a resettlement action plan and relocation.
- Generating a social and institutional risk analysis.

The final objective of this phase of the study was to generate a pre-feasibility report that assessed data that is of a standard compatible with that compiled for the Mooi-Mgeni River Transfer System.

Both dams and associated options have associated social impacts. Of the negative impacts the most serious are the following:

- Loss of arable land.
- Loss of grazing land and communally utilised resources
- Loss of access routes
- Relocation of settlements.

For the purposes of comparison and in terms of the magnitude of the impacts the situation may be summarised as follows:

- The Smithfield Dam (as currently utilised and on its own) is least problematic in terms of magnitude of impacts and may be ascribed a factor of **1**. The magnitude of the impact will undoubtedly increase if plans for intensified settlement of the land go ahead.

- Impendle (lower FSL) is next least problematic but the magnitude of the impact, given the **current** extent of utilisation, is probably about twice as great as Smithfield. The magnitude of the impact might therefore be ascribed a factor of **2**.

- Impendle (higher FSL) has a greater impact (about 20%) than the lower Impendle and might be ascribed a factor of **2.4**.

In terms of the impacts, mitigation of these impacts, and associated compensation the following might be assumed:

	Option A	Option B	Option C
Associated dam/s	Impendle High FSL	Smithfield and Impendle Low FSL	Smithfield and Impendle High FSL
Magnitude Factor	2,4	1 + 2	1 + 2,4
Total	2,4	3	3,4

The magnitude of the impacts will probably relate fairly closely to the associated expense of compensation and mitigation. Under these circumstances Option B will be both more complex and more expensive than Option A to implement. It should be emphasised that neither will be impossible, from a social impact perspective, to implement.

Although neither will be impossible to implement the following will require detailed attention during a feasibility study:

- Potential resistance from the people of the Makhuzeni settlement to relocation. The concept of improved housing and potential resources will have to be carefully explained to, and negotiated with, this community.

- The potential re-settlement of the Mkomazi village (currently abandoned).

- The land restitution process that will probably get underway at Smithfield will make compensation negotiation complex.

- The Smithfield conveyance system may prove to be time-consuming to negotiate.

Furthermore the associated negative impacts need to be weighed against the positive impacts. For both options the following positive impacts could accrue:

- Creation of employment opportunities,
- Improved roads and access routes,
- Potentially improved housing for those relocated,
- Skills transfer and creation of opportunities for local sub-contractors,
- Improved chance of access to electrification and water reticulation system,
- Stimulation of regional economy (Durban – Pietermaritzburg axis) and creation of employment opportunities in these areas.

By building both dams the positive impacts are extended to two areas both of which are in dire need of economic stimulation. Ultimately the potentially negative impacts will have to be weighed against the positive impacts. In weighing these up the following should be intensively pursued during any further planning phases.

- A meeting with the relevant officials of the Department of Land Affairs should be called as soon as is practically possible.
- Representatives of the affected communities should be directly involved in further planning phases as soon as is practically possible.
- Set back area should be clarified, particularly from a water quality perspective, and the clarified position used to negotiate settlement strategies within the dam basin.

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CHAPTER ONE: INTRODUCTION

TERMS OF REFERENCE

The Department of Water Affairs and Forestry together with Umgeni Water has commissioned a pre-feasibility study into constructing a possible water transfer scheme from the Mkomazi River to the Mgeni River system. The scheme would help augment the Mgeni system that is already close to its capacity.

In order to undertake this study the Department of Water Affairs and Forestry and Umgeni Water have appointed Ninham Shand as their lead consultant team. Ninham Shand has sub-contracted Scott Wilson Planning and Development Resources to undertake a social impact assessment of the proposed developments. The study was to be carried out in two stages. The first stage, completed in November 1997, was concerned with a reconnaissance level comparative examination of five identified schemes (Impendle, Smithfield - Richmond, Smithfield – Baynesfield, Clayborne, and Ndonyane) and their conveyance systems identified as options for phased development.

The reconnaissance investigations concluded that options incorporating the Impendle and Smithfield - Bsynesfield schemes appeared to be, on balance, the most favourable. A pre-feasibility study of these options, with which this report concerns itself, constitutes the second phase of the Mkomazi-Mgeni study. As such this report is concerned with assessing the potential social impacts of these sites and of their conveyance systems. More specifically the report compares the Impendle scheme and Smithfield schemes. The **Impendle scheme** examined was one consisting of:

Phase 1: A Dam at Impendle site,
a gravity tunnel to Midmar Dam,
a pumpstation below Midmar feeding an upgraded waterworks,
conveyance through a series of existing clear water tunnels and
conveyance through existing and new pipleines to,
a new reservoir at Umlaas Road.

Phase2 : Raising of the Impendle Dam,
upgrade of the pumpstation below Midmar,
upgrade of the waterworks
upgrade of the pipelines.

The Smithfield Scheme examined was one consisting of :

Phase 1	Dam at Smithfield,
	pumpstation and tunnel taking water to,
	balancing dam and water works at Baynesfield,
	a clear water pipeline to a new reservoir at Umlaas Road,
Phase 2	A second dam at Impendle,
	water released downstream to Smtihfield Dam,
	duplication of the phase 1 pumpstation, waterworks and pipeline capacities.

The report therefore forms part of a wider pre-feasibility study that looks at the technical, economic and environmental implications of developing the proposed Dam sites. The results of these studies are to be found in the other reports associated with the study.

At this level the social impact study concerned itself with:

- Identifying the parties likely to be directly affected by the proposed schemes.
- Ensuring that **representatives** of directly affected parties in the target areas were informed about the proposed programme. Public involvement would be commensurate with the level required of "pre-feasibility" level studies.
- Soliciting concerns claims and issues from the representatives of the directly affected parties.
- Analysing these, concerns claims and issues.
- Generating a cost benefit matrix with social benefits and dis-benefits quantified where possible.
- Assessing the cost of mitigation including resettlement, a resettlement action plan and relocation.
- Generating a social and institutional risk analysis.

The final objective of this phase of the study was to generate a pre-feasibility report that assessed data that is of a standard compatible with that compiled for the Mooi-Mgeni River Transfer System.

APPROACH TO STUDY: LARGE SCALE WATER PROJECTS IN THE NEW SOUTH AFRICA

Social Impact Assessment studies form part of the process of Environmental Impact Assessment that has become the norm for technical investigation of large scale development projects commissioned by both the Department of Water Affairs and Forestry or by Umgeni Water. The standard methodology adopted for environmental studies is to identify potential negative impacts and suggest/design measures for the mitigation of these impacts. Social Impact Assessment, dealing as it does with an adaptable environment, has increasingly been concerned not just with negative impacts but also with an assessment of the potential positive impacts. Within the current political context this part of the study takes on added importance, particularly so as to meet the aims of the RDP which states that:

"The RDP is based on reconstruction and development being parts of an integrated process ... The RDP integrates, development, reconstruction and redistribution into a unified programme. The key to this link is an infrastructural programme that will provide access to modern and effective services like electricity, water, telecommunications, transport, health, education and training for all." (The Reconstruction and Development Programme: 1994:6)

The principals of "linking reconstruction and development" and having a process that is, as much as has been possible, people driven, will be guiding aims of much of this project. In particular we believe that by "piggybacking" local development initiatives onto macro "growth driven projects" the aims of linking reconstruction and development can be achieved with an optimal utilisation of resources. The key to this lies in the identification of appropriate opportunities at an early enough stage.

Therefore operating within the context of the "new South Africa" calls for a new set of responses from developers. Key to these responses is involvement of interested and affected parties in such a way that they are meaningfully incorporated into the planning process and into aspects of the operational component of the project. Essential to this process is lead-in time that allows developers to identify potentially obstructive issues and to develop, in conjunction with those affected, locally appropriate responses. Also critical to the process is the identification of potentially beneficial impacts. These should be managed in a way that maximises the spread of benefit without necessarily greatly increasing the cost of the project. By using integrated development planning principles this should take place. Under these circumstances it is possible to "piggyback" local development initiatives onto macro "growth driven projects" and thereby to ensure that the aims of linking reconstruction and development can be achieved with an optimal utilisation of resources.

METHODOLOGY

As this is a pre-feasibility report the methodology employed was of a detailed site and field based nature. This is in accordance with the standards and guidelines set for studies of this level, in guidelines set up for the Vaal Augmentation Planning Study. More specifically the methods used to generate the information in this report consisted of the following:

- a series of community meetings with stakeholders in the greater basin area (including regional authority briefing sessions)
- focus group interviews with resource users in the basin area
- key stakeholder interviews with people in the basin and along the conveyance routes
- site visits
- analysis of topographical maps and ortho-photos of the dam areas and conveyance routes
- interrogation of the available socio-economic data base
- literature survey

The study team was at pains to incorporate the concerns claims and issues of the interested and affected parties into the planning process. This concern is based up on the following:

- the belief that the people who will be affected by a development project have a right to be informed about the project and to be given an opportunity to make their opinions and feelings about the project clearly heard;

- the evidence of experience that lay people can contribute developmentally sound insights which may have been overlooked in the planning process;

- the fact that public opposition to development plans can cause delays, and associated costs which, at worst, can make the difference between a viable project and a non-viable project;

- the recognition that in the current political climate consultation, empowerment and capacity building are particularly important aspects of development.

OVERVIEW OF THIS REPORT

This report is made up of the following chapters. Chapter 2 provides a contextual overview of the dam sites in relation to their location and gives some insight into the socio-economic status of the people who reside

in the dam basin. Chapter 3 then sets out the detailed analysis of impacts associated with the proposed dam sites, conveyance routes, waterworks and reservoir, as well as with activities associated with construction. Chapter 4 looks at measures to mitigate and manage the impacts of the dam sites, including possible compensation policies. Chapter 5 outlines a draft spatial management strategy to integrate the social and spatial aspects of the social impact strategy. Chapter 6 provides a conclusion.

CHAPTER TWO : CONTEXTUAL OVERVIEW

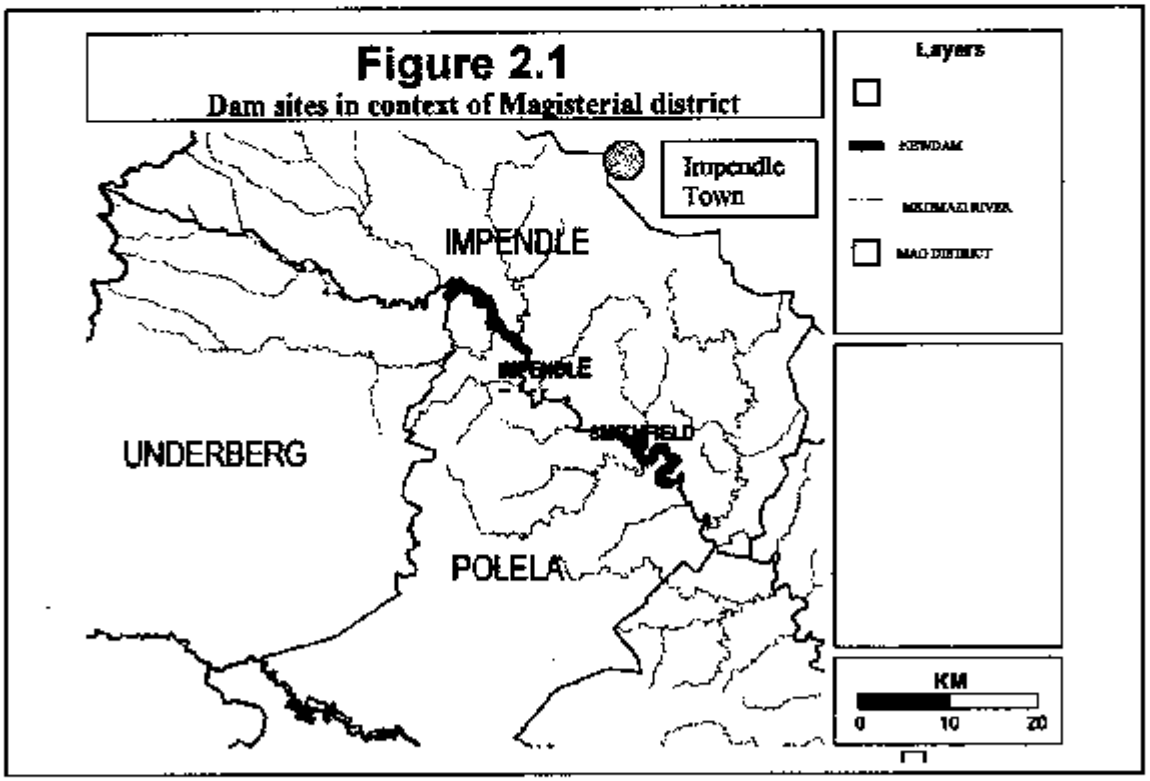
INTRODUCTION

This Chapter provides a contextual overview of the proposed dams and locates them within their sub-regional context,. It also presents a broad-based socio-economic and demographic overview of the affected population. The proposed dams are discussed in turn.

SUB-REGIONAL CONTEXT

Location of Impendle Dam

The site of the proposed Impendle dam is situated approximately 1 km downstream of the confluence of the Mkomazi River and its tributary, the Mkomazana River (See Figure 2.1). The figure also indicates that the Impendle dam site is situated within the Indlovu Regional Council area and that the North Bank of the dam would fall within the Impendle Magisterial District while the South Bank would fall largely within the Polela Magisterial District. Some of the dam might back up into the Underberg area.



Both Polela and Impendle are former "KwaZulu" areas although, as will be discussed later, with complex land tenure histories tied up in the machinations of Apartheid planning. The dam site is approximately 15 km west of the town of Impendle and is situated in the middle-reaches of the Mkomazi River. The

vegetation is characterised mainly by woodland and grassed grazing land, while the alluvial plain along side the Mkomazi is relatively arable. Some of the land in the dam basin has been developed for irrigation.

The dam site straddles a complex array of differing systems of land tenure. In terms of construction of the Impendle Dam this will undoubtedly make impact management particularly complex. There are four main types of landholders in the Impendle Dam basin. These are:

- Nxamalala Tribal Authority (Right Bank) and, if the FSL is high enough, the Basotho Tribal Authority
- The Department of Land Affairs (Right and Left banks)
- Individual Holders with freehold rights (Mostly Left bank)
- Companies with freehold rights. (One each on right and left banks)

A complete list of landholders is given in Appendix 1.

For residents on the Tribal Authority land and residents on the Department of Land Affairs properties land tenure is largely organised on a "traditional" basis. At present *de jure* land ownership lies with the Department of Land Affairs and with the established Tribal Trust. However, tribal chiefs (in consultation with their councils) make de facto land usage and settlement allocations. In some parts of the dam basin it would appear as if the regional councillors are active in the land allocations process. After the recent local government election, local powers were entrenched in elected Councillors with Tribal Councils responsible for administration of traditional laws. Councillors fall under the under the auspices of a wider Regional Council whose responsibility it is to administer services and planning to non-urban areas. Also in operation are Regional Authorities. In KwaZulu Natal the Regional Authorities are parallel bodies, made up of traditional leaders, which now act in a more advisory capacity. In terms of the Impendle Dam negotiations around management of impacts and compensation for tribal and state held land would have to be carried out at five levels. These are:

- National Government (in particular the Department of Land Affairs)
- Provincial Government (provincial Department of Land Affairs)
- The Indlovu Regional Council
- The Nxamalala Tribal Authority/Basotho Tribal Authority and the Hlanganani Regional Authority
- Individual householders and those with usufructury land rights.

Freehold land in the Dam Basin is held by a variety of parties. Although most individuals and company owners appear to be willing to consider cash compensation some of the freehold area could make compensation management complex. In particular the residents of the area that accommodates the settlement of Makhuzeni, if not approached sensitively, could present significant management complexities. Makhuzeni is part of the Stoffleton settlement founded by farm-workers evicted form the Ixopo area in the 1940's. The evicted workers bought freehold land in the Impendle Dam basin and have held onto the land despite attempts by the state to incorporate them into the areas of the former "KwaZulu" and to reconstitute their freehold land as tribal trust. The greater part of the Makhuzeni settlement falls below the 1200m contour and will therefore probably have to be resettled if the larger Impendle option (Option A) is decided upon.[1] Even in the event of the smaller Impendle dam (Option B) being built it might be prudent to relocate the greater part of the settlement.[2]

Impendle Dam Linkages

The area of land to be affected by the proposed dam presently contains scattered traditional settlement and formal agricultural holdings. The pattern of settlement has been influenced by geographical, biophysical and lands tenure features. Settlement has tended to cluster in reasonably close proximity to the transport routes. Social facilities and economic activities, in order to be accessible to passing traffic have also followed these routes. Traditional homesteads also tend to cluster on the mid to lower slopes of the Mkomazi valley on account of the availability of water in the river and the reasonably arable land adjacent to the river.

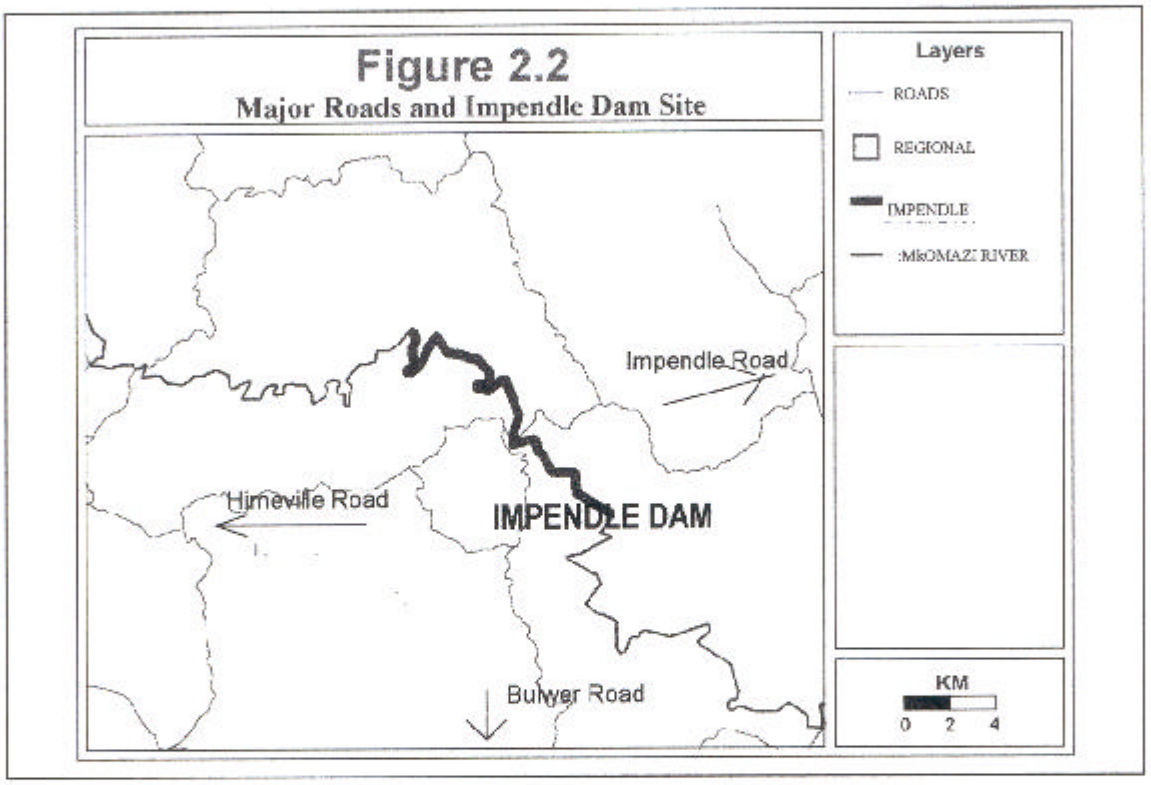
The local economic activity is both of a subsistence nature, (specifically taking the form of food crop cultivation and livestock grazing) and some medium to high intensity commercial farming. Formal employment opportunities are very limited and most of the local economic activity revolves around retailing and trading. In view of the limited local economic resources, there is a high reliance upon outside employment and income sources. Migrant remittances and welfare transfers are two of the most important income sources in the Mkomazi valley.

Figure 2.2 illustrates that an important transport route that links Impendle in the East with Himeville in the West cuts the proposed dam site. This road plays an important function in the sub-regional road network in Polela/Underberg and connects Impendle, Bulwer, Underberg, Loteni, Sani Pass and Nottingham Road). Economic activities have emerged at various points along the road, notably in the vicinity of the Mgodi

[1] The larger Impendle Dam was assessed at the 1200m contour although a buy out line of about 10m higher than this was assumed.
[2] For the purposes of this report the smaller Impendle Dam is assessed with a buy out line of 1195m.

(some 6km East of the Dam site). A series of similar nodes occur along the road between the dam site and Himeville.

A secondary road also cuts the Impendle Dam site where it crosses the Mkhomazana River. This road offers direct road access to Rockley Lodge farm, but also to Impendle, Bulwer, Underberg, Loteni, Sani Pass and Nottingham Road. Although of lesser importance than the Himeville Road it is still of local importance.



Land Usage in the Impendle Basin area

The dam basin is relatively well developed. There are riparian agricultural lands along a large portion of the length of the Mkomazi and Mkomazana Rivers. Of particular note are the relatively intensively cultivated arable fields in the vicinity of Rockley Lodge settlement and upstream of the Himeville road bridge. Lands appear to be well tended and fenced. Crops grown include Maize, Beans, Vegetables and, Lucerne.

It is estimated that about 107ha of arable land (either currently, or recently, under cultivation) would be lost to the dam. This includes irrigated land and grazing adjacent to Mkhomazana River - just above junction of Mkhomazana River and Mkomazi River would be inundated. For the remainder of the basin grazing and

shrub land which seems to be of "better than average quality" would also be lost. Human settlement, in the form of homesteads, takes up approximately 7% of the land area

Demographic & socio-economic Context (Impendle)

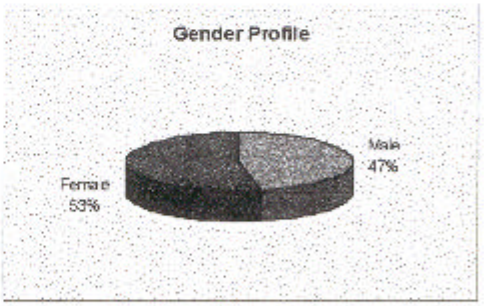
The information presented in this Section is based on the findings of the adjusted 1991 Census.[3] For the most part characteristics of these people are generally typical of rural areas in KwaZulu-Natal. As **Table 2.1** indicates, more than half of the people residing within the proposed dam basin are female, which reflects the impacts of migrancy upon the structure of rural households in the Mkomazi River valley. It is estimated that some 2500 people are indirectly dependent (to a greater or lesser extent) on resources in the valley. For the most part these people live in the settlements of Mkomazi, Cibelichle and Makhuzeni (all clustered within a 6 kilometre radius of the dam wall). The greatest percentage of these people (about 95%) utilise the resources of the basin on a subsistence basis. The remaining five percent however, own about 35% of the land that will inundated.

A further 5 500 people may be indirectly using resources i.e.: grazing livestock in the area, gathering firewood for fuel, or dependant (to a greater or lesser extent) on the economic base generated by the production and harvesting of resources in the basin.

Approximately 84% of the population reside in the dam site on a permanent basis, while the remainder commute and migrate between the valley and places of work further.

Table 2.1: Gender and Residential Status

	No of People	%
Male	1175	47,0
Female	1325	53,0
Permanent Residents	2093	83,7
Non-Permanent	407	16,3



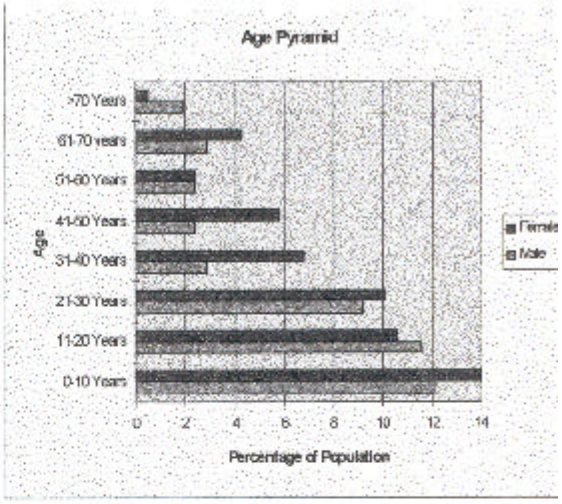
The age profile shows that the population is generally youthful. **Table 2.2** presents a detailed analysis of the population which indicates that almost one half of the resident population of the dam basin area are not older than 20 years. The high proportion of young people is fairly typical of rural tribal areas and can be attributed to a combination of factors, notably, the absence of many working age people and a relatively

[3] Figures were obtained for the Enumerator Areas that border on the proposed Impendle Dam. Enumerator areas are the basic building block of the census and the smallest units for which data is published. There are six EA's that border on the Impendle Dam. EA's have been "cut" using a GIS and estimates of the numbers of people directly benefiting form the resources of the dam basin have been estimated form this "cut".

high natural population growth rate. The accompanying age pyramid shows that the absence of working age people is most evident among males in the 31-40 year and 41-50 year age category.

Table 2.2 : Age Profile

Age Category	% Male	% Female	Total
0-10 years	13,1	13,5	26,6
11-20 Years	12,6	10,1	22,7
21-30 Years	8,8	9,6	18,4
31-40 Years	2,9	6,8	9,7
41-50 Years	2,4	5,8	8,2
51-60 Years	2,4	2,4	4,8
61-70 Years	2,9	4,3	7,2
>70 Years	1,9	0,5	2,4
Total	**47,0**	**53,0**	**100,0**

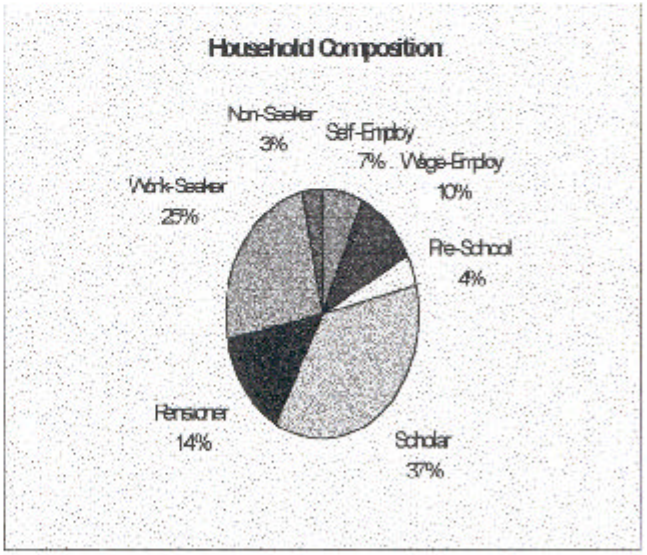


Household Profile (Impendle Area)

Table 2.3 indicates that pre-school-age and school-going-age children are the largest demographic segment, collectively making up 40,7% of the households. This is followed by a category of unemployed adults made up of people who are actively seeking employment (25,1%) and not seeking employment (3,2). Only 17,2% of people in the surveyed households are engaged in economic activity, either through self-employment or through wage employment. 13,9% of people are either "retired" or pension-drawers.

Table 2.3 : Household Composition

Category	%
Self-Employed	7,0
Wage-Employed	10,2
Pre-School	4,3
Scholar	36,4
Retired / Pensioner	13,9
Work-Seeker	25,1
Non-Seeker	3,2
Total	**100,0**



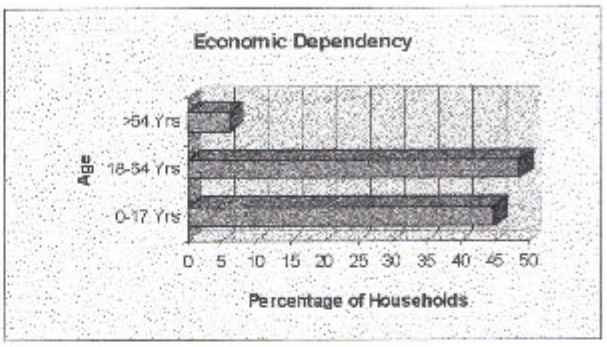
Socio-Economic Profile (Impendle)

Given the present socio-economic and demographic profile, there is a high rate of economic dependency within households residing within the proposed dam site. This is indicative of the lack of local employment

opportunities within the Mkomazi valley. **Table 2.4** indicates that less than half of the average household occupants (48,8%) fall within the economically active age group (18-64 years). Only 17% of the adult resident population is engaged in income earning activities, which implies that there are five dependants for every employed person.

Table 2.4 : Economic Dependency

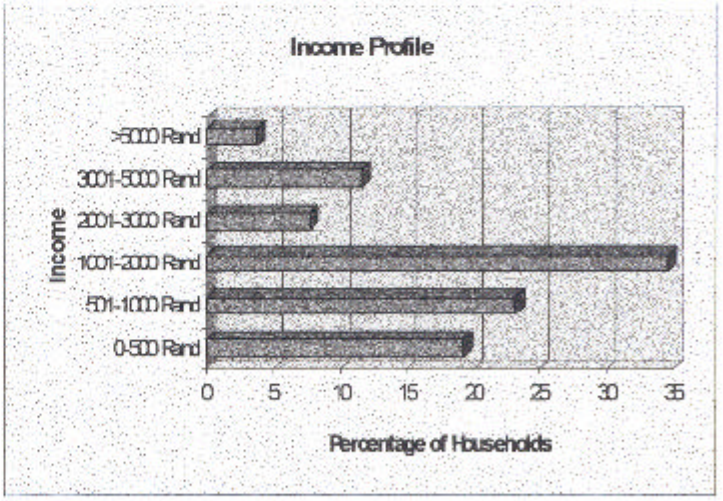
Age Group in years	%
0-17	45,0
18-64	48,8
>64	6,2
Total	100,0



In addition to displaying a high dependency rate, the affected population has a relatively low skills base, which is not uncommon given its rural context. Many of the surveyed households are vulnerable to poverty. According to the Census results the average household income stands at R2060,00 per month and is made up of wage income, pension and welfare transfers, migrant remittances and income from agricultural activities. **Table 2.5** presents a detailed analysis of household income levels. It shows that the largest proportion (34,6%) of households fall within the R1001-R2000 income category. Approximately 42% of households earn R1000 or less which indicates that they are vulnerable to poverty and explains why most households still rely in some way upon subsistence agricultural activities to augment whatever income they earn.

Table 2.5 : Household Income

Income	%
0-500 Rand	19,2
501-1000 Rand	23,1
1001-2000 Rand	34,6
2001-3000 Rand	7,7
3001-5000 Rand	11,6
>5000 Rand	3,8
Total	100,0



Location of Smithfield Dam

The site of the proposed Smithfield Dam is situated approximately 2 km upstream of the confluence of the Mkomazi River and its tributary, the Mfeneni River **(See Figure 2.1).**[4] The map also indicates that the Smithfield dam site is situated within the Indlovu Regional Council area and that the left Bank of the dam would fall within the Impendle Magisterial District while the right Bank would fall within the Polela Magisterial District. Both Polela and Impendle are former "KwaZulu" areas although, the land on the left Bank has had a political history different to that on the other side of the river. The dam site is situated n the middle-reaches of the Mkomazi River. The vegetation is characterised mainly by woodland and grassed grazing land, while the alluvial plain along side the Mkomazi is relatively arable. The land on the right bank of the river is noticeably more degraded than that on the left bank.

There are two main types of landholders in the Smithfield Dam basin. These are:

- Tribal authorities which include
  - Bhidla Tribal Authority (right bank downstream portion borders on Smithfield Dam site)
  - Zashuke-Bomvu Tribal Authority (right bank borders on Smithfield Dam site and dam wall
  - Qadi Tribal Authority (left bank downstream from Smithfield Dam but with claims to lot Smithfield 14796 on which the dam wall is situated).
- Department of Land Affairs holds land scheduled for developed restitution (to land claimants) and redistribution to members of the surrounding tribal authorities (right bank)

A complete list of land holders is given in Appendix 1.

For residents on the Tribal Authority land and residents on the Department of Land Affairs properties land tenure is organised on a "traditional" basis. At present *de jure* land ownership lies with the Department of Land Affairs and the Ingonyama Tribal Trust which is held in trust by the Zulu monarch. However, Tribal chiefs make de facto land usage and settlement allocations. As with the Impendle Dam and after the recent local government election, local government powers were be entrenched in elected Councillors with Tribal Councils responsible for administration of traditional laws. Councillors fall under the under the auspices of a wider Regional Council whose responsibility it is to administer services and planning to non-urban areas. In terms of the Smithfield Dam negotiations around management of impacts and compensation for tribal and state held land would have to be carried out at five levels. These are:

[4] For the purposes of this report the Smithfield Dam was assessed with a buy out line at 920masl.

- National Government (in particular the Department of Land Affairs)
- Provincial Government (provincial Department of Land Affairs and Traditional and Environmental Affairs)
- The Indlovu Regional Council
- The Bhidla Tribal Authority/Zashuke-Bomvu Tribal Authority/Qadi Tribal and the Hlanganani Regional Authority.

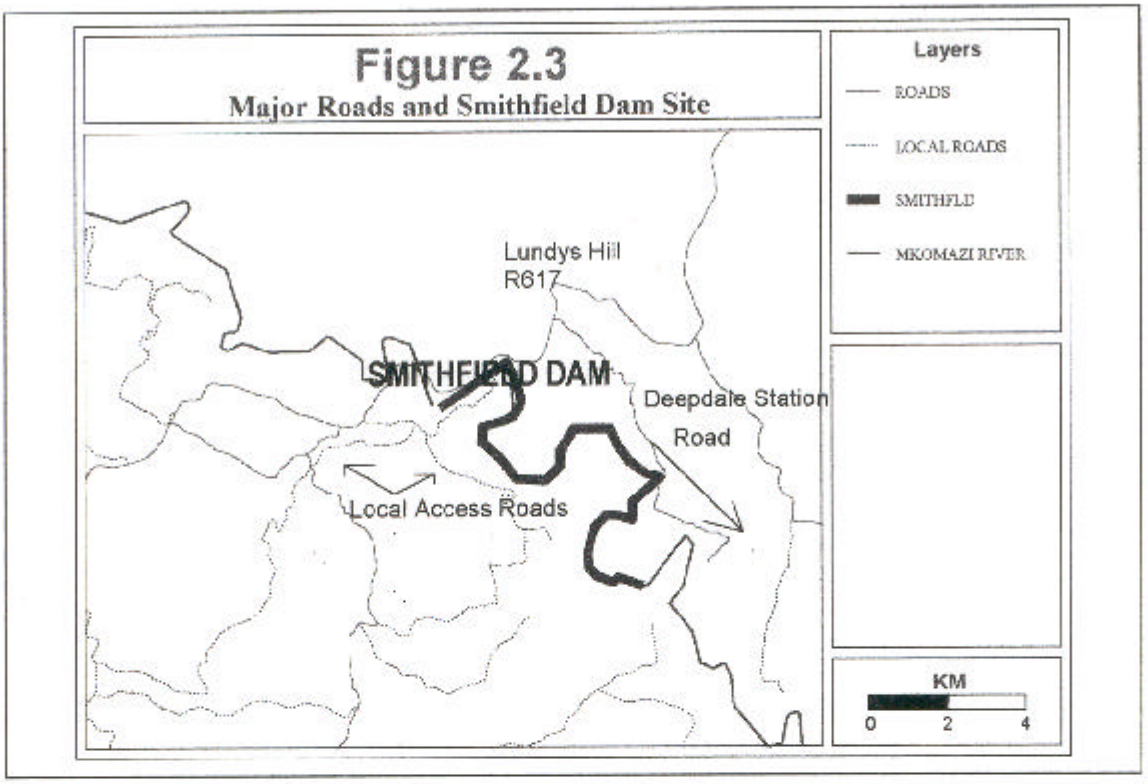
Smithfield Dam Linkages

The area of land to be affected by the proposed dam presently contains scattered traditional settlement and remnants of formal agricultural holdings. The pattern of settlement has been influenced by geographical, biophysical and land tenure features. As with the Impendle site settlement has tended to cluster in reasonably close proximity to the transport routes and social facilities and economic activities, in order to be accessible to passing traffic have also followed these routes. Again, as with Impendle, traditional homesteads have tended to cluster on the mid slopes of the Mkomazi valley on account of the availability of water in the river and the reasonably arable land adjacent to the river. Unlike Impendle however the settlements are sufficiently high above the river to be above the proposed FSL of the Dam.

The local economic activity is largely of a subsistence nature, specifically taking the form of food crop cultivation and livestock grazing. Formal employment opportunities are very limited and most of the local economic activity revolves around retailing and trading. In view of the limited local economic resources, there is a high reliance upon outside employment and income sources. Migrant remittances and welfare transfers are two of the most important income sources in the Mkomazi valley.

Figure 2.3 illustrates that two important transport routes link the Smithfield Dam site with the R617 The R617 connects Pietermaritzburg – Howick – Bulwer – Underberg. The first of these roads runs along the left bank of the proposed Smithfield Dam and links Deepdale Station with the R617. This road would be inundated for about 2km of its course by the proposed dam. The second road runs along the right flank of the proposed dam and connects the settlements of Machabasini and Nonquxa with the R617. This road, although close to the dam, appears to be above levels of inundation. These roads play an important access function in the local road network. In conjunction with the settlements economic activities have emerged at various points along the road, notably in the vicinity of the Machabasini and Nonquxa, and to a lesser

extent at Deepdale. There are hosts of smaller foot paths/tracks that criss-cross the dam basin and would be lost to inundation.



Land Usage in the Smithfield Basin area

The dam basin is relatively well developed on the left bank but noticeably over-developed on the right bank. There are riparian agricultural lands along a large portion of the length of the Mkomazi River. Of particular note are the relatively intensively cultivated arable fields in the vicinity of the Nonguxa settlement and on the alluvial plain on Lot 851815 (owned by the Department of Land Affairs). Crops grown include Maize, Beans, and some Vegetables. In all about 200ha of arable land (either currently, or recently, under cultivation) would be lost. For the remainder of the basin grazing and shrub land which seems to be of "better than average quality" would also be lost.

Demographic & socio-economic Context (Smithfield)

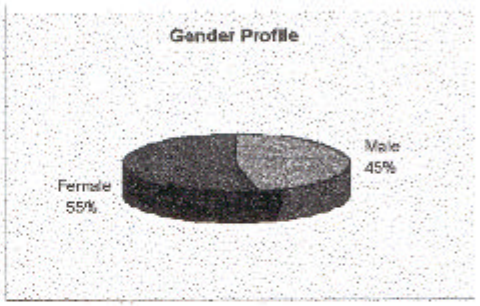
The information presented in this section is also based on the findings of the adjusted 1991 Census. For the most part characteristics of these people are generally typical of rural areas in KwaZulu-Natal and very similar to that of the Impendle Dam site. As **Table 2.5** indicates, more than half of the people residing proximate to the proposed dam are female, which reflects the impacts of migrancy upon the structure of rural households in the Mkomazi River valley. The male:female ratio shows a more skewed distribution than for the Impendle site indicating a greater dependency on migrany. This is probably due to:

- Better access from the Smithfield site to Pietermaritzburg and;
- The more degraded nature of the Smithfield resource base making returns on local income generation more marginal

It is estimated that some 1100 people are indirectly dependent (to a greater or lesser extent) on resources in the valley. For the most part these people live in the settlements of Machabasini (Bhidla Tribal Authority) and Nonquxa (Zashuke-Bomvu Tribal Authority) both of which are situated within a 5 kilometre radius of the dam wall). Almost all of these people utilise the resources of the basin on a subsistence basis. A further 2 000 people may be indirectly using resources; that grazing livestock in the area, gathering firewood or dependant on the economic base generated by the production and harvesting of resources in the basin.

Table 2.5 : Gender and Residential Status

	No of People	%
Male	494	45
Female	606	55



Even more marked than with Impendle the age profile shows that the population is generally youthful. An analysis of the population which indicates that almost one half of the resident population of the dam basin area is younger than 20 years. The high proportion of young people is fairly typical of rural tribal areas and can be attributed to a combination of factors, notably, the absence of many working age people and a relatively high natural population growth rate. Analysis also shows that there is absence of working age people is most evident among males in the 31-40 year and 41-50 year age category, again a result of migrancy.

Household Profile (Impendle Area)

As with Impendle an analysis indicates that pre-school-age and school-going-age children are the largest economic segment, collectively making up 44,6% of the households. This is followed by a category of unemployed adults made up of people who are actively seeking employment (25,7%) and not seeking employment (3,2). Only 16,2% of people in the surveyed households are engaged in economic activity, either through self-employment or through wage employment. 10,3% of people are either "retired" or pension-drawers.

With only 16,2% of the adult resident population is engaged in income earning activities there are five dependants for every employed person. This is indicative of the lack of local employment opportunities within the Mkomazi valley.

In addition to displaying a high dependency rate, the affected population has a relatively low skills base, which is not uncommon given its rural context.

Many of the surveyed households are vulnerable to poverty. According to the Census results the average household income stands at R1965,00 per month and is made up of wage income, pension and welfare transfers, migrant remittances and income from agricultural activities. This is slightly lower than in the Impendle area, indicating that the local resource base is poorer and that, perhaps, migrant incomes, were not adequately reflected as local earnings during the census taking.

CHAPTER THREE: DETAILED ANALYSIS OF IMPACTS

INTRODUCTION

This section of the report outlines the key issues and social impacts associated with the proposed Impendle and Smithfield schemes. These issues and impacts are summarised in **Table 3.1,** at the end of this section. The following section (**Section Four**) will present detailed strategies and measures to manage the issues and mitigate the potential impacts.

LOSS OF AGRICULTURAL RESOURCES

Cultivated Land

The impact of the dams would be to deprive the affected households of important staple food sources. Estimates from stakeholder interviews held among people living in the subsistence farmed areas indicate that approximately 80 % of cultivated land is used for maize production and 20 % for mixed vegetables. Agricultural yields are difficult to measure accurately because precise records are not kept, and people only really measure produce in terms of bags of ground maize. It is estimated that a maize crop of 1,2 - 1,5 tons is harvested annually within the dam site, which would probably support a large proportion of the population living within the dam site The only **substantial** commercial farming initiative in either of the dam basins occurs at Rockleigh Lodge where the owner, Mr Ndlela, indicates that he grows vegetables (mostly cabbages, potatoes and beans) under irrigated conditions. His farming operation employs about 16 people.

In terms of mitigation, it will be necessary to ensure that affected households are not made worse off by the dam. Therefore it will be important to employ measures that will have the effect of improving their life opportunities either by identifying arable land nearby or by identifying alternative income earning opportunities. The loss of land is more a great deal more acute in the Impendle Dam Basin than in the Smithfield Basin. In the Impendle phase 1 option (Option A) about 100ha of arable land would be lost, at the lower level (hereafter the phase 2 level associated with the Smithfield option) this would decrease slightly to about 95 ha. The marginal decrease is due to the fact that most of the arable land is located proximate to the river in the lower lying areas. In the Smithfield option about 20ha of arable land would be lost.

Section Four deals with mitigation and compensation measures in more detail.

Grazing Land

The loss of grass land and wood land will obviously reduce the amount of commonage that people utilise for grazing their livestock. The implication is that the proposed dams will load additional pressure on dwindling grazing resources. It is understood that stock move freely within the wider dam basin during the course of the year, and as such, the loss of grazing land within the dam site potentially affects households living outside the dam site as well.

The impact of the dams is that it will substantially reduce the grazing area available in the respective tribal areas. In terms of mitigation, it will be important to employ measures that will allow people the basin of retaining their livestock holdings without necessarily accelerating land degradation related to over-grazing. Again the loss of land is more a great deal more acute in the Impendle Dam basin than in the Smithfield basin. . In the Impendle phase 1 basin about 600ha of grazing land would be lost, at the lower level this would decrease slightly to about 390 ha. Mr Ndelea, at Rockleigh Lodge, indicates that he farms diary and beef herds in an intensive manner. He has a herd of some 185 cattle that graze, at least in part, on irrigated pasturage. In the Smith field basin about 480ha of grazing land would be lost.

LOSS OF WOOD-LAND AND RIVERINE VEGETATION

A variety of fruit trees will be lost. Although not necessarily staple food sources, fruit trees supplement the nutritional needs of households, and as such, should be considered among the negative impacts of the proposed dam. Of potentially more significance is the fact that the proposed dams will inundate approximately land that is vegetated by wood land and thicket. This provides an important supply of fuel wood to the communities, as most of the households affected by the dams are not electrified.

The wood land and riverine vegetation is also an important source of medicinal and herbal materials for local inhabitants. Investigations indicate that for a variety of uses, ranging from medicinal remedies to matting and handicraft activities, local people use 15 types of species of plants and trees. Most of these species are situated either within the river course or on the river banks and plains immediately above the river course. It will be important for mitigation purposes to ensure that the supplies of plant life, particularly those that are already scarce or not easily available within the Mkomazi valley, are not obliterated by the dam. This is dealt with in more detail in **Section Four**.

LOSS OF HOUSEHOLD STRUCTURES AND GRAVES

At ultimate level (phase 1) the Impendle Dam is associated with the necessity to remove about 40 -50 households, most of which are located in the village of Makhuzeni. Rondavels and single room flat roofed structures are by far the most common structures found within the dam site, although "traditional" dwellings range in size up to six room structures. In addition there are a number of "formal" structures,

associated with the developed farms of Rockley Lodge that are below the proposed FSL. At the lower (phase 2) there would also be the loss of about 40 –50 households (again most are in Makhuzeni). A point of concern is the village of Mkomazi. Although the village was abandoned during the pre-feasibility level investigation experience has shown that the potential development of a dam (and consequent compensation) may act as a trigger to spur people on to reoccupation of abandoned housing.

In the Smithfield option there are two households very close to the proposed FSL, both which would probably have to be relocated. However given concerns around the proximity of households to the water edge, from the point of view of water quality, it might be prudent to relocate the entire settlement. While this concern has a degree of historical legitimacy it should also be looked at in the light of current attempts to make sanitation infrastructure available to residents in rural areas. Under these circumstances it may be more cost effective (and socially manageable) to let households, that need not move, remain and to provide (as part of compensation negotiations) adequate sanitation facilities for them.

The fieldwork investigation asked about graves below the FSL. It is almost certain that about 80 graves are located within the Impendle dam site (at phase 1 level). These are associated with the settlements of Makhuzeni and Mkomazi. Experience on similar projects elsewhere reveals that the actual number of graves could be substantially more, considering that households situated outside of the dam site may have graves within the dam site. The actual number and location of graves will be finalised in further investigations should the Impendle Dam site be looked at in more detail. There are possibly a small number of graves, below the FSL, associated with the Smithfield Dam site.

In terms of mitigation and compensation, it will be important to ensure that affected households are not made worse off by the dam. As such, it will be necessary to formulate a compensation package that is tailored to the sensitivities and requirements of affected households, both in terms of replacing lost structures and addressing the cultural implications of relocating ancestral grave sites.

LOSS OF TRANSPORT ROUTES AND RIVER CROSSINGS

As was indicated previously, both dams will flood important transport routes which will have the effect of impeding the movement of people and vehicles. In the case of Impendle Dam (both phase 1 and 2 levels) this will affect movement across the Mkomazi and Mkomazana Rivers as investigation shows that there are as many as 12 points (slightly less for the phase 2 level) within the dam site at which people on foot regularly cross between the northern and southern sides of the River. This however, is episodic fording as a full river greatly curtails the ease with which the dam may be crossed. However, once the dam is full, people will no longer be able to enjoy even this episodic fording of the river and instead will have to circumvent the dam to reach the other side. The effect that this would have is to substantially increase the

time and inconvenience of walking to the opposite side of the river. This is likely to have negative repercussions for social ties and relations in situations where the dam will separate and divide tribal members from each other.

In the case of the Smithfield Dam both fording the river will be curtailed, but so to will an important North - South linkage (Deepdale Station Road), on the left bank of the river, be cut off.

In terms of mitigation, it will be important for a variety of social and economic reasons to ensure that local communities are not made worse off by the dam. As such, it will be necessary to devise approaches to retain important transport linkages between opposite sides of the dam as well as upstream and downstream of the dam. **Section Four** looks at this in more detail.

SAFETY OF HUMAN AND ANIMAL LIFE

The presence of a large permanent body of water poses potential risks to life in the form of accidental drowning. This kind of impact is synonymous with dams of any sort, and measures will need to be devised to minimise potential risk to life.

LOSSES ASSOCIATED WITH EXTRACTIVE ACTIVITIES

In addition to the dam itself, there are a series of attendant impacts associated with the extractive activities and construction site which require assessment. In the main, borrow pit activities are likely to have the most significant social impacts for two reasons. Firstly they are likely to consume tracts of land within the Mkomazi valley. While this is not much of an issue where land for quarries or borrow pits is that which is going to be submerged by the dam, it becomes problematic if areas are outside of the basin and on productive or residential land. Although it appears as if most of the material needed for the dam will probably be sourced from within the basin these details would only become more assuredly available during a feasibility study. As things stand there do not appear to be impacts associated with borrow pits or quarries (even if they are located outside of the dam basin) that would constitute a major impediment to development.

CONVEYANCE SYSTEMS, WATERWORKS AND RESERVOIR AT UMLAAS ROAD

The conveyance systems associated with the Impendle option, although it may have some economic impacts, is unlikely to create major social impacts. The tunnel that will convey the water from the dam to the existing Midmar Dam will have almost no social impact other than.

- *Potential disturbance of groundwater sources.* Tunnels (if they are not lined) have the potential to disturb groundwater sources and therefore to impact negatively on the yield of boreholes. People in the Impendle location are, at the moment, fairly dependent on boreholes as a potable water source.

The proposed Nzinga Community Water Supply Project (currently in its planning phases) will supply water to a number of communities close to the conveyance route. At his stage there is no firm decision as to whether water will be supplied from the Nzinga River or from the development of a borehole supplied reticulation system. If the latter option is selected then the tunnel may have some impact. Although this is a possible impact, the provision of a tunnel membrane, will mitigate against this occuring.

- *Spoil area*. The spoil from the tunnel needs to be "dumped". If not carefully selected this could have some impact in terms of utilising otherwise arable land.

From delivery to Midmar Dam water will be abstracted and treated at an extended waterworks and conveyed by existing and proposed tunnels and pipelines, including the Northern Feeder, to a proposed reservoir at Umlaas Road. Although infrastructure may need to be expanded the works will take place within or alongside already registered servitudes and should not have a major negative social impact. Registration of servitude gives the servitude holder (in this case Umgeni Water) certain property rights (e.g. right of access). It also restricts the range of development or landuse options open to landholder on the piece of land that is registered to servitude. The value paid to the owner of the land, for the rights to register a servitude, were calculated in terms of loss of land potential. Where an owner may be found to have transcended the servitude agreement (e.g. grown crops on land that were precluded from cultivation within the servitude) them Umgeni Water does not pay for damage that might accrue in exercising rights of access etc. Where additional servitudes may have to be acquired then the developing agent will be expected to pay fair compensation to the property owner. Care should be taken to ensure that soils are replaced so that the productivity of the land is not diminished.

Crime and associated violence is often expressed, by stakeholders, as one of their critical concerns. Central to their concern is the perception that crime increases when contractors workers have access to their lands. As such the contractor should also be instructed to exercise due caution in ensuring the security of the land upon which he is working.

The proposed reservoir at Umlaas Road will be situated adjacent to the N3 and in the vicinity of the farm, "The Willows". The reservoir appears to inundate land given over to chicken farming and the grazing of dairy herds. Although rural the land is in a belt that is highly disturbed by roads, railway lines, and powerlines. Although the social impacts appear minimal compensation will have to be paid to the land owner and care will have to be taken to ensure the minimum of disturbance during construction. In all it it anticipated that about 4ha would be inundated.

The Smithfield Dam option is somewhat more complex in terms of the social impact of its conveyance system. As with Impendle the first part of the conveyance system consists of a tunnel. As with Impendle the tunnel may impact negatively on the groundwater system although mitigation via a tunnel membrane is likley..

The tunnel delivers water into a holding dam on the Mlazi River. The holding dam on the Mlazi River is in existence but will have to be raised. Little in the way of social impact is anticipated to accompany this raising. Although the holding dam will almost certainly not be problematic the extra water in the Mlazi may have some impact on access, although this appears not to be problematic at this stage.

The construction of the proposed Baynesfield waterworks will require the expropriation/purchase of agricultural land. From abstraction at the new water works the water will be conveyed, via pipelines to the proposed reservoir at Umlaas Road. The new pipelines will be approximately 21km long.[5] As far as can be determined its entire course will be through freehold land. It is anticipated that for the most part the pipeline will be on agricultural land and will require the registration of a servitude. Registration of servitude gives the servitude holder certain property rights (e.g. right of access). It also restricts the range of development or landuse options open to landholder on the piece of land that is registered to servitude. The value paid to the owner of the land, for the rights to register a servitude, should be calculated in terms of loss of land potential. In terms of current policy Umgeni Water would pay 30% of the value of land where the owner could still use the land and 100% for land that is sterilised. Where an owner is found to have transcended the servitude agreement (e.g. grown crops on land that were precluded from cultivation within the servitude) then Umgeni water does not pay for damage that might accrue in exercising rights of access etc.

For freehold title (private ownership), where the landowner has title deeds, an application is made to the owner for servitude. This is part of a formal agreement. To register the servitude, a formal procedure is followed through the relevant deeds office, whereby the owner has the opportunity to negotiate compensation. Current market values for land along the proposed pipeline (excluding compensation for improvements and other costs) route are the following:

- Grazing land = R 1 200 to R1 500 per ha.
- Arable land = R 2 500 per ha
- Irrigated Land = R 5 000 per ha

[5] Although the pipelines will be implemented in two phases they are planned to lie within the same servitude.

- Orchards = R 35 000 per ha.

IMPROVED ACCESS TO BASIC NEEDS

The proposed dams would have a number of implications for the quality of life of the local population living near to it. Not the least of which is the impact the dams could have on access to a series of basic needs.

In the first place, the proximity of a permanent body of water could potentially enhance the viability of implementing rural water reticulation schemes to the communities adjacent to the dam. It could also enhance the viability of small irrigation schemes immediately adjacent to, and downstream of, the dam.

Secondly, of necessity the construction of the dam will entail the improvement of existing road infrastructure, the provision of bulk electrification and the construction of site buildings and infrastructure. These infrastructures will potentially have a direct bearing upon people's access to infrastructure and services. For example, the installation of bulk electricity will enhance the viability of reticulating electricity to nearby community facilities and households; an improvement to the road network will enhance the reliability of access roads into the Mkhomazi valley; and once the construction phase is complete, the vacated site buildings could possibly be made available to local communities for public facilities.

It will be necessary to ensure that such potential opportunities are maximised. Section Four sets out an approach to capturing these opportunities which will ensure that, as far as is economically feasible and socially acceptable, potential benefits are widely distributed.

IMPROVED LOCAL ECONOMIC DEVELOPMENT OPPORTUNITIES

In addition to basic needs, the proposed schemes also have repercussions for local economic development within the middle reaches of the Mkomazi valley. Firstly, the construction phase will provide employment opportunities for local labour and, to a limited extent, small scale contractors. Secondly, in the case of public works projects, such as the upgrading of roads, employment would be supplemented by basic adult education and training opportunities, which could enhance the skills base of the workforce. Thirdly, the injection of wages and salaries into the valley will have important implications for the local economy by increasing the disposable income of households. Although some of this income will be spent outside the local economy on goods that are not available within the local economy, money will undoubtedly also circulate within the local economy and create multiplier effects on a significant scale. Last, but not least, the dam should be treated as a local development opportunity and the scope of study for the feasibility phase investigation should make provision for an investigation of this nature.

It will be necessary to manage the local economic development opportunities that emerge to make the best possible use of the incoming resources and to ensure that the potential benefits are distributed widely. **Section Four** outlines an approach to this aspect.

CONCLUSION

The proposed dams potentially impacts upon the communities that will play host to them in a number of ways. There are a series of "negative" impacts, in the form of agricultural resources, dwellings, social and physical infrastructure and potentially locally sensitive sites (e.g. graves), which would be flooded by the dams. There are also potentially significant "positive" impacts, in the form of economic opportunities and infrastructural improvements. The objective of the following Section is to present a strategy towards managing the impacts so that the potential benefits can be maximised and distributed widely, and the potential losses can be mitigated and compensated for in a way that is acceptable to affected households and local communities and a way that will ensure that people are not made worse off by the proposed dam.

By way of summary the table below lists major quantifiable impacts by dam options.

	Impendle (Phase 1 Option A) 1205masl buyout line	Smithfield (Phase 1 associated with Option B) 920masl buy out line)	Impendle (Phase 2 associated with Option B) 1195masl buyout line	Combined Smithfield with Impendle 1205	Combined Smithfield and Impendle 1195
Arable Land	100ha	20 ha	95ha	120 ha	115ha
Grazing land	600ha	480ha	390ha	1080ha	870ha
Households relocated	The entire Makhuzeni settlement (40 –50 hhs) will almost certainly have to be relocated. Other housing will be lost on the formal farms and the village of Mkomazi (although now abandoned) may be re-occuppied. Most of the Mkomazi village is below the FSL (40-50hhs).	2	With the purchase line all households in the Makhuzeni settlement might be moved. Other housing will be lost on the formal farms and the village of Mkomazi (although now abandoned) may be re-occuppied. Most of the Mkomazi village is below the FSL.	The entire Makhuzeni settlement will almost certainly have to be relocated. Other housing will be lost on the formal farms and the village of Mkomazi (although now abandoned) may be re-occuppied. Also 2 households at Smithfield.	With the purchase line all households in the Makhuzeni settlement might be moved. Other housing will be lost on the formal farms and the village of Mkomazi (although now abandoned) may be re-occuppied. Most of the Mkomazi village is below the FSL. Also 2 households at Smithfield.
Access routes	• Loss of Himeville-Impendle Access road and Bridge. A bridge across the dam wall to replace this loss is proposed. • Loss of Mkomazana Bridge and access road to Bulwer. A bridge across the dam wall to replace this loss is proposed.	• Loss of Deepdale access road. The road will be re-routed around the dam flood line. • 6 footpaths	• Loss of Himeville-Impendle Access road and Bridge. A bridge across the dam wall to replace this loss is proposed. • Loss of Mkomazana Bridge and access road to Bulwer. A bridge across the dam wall to replace this loss is proposed. • 8-10 footpaths	• Loss of Himeville - Impendle Access road and Bridge • Loss of Mkomazana Bridge and access road to Bulwer. A bridge across the dam wall to replace this loss is proposed. • Loss of Deepdale access road • 14-16	• Loss of Himeville-Impendle Access road and Bridge • Loss of Mkomazana Bridge and access road to Bulwer. A bridge across the dam wall to replace this loss is proposed. • Loss of Deepdale access road • 14-16 Footpaths

				Footpaths.	
Communal Resources	Loss of fuel bio-mass and communal plant resource of the inundated basin (for comparative purposes a factor of 1)	Loss of fuel bio-mass and communal plant resource but loss is less than in Impendle (Factor of 0.5)	Loss of fuel bio-mass and communal plant resource of the inundated basin but less than that associated with larger Impendle Dam (Factor of 0.7)	Combined Loss of fuel bio-mass and communal plant resource of the inundated basins (Factor of 1.5)	Combined Loss of fuel bio-mass and communal plant resource of the inundated basins (Factor of 1.2)

CHAPTER FOUR : IMPACT MANAGEMENT IN THE DAM AREAS

INTRODUCTION

As has been stated the Impendle and Smithfield Dam sites are located on

- Freehold land held individually or by companies and farmed "for gain".
- Freehold land farmed communally and on a largely subsistence basis
- Tribal Trust Land

The purchase of the freehold land in the first category is unlikely to prove to be problematic. Purchase of land in the second category is likely to be more problematic as people residing on some of the land, and in terms of current thinking have legitimate claims to it, are not necessarily regarded as legal owners. The second and third categories of land owners therefore present particular challenges in terms of compensation and mitigation. In order to meet these challenges a suggested management strategy is spelled out in this section.

At present trust land is held for the communities who occupy them. They do not own the land but enjoy the use of the resources of the land. The trustees of the land are the state with certain rights devolved to the gazzetted tribal authorities.

In the absence of freehold title purchase of the affected land and monetary compensation to the users of the land is not currently possible. However, in the Impendle option the affected tribal authorities are generally proximate to adjacent freehold land. In some instances this could be bought for the tribal authorities, to replace the land that is being lost. For the Impendle option the freehold land that is located on both the right and left banks could be bought up and go some way towards compensating the Nxamalala and Basotho Tribal Authorities for losses. This would however, have to be negotiated with the various owners, the Tribal Authorities and with the state as pending land restitution cases and instances of redistribution would impact on viability of this strategy. In the Smithfield instance the viability of purchase of freehold land is made a great deal more complex by the pending land restitution and redistribution packages being proposed. As such, and in both cases, while purchase of freehold land this will go a long way towards mitigation of impacts it is unlikely that this will satisfy all compensation demands. Therefore, more creative compensation policies need to be identified. Compensation policies will have to accentuate the local development nature of the dam project.

The following suggestions, for the management of social impacts, arise out of our experience with the Lesotho Highlands Water Project, the Tugela-Mhlatuze Government Water Scheme, and the Driekoppies Dam. Within this broader context the following compensation strategies are proposed.

REPLACEMENT HOUSING ON TRIBAL TRUST LAND

A starting principle should be that the implementing agent should rebuild housing required for the project rather than offer cash compensation. All actively utilised dwelling units should be replaced irrespective of the condition of the house. The fact that housing will be new, and usually built from materials that are better than those that are lost, means that households are generally better off in terms of the quality of their housing. The following more specific recommendations are made.

Residential property

Where the implementing agent intends to acquire a residential site, they should ask the owners and occupants of the site where they wish to resettle. This preference is influenced by many factors, including the decisions of neighbours and kin, and is likely to change in response to changing circumstances and opinions in the community. The implementing agent should therefore allow ample time and provide the necessary information and other assistance to help people to make this choice. The site should be selected in conjunction with the Tribal Authority.

People should not be removed from their sites before they can move into at least part of the new homestead being built for them.

The implementing agent should investigate the availability of residential sites, with land for gardens where this is desired, in the areas chosen by the prospective resettlers. In the selection of new residential sites due consideration should be given to the views of the host communities.

Should an extended family, a village community or any other group of neighbouring households which are to be relocated wish to live close to one another in future, the implementing agent should make every effort to assist them to obtain residential holdings, in a single block or acceptably close to one another.

As a general principle households should be relocated within the same Tribal Authority, but may be relocated elsewhere if:

- there are compelling social, economic or political reasons for their relocation elsewhere;
- there is insufficient residential land available in the area of their choice.

The present policy is geared to the owner-occupier. This category includes by far the greater majority of the households in the project area. Where the implementing agent acquires residential property on which there are one or more habitable houses, it should do so according to the choice of the owner and

Either build the same number of new houses. Housing should be rebuilt to resemble that which is lost. That is, a rondavel will be replace with a rondavel, a flat with a flat. A range of designs should be generated from which the individuals can choose.

or amalgamate the floor area of the old dwellings into a smaller number of new houses, of at least equal quality and floor area to that of the acquired dwelling(s), at the new residential site.

The implementing agent should consult with the owner on which among a number of standard designs, appropriate to the given floor area, should be provided. The implementing agent should have the right to demolish every building it acquires, after an acceptable period has lapsed, in order to prevent its unauthorised re-occupation.

The implementing agent should be responsible for the construction of the new housing and should provide transport for the occupants and their belongings when construction is complete. The owner should be entitled to remove any materials he or she wishes to salvage within one month of vacating the old dwelling. The implementing agent should provide transport for these materials, other than masonry[6], to the new residential site. Where the old homestead was fenced the implementing agent should erect a fence of at least equivalent standard.

Where the implementing agent displaces a household from its homestead, and where the household voluntarily moves into existing buildings elsewhere, there may be no need for the implementing agent to rebuild the old houses. If in the judgement of the implementing agent and of the affected household the latter may benefit more from the cash equivalent of the replacement housing than from the housing itself, cash will be paid.

Cash should also be paid in the following instances:

- Incomplete dwelling units, or units which have collapsed and are no longer functioning as dwelling space, should be evaluated and the owner paid out cash for them. Valuation should be undertaken by an official of the Department of Agriculture.

- Cash should also be paid for the ancestral hut "*iqulugwana*". These are generally structures of grass and reeds. Replacing them is difficult for contractors and people prefer to rescue the material and rebuild the hut for themselves.

[6]**Including stones, bricks, and concrete blocks and slabs.**

- Cash should be paid for "*isibiya*" (cattle and goat pens) and for any other miscellaneous improvements on the site. Alternatively the household could be asked to reconstruct *isibaya* etc. at the new site and be paid compensation when this is completed.

Rebuilding structures, rather than paying out cash for structures is advocated for the following reasons.

Firstly the temptation for people to take the cash and use it for other immediate consumption needs is sometimes overwhelming and people subsequently find that they have to settle for an inferior standard of housing to that which they previously enjoyed. If this situation arose it would run counter to the DWAF's stated policy that no one should be worse off after project implementation than before.

Secondly, the sums paid out after valuation according to the official rates tend to be very low. People sometimes accept these rates because they have little idea of what replacement housing could cost them and the sums mentioned to them often seem large.

Third, experience has led us to suspect that some contractors take the approach that by bargaining people down to as low a figure as possible they are saving the project money. While this may be true we feel that money should not necessarily be saved at the expense of the people who bear the costs of having their way of life disturbed.

Lastly, in a situation dominated by migrancy the possibility exists that the household head could abscond to an urban area with the money leaving a destitute rural family behind to cope as best they can.

In this regard we also feel that, in line with the current trends, the replacement housing should (where possible) be sub-contracted out to local "emerging contractors". However we would recommend that prior to any contractor being appointed they be evaluated in terms of capacity and in terms of their track record. This evaluation need not be detailed but cursory. Alternatively there is no reason, if a suitable emerging contractor cannot be identified, why an established contractor should not be appointed. However he should make use of local labour to construct the buildings as far as possible.

Kraals, outbuildings and fences

The implementing agent should either reconstruct these at the new site, or should compensate the owner in cash at their replacement value, which should include the costs of materials, transport, and labour. The choice between these alternatives should rest with the owner.

Toilets

Whether a property acquired by the implementing agent includes one or more toilets, or not, for the sake of improving access to sanitation (and to protect water quality in the dam) the implementing agent should provide VIP toilets at the new site.

Water supplies

Where the project is the cause of a reduction in the supply of water from an established source, natural or artificial, to a community or an individual household, the implementing agent should reinstate that source or replace it with another of at least equal volume, quality and convenience. A number of small springs, used by the community, will be lost to the dam.

Commercial properties

Where the implementing agent acquires a commercial property the owner should be given the choice between

- receiving the full replacement value of the property in cash;

  or

- arranging for the design and construction of equivalent new premises, the cost of which would be borne by the implementing agent.

The implementing agent should provide transport for the stock and equipment, and any other items the owner wishes to move to new business premises.

GRAVES

For many Zulu people graves are seen as the resting place of ancestors. According to traditional belief ancestral spirits are displeased when their graves are disturbed. Angry ancestors are often regarded as responsible for misfortunes such as illness, drought, cattle dying, crop failure, loss of employment, etc. The disturbance of graves is therefore regarded as a serious matter. When graves are disturbed a sacrifice should be made to the ancestors to appease the spirit.

The nature of the sacrifice depends on the role that the ancestor is seen to play in the lives of living descendants. The disturbance of a grave of great significance would call for the sacrifice of a bull, a less important ancestor would mean the slaughter of a goat. Each case should be judged on its merits and appropriate compensation paid out.

The relocation of the grave should be undertaken by a professional undertaker. Most people prefer that remains be reburied in the "Zulu style" i.e. wrapped in blankets rather than in a coffin.

Where the implementing agent acquires land which contains graves it should discuss with the households responsible for the graves whether they want exhumation and reburial of the remains.

If this is desired the chief and land Allocation Committee of the area of which the families are to be relocated should be asked to arrange for reburial sites to be provided.

The superstructure of the new graves, including tombstones, should be provided to a standard at least as high as that of the old graves. If the surviving kin desire that new gravestones be erected these should be provided.

The exhumation and re-interment should be carried out with all due ceremony and ritual as agreed by the implementing agent and the surviving relatives.

The costs of the above provisions should be fully met by the implementing agent.

CROPS IN THE FIELD

Where land with crops is acquired, or crops or destroyed, compensation should be negotiated between the homestead owner and the extension officer from the KZN Department of Agriculture. The procedure for doing this is well and has been followed during this course of many development projects in the KwaZulu-Natal. A cash payment is made to the household, preferably to the senior woman in the household.

LAND ACQUIRED

This is by far the most difficult impact to mitigate. Cash cannot be paid for land as it is tribal and not freehold. However fair compensation must be made available. A number of options are outlined below and in the rural development programme explored in greater detail later in this chapter. Each needs to be carefully negotiated between the implementing agent, the affected individual and the Tribal Authority.

Land will be acquired by the implementing agent for the Impendle or Smithfield Dam and the purposes of its construction. Land will be acquired via the established legal channels. However, given the historically marginal position that people in the rural areas of South Africa have occupied, notification of intent to occupy land is likely to need to be carefully negotiated at the local level. A such we believe that the implementing agent has the duty to inform any persons whose rights or property will be affected by the implementing agent operations before it commences its works which may affect those rights or property. In the case of property whereon there is an occupied dwelling the notice period should be six months and in the case of other property or right to the land the notice period should be one month. Formal notification should be given in writing and the method of sending these notices is specified as follows:

a) It may be served on the owner of the property or land right, who should sign for the receipt of the notice;

b) if there is an occupant of the land or property who is not the owner of the property or land right, both the owner and the occupant should be served with a formal notice of the implementing agent's intention to acquire the property or land right;

c) If the owner cannot be traced the implementing agent, in collaboration with the local authorities, kin and neighbours, should try to locate his authentic representative, who should be served with the notice and may, at the implementing agent's discretion, receive the due compensation on behalf of the owner.

Land which has been acquired by the implementing agent, for example in the vicinity of the reservoir and on vacated construction sites, may not be needed for permanent or exclusive use by the implementing agent. Such land may be opened for access to its previous users under conditions established by the implementing agent or made over to some other public use. The management of this land for the benefit of its previous occupants and users is an aspect of compensation. Management is probably best undertaken within the concept of zones. Zones would include the following categories.

PERMANENT OCCUPATION

Land acquired by the implementing agent for permanent occupation, but where access, subject to specified conditions, may be granted to the public. For example:

1) land occupied by a reservoir where the implementing agent may permit and even encourage certain people to fish, operate boats, etc.

2) land under powerlines where the implementing agent has a wayleave which permits it to exclude or allow various forms of land use;

3) Land on the periphery of a reservoir where the implementing agent proclaims a "safety zone" within which human settlement is excluded in order to reduce hazards to local residents;

Access to this category of land may be allowed by the implementing agent subject to an agreement under leasehold or any other arrangement agreed by the implementing agent with prospective users. Leases may not be renewed and other agreements may be suspended by the implementing agent if the land or water is being used irresponsibly or unproductively, or if the implementing agent wishes to resume occupancy.

Temporary and Exclusive Occupation

Land acquired for temporary and exclusive occupation and use by the implementing agent. E.g. land on which contractors' camps and temporary access roads are built. This will later be returned to the previous occupants or made over for some other public use.

In either case the land so occupied should be reinstated by the contractor, and returned to the previous occupants or to the implementing agent in the condition specified in the contract.

The tender documents should be highly specific in their requirements for reinstatement, giving the contractor and the supervising engineer clear instructions for reinstatement. These actions should also appear in the bill of Quantities.

The supervising engineer should authorise payment for these items only after a thorough inspection of the site by his own technical and environmental staff, and following formal clearance by the Environmental Division of the implementing agent.

Temporary and non-exclusive Occupation

The implementing agent or its Contractors may overestimate the area of land they require for their operations, and should this become apparent they may allow public access for limited purposes, such as grazing or ploughing, until the contract is ended, when the land will be returned to its previous uses, or made over for some other public use, in a condition at lease equivalent to that in which it was acquired.

Acquisition of arable land

The implementing agent may acquire land for a variety of purposes associated with the project. These should include land acquisition for purposes directly related to the construction of the dam, including access roads, contractors camps, and for the inundated area; and also land which may be required for the purposes of resettlement and compensation of affected communities and households.

Where arable land is acquired by the project, and the affected household wishes to be compensated with land for land (i.e. that purchased form adjacent freehold areas), the implementing agent should endeavour to provide alternative land of at least equivalent productive potential in a place acceptable to the affected family.

The provision of replacement arable land will normally entail a move or residence for the affected family and its livestock. The acceptability of a relocation destination therefore requires a combination of suitable

arable land, access to winter and summer grazing, and a residential site with provision for a garden, all within convenient reach of one another.

The land rights granted to a family compensated with land for land should provide security of tenure at least equivalent to that which the family held over its previous fields.

The implementing agent should investigate the feasibility and cost of reclaiming land for agriculture through any long-term cost-effective means. Where, for example, it is found to be economically and technically feasible to reinstate a spoil dump for agricultural purposes or to move soil from a reservoir basin to a higher terrace, this should be incorporated into the contractor's contract and bill of quantities. The land so reclaimed should be distributed by the tribal council to applicants selected from among those losing land to the project.

Furthermore, where arable land is required by the project, the implementing agent should investigate with the local chief and land allocation committee the availability of land which is not being used by its present holders an which could, with the consent of its present holder, become available for re-allocation.

Such arrangements should not be made by the implementing agent until it is entirely satisfied that the family relinquishing its land rights will not be impoverished or in any way disadvantaged by the loss of rights over that portion of land. The implementing agent should inform persons from whom it is compulsory to acquire arable land that they may, if they wish, investigate the availability of fields belonging to others. If they are successful in finding such land, the implementing agent should assist them by all legal and appropriate means to effect the transfer of land rights through the normal channels.

The implementing agent's objective is to ensure that in addition to receiving direct compensation for their losses, affected households should be enabled to recover their own independent earning capacity through enhanced agricultural production from the remaining land and through the development of alternative sources of income. This is explored in more detail in the section on the rural development programme.

Acquisition of grazing land

Grazing land is a communal asset. Compensation for its loss therefore needs to be considered as a loss to the community and also as a loss to individual livestock keepers, both present and future.

Where it is not possible to compensate through purchase of freehold land for the tribal authorities the implementing agent should compensate the communal loss by planning and implementing range management and fodder production programmes in collaboration with the local communities affected by the loss. The objective should be to improve the productivity of the remaining range resources by an

amount at least equivalent to the annual loss in biomass caused by the project. This should take place as part of a rural development programme (referred to in a section below).

TREES AND NATURAL SOURCES OF FUEL

Wherever it is necessary for the implementing agent to acquire individually owned trees, it should provide compensation in the form of five seedlings of the same or another acceptable species for each tree acquired. The implementing agent should ensure that the recipients of these seedlings receive any necessary advice and support in their cultivation and care.

Many households in the project area depend heavily on natural vegetation for their fuel. Large areas of this communal resource will be lost to inundation, and individual families will thus be deprived. The implementing agent should investigate woodlot programmes as a mitigatory measure. This should take place as part of a rural development programme (referred to in a section below).

ACCESS

Relocation and compensation

Where a family or a community will suffer significantly impeded access and loss of communications on account of the project, and wishes to move to a new site, the implementing agent should provide them full entitlement to relocation and compensation, as if that family or community were to be involuntarily resettled and compensated for its losses.

The definition of 'significantly impeded access" cannot be formulated precisely, and the implementing agent should accept that any family or community that clearly wishes to move has good reason for doing so, and for not wishing to remain.

Roads

The implementing agent should replace roads which it floods or otherwise closes with access of least the same standard. For the Impendel Dam to be socially feasible the Impendle - Himeville road needs to be realigned. For the Smithfield Dam to be socially feasible the Deepdale road will have to be realigned.

Access across valleys

Where access across river valleys is interrupted by flooding, the implementing agent should provide an alternative means of access by ferry, bridge or other means acceptable to the affected communities at former major crossing points, to ensure that communications are maintained.

The provision of alternative means of access would, of course, become unnecessary if all those using the crossing in question had been resettled to a place where they no longer needed to use that crossing.

INFRASTRUCTURE AND AMENITIES

Government-owned infrastructure

The implementing agent should replace any local infrastructure and public amenities it acquires, such as dips, village water supplies, clinics, schools, etc. Environmental and physical planning considerations should be taken into account in the replacement and siting of such infrastructure.

Community-owned amenities

Where the implementing agent acquires public amenities and land belonging to a group or section of the public, such as a church or an association, its replacement should proceed along the same lines as the replacement of commercial premises.

OPTIMISATION OF DEVELOPMENT INPUTS

A flip side to the development of a compensation policy is accentuation of the potential positive impacts inherent in the project. In the past these have been seen as incidental but with careful though and a process of local consultation they can be designed to meet a range of local agendas *without necessarily becoming a project expense*. The following items are particularly important.

- reservation of appropriate sub-contracting jobs for local entrepreneurs/emerging contractors.

- encouraging contractors to optimise the numbers of jobs that they can make available i.e. substitution of plant for labour where possible

- structuring a local employment policy that spreads jobs as widely within the area as possible

- initiation of a public works allied adult basic education programme for locally recruited workers

- design of construction access roads so that they meet both project and local development agendas

- design of the construction camp so that infrastructure can be used by the community in the post construction phase.

- encouraging ESKOM to design their infrastructural development with the aim of expanding their network into the area.

Strategies to address some of these are spelled out in more detail in the following sections.

SUGGESTED LOCAL EMPLOYMENT STRATEGY AND ROLE OF HOST COMMUNITY WORK GROUP

Of critical concern is the maximisation of opportunities for the employment of local labour. To this end the tender document should call for the contractor to draw 90% of his unskilled labour from the local area. While maximising the use of local labour and training opportunities is clearly a requirement of the RDP, specifying that 100% of the unskilled labour should be local is problematic as sometimes the contractor's domestic subcontractor (who may only be on site for short periods of time) supply their own unskilled labour which they have employed on a long term basis. However specifying that 90% of unskilled labour should be local should be no problem. Preliminary estimates suggest that for the tunnel inlet and outlet areas as a whole, a total of 108 local people could be employed. An unskilled labourer is deemed to be some one working under supervision of at least a semi-skilled worker.

In order to sensitise the contractor to the context from which local labour will be drawn and in an attempt to pre-empt monopolisation of the employment opportunities by any single group within the local area provision is made for the establishment of an *Host Community Working Group (HCWG)*. The HCWG would be the key advisory system and local liaison structure which would be responsible for giving input into recruitment, management, remuneration and training of local labour for the duration of the project.

The HCWG would be an independent body constituted and driven by local stakeholders. The social consultant would play a facilitative and secretarial role and the client, contractor, and consulting engineer would give expert input. The HCWG would consist of representatives from the following organisations:

⇒ Department of Water Affairs and Forestry (DWAF)
⇒ Umgeni Water
⇒ Consulting Engineers
⇒ Contractor(s) (after appointment)
⇒ Social Consultants
⇒ Local Community Representatives

In order to obviate delays in decision making it is suggested that an alternative member is appointed for each member of the HCWG to fill in should the need arise.

For the duration of the *construction phase* the HCWG will need to meet regularly to assess the various components of the employment management system. It is critical that the HCWG meet for a short period in the *post-construction phase* to critically evaluate the employment strategy for this project.

The HCWG would meet as soon as possible, prior to the award of the contract, and during the design phase. The purpose of this meeting would be to agree on a clear approach regarding the following areas which would constitute the central areas of an employment advisory system. The areas would be:

- How should people be recruited

⇒ advertising of jobs and communication channels; and

- Who should qualify for local employment-

⇒ desired quotas from local Tribal Authority areas;

⇒ gender considerations; and

⇒ skill levels and training potential.

⇒ short-listing of appropriate candidates (criteria to be established by the HCWG) and priority listing of suitable people.

The applicable clauses in the "General Conditions of Contract for Works of Civil Engineering Construction" (1990) should apply.

The nature of the recruitment process is of critical importance if a central goal of this project is to maximise employment opportunities for local people. In order to fulfil this objective the following guidelines should be followed but will be discussed within the HCWG:

- The actual advertisement of job opportunities and recruitment of labourers is the responsibility of the Contractor. The Contractor should endeavour to ensure that the recruitment procedures are in keeping with the proposals forwarded by the HCWG. However the contractor should be given the opportunity to reject proposed labour, as long as sufficient motivation is provided. This will protect the contractor from having to hire labour that is not suited to the required tasks and will also afford the client protection from claims based upon non-performance of labour.

An open and well-publicised recruitment process should be embarked upon which will allow sufficient time for people to respond and apply for all unskilled and semi-skilled jobs; the advertising process should also provide a clear indication of the type of skills sought and the length of time for which people are likely be employed; the advertising process should be appropriate to the socio-economic conditions that prevail in the area.

Information sessions should be convened with prospective employees where the expectations of local people are dealt with in a candid yet sensitive manner, this should be the joint responsibility of the contractor and HCWG.

Where contractors are unable to fill posts from the local pool they should indicate the categories of work and any other reasons for not employing local people. It is also important that the position of temporary workers be clearly spelt out.

Other issues that the HCWG could advise upon would include:

- Remuneration:

⇒ Starting wage levels commensurate with experience qualifications and skills, manner of payment, other benefits.

- Skills:

⇒ Identification of local entrepreneurs with the resources to carry out subcontract work.

- Mediation:

⇒ Grievance procedures and dispute resolution.

The HCWG would be composed in such a way that the local people would own the group with the consultants and contractors acting in an expert input capacity.

INTEGRATED SERVICE EXTENSION

During the construction phase it is recommended that the contractor do everything in his power to extend the services available at his camp to the local inhabitants. Recommendations as to how and where this should take place should form part of the detailed design. In this regard the following is recommended.

- A 1000 litre water tank should be situated immediately outside the construction camp for local use. It would be filled once per day. The extension of a potable water supply to the community is unlikely to cost the contractor very much but will prove to be of immense value in generating goodwill.

- If possible ESKOM should be encouraged to extend their electricity service to the contractor (if it is provided) to critical points of local consumption. These would include the clinic site, the schools,

mission station, shops, tribal court, etc. Facilitating this is beyond the brief of the contractor and of the implementing agent but should be addressed in the Relocation Action Plan and an approach made to ESKOM prior to construction being undertaken.

- Other service extension possibilities will become evident during the construction phase. The HCWG should be encouraged to be aware of these possibilities and make pursue the necessary courses of action wherever possible.

INTEGRATED RURAL DEVELOPMENT PROGRAMME

It is suggested that the amount of money it would cost to purchase the land, that the dam would inundate, be calculated at market rates and an amount equivalent to this, not spent on acquiring replacement land, be set aside for the purposes of a local rural development programme. This is allowed for in the costing schedule which accompanies this document. The local rural development programme (referred to in the text above) would seek to:

- replace food security and land based incomes lost to the construction of the dam
- ensure that the degradation that could be exacerbated by increased pressure on resources is ameliorated

Although detailing this programme is beyond the scope of this brief, and would fall within the ambit of a detailed Feasibility Study and Relocation Action Plan some of the key principles that should be followed are outlined in this section.

- The first key principle is that the implementing agent should seek to ensure that the rural development programme is designed in such a way that the resources in the dam area will be managed, conserved and utilised in manner that is as *sustainable* as possible.

- The second key principle that should be followed is that *the people of the affected area be involved*, as fully as possible, in designing and implementing the rural development programme. Failure to ensure that people were adequately involved in designing the rural development programme associated with Phase 1a of the Lesotho Highlands Water Project continues to be one of the most problematic aspects of this project.

It should be noted that the Settlement and Land Acquisition Grant of the Land Redistribution Programme might be geared in for the purposes of development of land in the basin. Under these circumstances an amount of R15 000 per household could be obtained.

It is suggested that six key components of the rural development programme will probably need to be explored in detail in the Feasibility Study / Relocation Action Plan. These are:

- *A Fisheries project*: The possibilities of stocking the dam with fish, either for domestic use, or to attract fee-paying anglers should be explored. Particular care would have to be given to the environmental concerns associated with a project of this nature.

- *Irrigation:* The potential for irrigating the land that above the FSL level of the selected dam site should be explored. This will add value to the land remaining and will, in some measure, replace production lost to inundation. Potential downstream irrigation, as a compensation measure, could also be looked at.

- *Range Management:* Some of the areas in the proposed basins (particularly the right bank of the Smithfield option) appear to be heavily overstocked at the moment. Loss of management options to ameliorate the impacts of stock loss and degradation should be implemented. Options could include, irrigating pastures, feedlots, and stock reduction.

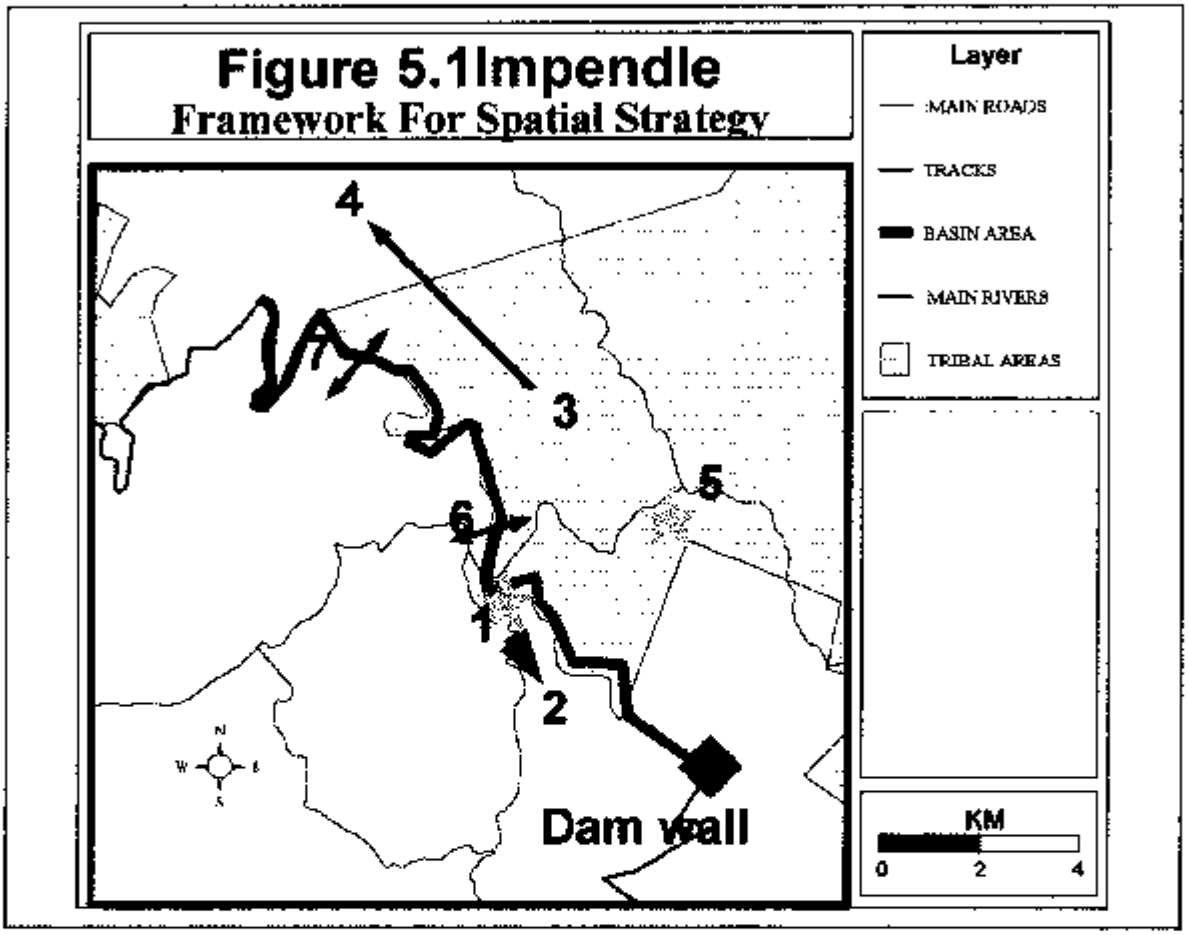
- *Woodlots:* By removing firewood resources the potential to exacerbate destruction of woodlands exists. Woodlots and other fuelwood replacement projects need to be considered.

- *Medicinal plants:* The izinyanga in the area rely heavily on medicinal plants to sustain their trade. They need to be supported with a project that would look at growing critical species in restricted zones. Again irrigation of species could be considered.

- *Tourism:* The tourist potential associated with the dams needs to be investigated, particularly as it falls within accessible linkage to both the Midlands Meander and the Drakensberg.

SECTION FIVE: SPATIAL STRATEGY

The following section details a spatial strategy, at pre-feasibility level, which could be utilised to deal with some of the social impacts, associated with the dams. Figure 5.1 outlines the key concepts (at a pre-feasibility level) for a spatial strategy for Impendle Dam.



The following key strategies are suggested to ensure that the dam is feasible from the social aspects.

1. **Makhuzeni Settlement to be relocated.** The Impendle Dam (Option A) will flood the greater part of the settlement while the lower reaches of the settlement will be flooded by the Option B Impendle Dam. Given concerns about water quality issues it might be prudent to relocate the entire village. This is a key area of concern that should be thoroughly investigated at the feasibility stage of the project. The settlement can be relocated to a distance above the high water mark and along the axis of the arrow between Nos 1 and 2 in the figure above.
2. **Freehold farms in Rockley Ridge area.** The people of Makhuzeni can have these farms purchased for them as compensation for land lost to the dam. The owner of Rockely Lodge has indicated that this

would be acceptable if the compensation price is reasonable. Further development (e.g. irrigation) of some of the land above the FSL might have to take place to make the land fair compensation for the good quality riparian land being lost by the Makhuzeni residents. The Settlement and Land Acquisition Grant of the Land Redistribution Programme might be geared in for these purposes. Under these circumstances an amount of R15 000 per household could be obtained. This means that about R1,000,000 could be obtained.

3. **People of Nxamalala Tribal Authority.** The people of the Nxamalala Tribal Authority will lose land and resources to the Impendle Dam. They can be compensated in a similar fashion to the people of Makhuzeni by purchasing the farms in the Brookend vicinity. As with the Makhuzeni village the Settlement and Land Acquisition Grant of the Land Redistribution Programme might be geared in for these purposes. Of particular concern is the currently abandoned village of Mkomazi. If this is resettled then additional resources will have to be made available to mitigate associated impacts.
4. **Brookend Farms.** The developer, as compensation for the people of the Nxamalala Tribal Area, may purchase theses farms. The suitability of this as a mitigation measure will have to be studied in detail at a feasibility level.
5. **Settlement of Impendle.** Although not likely to be affected by the dam in terms of the need to resettle people this village will lose considerable land resources. They will also lose a primary access road (6). The mechanism by which some people from this village might be relocated to the Brookend area will also have to be studied in detail at a feasibility level.
6. **Impendle – Himeville Road.** This road is of critical importance in terms of for sub-regional access and an alternative crossing point, either over the dam wall or around the basin will have to be constructed.
7. **Local Crossing points.** A number of local crossing points including that across the river at Brookend will have to be replaced. As with some of the dams in the Lesotho Area, ferries might be considered.

As for Impendle Dam Figure 5.2 outlines the key concepts (at a pre-feasibility level) for a spatial strategy for Smithfield Dam.

1. **Smithfield Farm.** This farm is scheduled, in terms of current Department of Land Affairs planning, for settlement of individual small scale farmers. In terms of a recent study undertaken there are ten applicants for land on this farm.
2. **Crowle Farm.** This farm is also scheduled, in terms of current Department of Land Affairs planning, for settlement of individual small scale farmers. In terms of a recent study undertaken there are four applicants for land on this farm.
3. **Valley View Farm.** This farm is also scheduled, in terms of current Department of Land Affairs planning, for settlement of individual small scale farmers. In terms of a recent study undertaken there are 14 applicants for land on this farm.

4. **Claremont Farm.** This farm is scheduled for restitution as a settled community project. There are 24 applicants for settlement on this farm.
5. **Deepdale Farm.** This farm is also scheduled for restitution as a settled community project. There are 30 applicants for settlement on this farm.
6. **Camden Farm.** This farm is scheduled for restitution as a settled community project. There are 18 applicants for settlement on this farm.
7. **Bhida and Zashuke Tribal Authorities.** These tribal authorities are relatively densely settled and extensive degradation is evident.
8. **Qadi Tribal Authority.** This tribal authority is not as densely settled as the Bhida and Zashuke. It will only be very marginaly affected by the Dam.
9. **Deepdale Station Road.** The Dam will affect this road and a suitable re-routing will have to be made.
10. **Proposed Impendle Nature Reserve.**

In terms of the Smithfield Dam the planned settlement of the Department of Land Affairs farms will make compensation negotiation complex. Negotiation with the Department of Land Affairs should be pursued as soon as is practically possible. Mitigation strategies will probably have to focus on

- the expansion of settlement and resource utilisation away from the reservoir and,
- enhancing the quality of land in the immediate dam vicinity (e.g. though implementation of irrigation projects and negotiated rural development and agricultural extension initiatives).

Neither of these strategies is without complications. Firstly, the first strategy (expansion of settlement) may require purchase of additional land, particularly that scheduled for inclusion into the proposed Impendle Nature Reserve. The expansion of settlement into the area scheduled for nature reserve may have negative implications for water quality. Secondly, agricultural extension activities, aimed at enhancing land quality, have had limited success in Africa, particularly in communal areas.

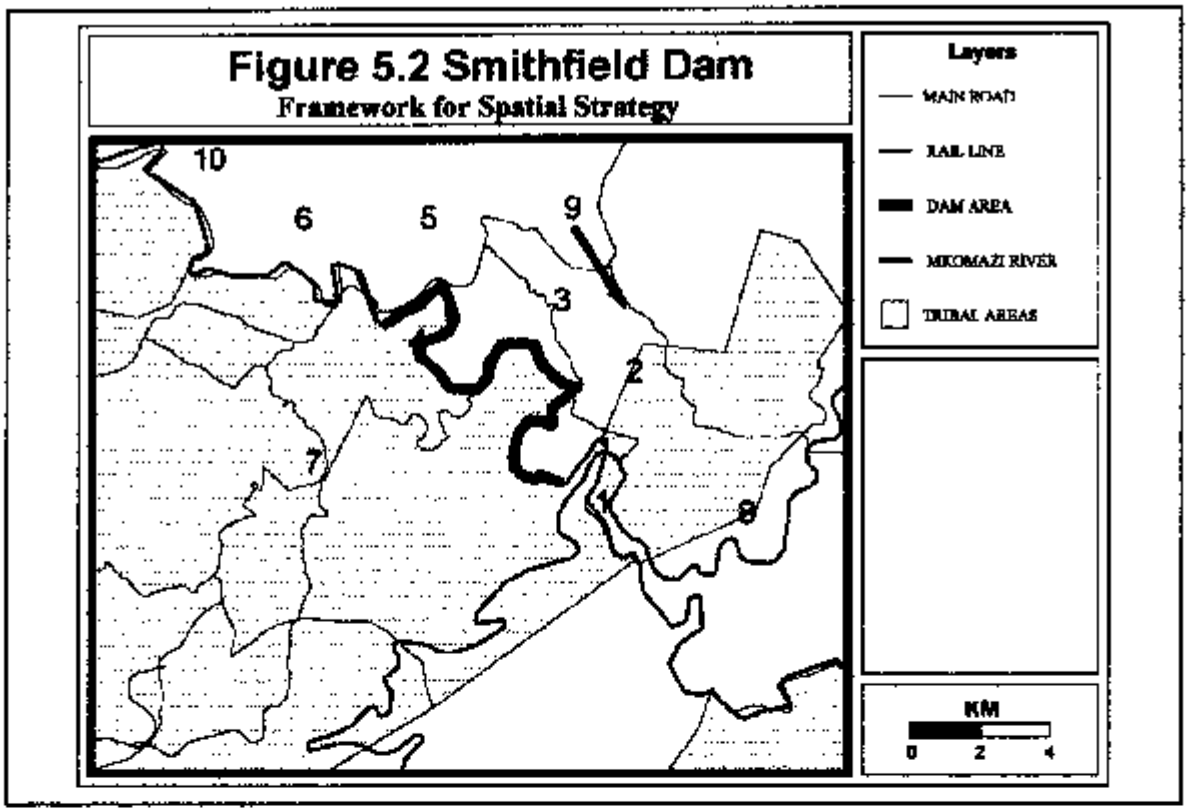


Figure 5.2 Smithfield Dam
Framework for Spatial Strategy
10
6
5
9
3
2
7
8
Layers
MAIN ROAD
RAIL LINE
DAM AREA
MKOMAZI RIVER
TRIBAL AREAS
KM
0
2
4

SECTION SIX: SUMMARY AND RECOMMENDATIONS

Both dams and associated options have associated social impacts. Of the negative impacts the most serious are the following:

- Loss of arable land.
- Loss of grazing land and communally utilised resources
- Loss of access routes
- Relocation of settlements.

For the purposes of comparison and in terms of the magnitude of the impacts the situation may be summarised as follows:

- The Smithfield Dam (as currently utilised and on its own) is least problematic in terms of magnitude of impacts and may be ascribed a factor of **1**. The magnitude of the impact will undoubtedly increase if plans for intensified settlement of the land go ahead.
- Impendle (lower FSL) is next least problematic but the magnitude of the impact, given the current extent of utilisation, is probably about twice as great as Smithfield. The magnitude of the impact might therefore be ascribed a factor of **2**.
- Impendle (higher FSL) has a greater impact (about 20%) than the lower Impendle and might be ascribed a factor of **2.4**.

In terms of the impacts, mitigation of these impacts, and associated compensation the following might be assumed:

	Option A	Option B	Option C
Associated dam/s	Impendle High FSL	Smithfield and Impendle Low FSL	Smithfield and Impendle High FSL
Magnitude Factor	2,4	1 + 2	1 + 2,4
Total	2,4	3	3,4

The magnitude of the impacts will probably relate fairly closely to the associated expense of compensation and mitigation. Under these circumstances Option B will be both more complex and more expensive than Option A to implement. It should be emphasised that neither will be impossible, from a social impact perspective, to implement.

Although neither will be impossible to implement the following will require detailed attention during a feasibility study:

- Potential resistance from the people of the Makhuzeni settlement to relocation. The concept of improved housing and potential resources will have to be carefully explained to, and negotiated with, this community.
- The potential re-settlement of the Mkomazi village.
- The land restitution process that will probably get underway at Smithfield will make compensation negotiation complex.
- The Smithfield conveyance system may prove to be time-consuming to negotiate.

Furthermore the associated negative impacts need to be weighed against the positive impacts. For both options the following positive impacts could accrue:

- Creation of employment opportunities,
- Improved roads and access routes,
- Potentially improved housing for those relocated,
- Skills transfer and creation of opportunities for local sub-contractors,
- Improved chance of access to electrification and water reticulation system,
- Stimulation of regional economy (Durban – Pietermaritzburg axis) and creation of employment opportunities in these areas.

By building both dams the positive impacts are extended to two areas both of which are in dire need of economic stimulation. Ultimately the potentially negative impacts will have to be weighed against the positive impacts. In weighing these up the following should be intensively pursued during any further planning phases.

- A meeting with the relevant officials of the Department of Land Affairs should be called as soon as is practically possible.

- Representatives of the affected communities should be directly involved in further planning phases as soon as is practically possible.
- Set back area should be clarified, particularly from a water quality perspective, and the clarified position used to negotiate settlement strategies within the dam basin.

APPENDIX A: MKOMAZI-MGENI TRANSFER SCHEME PROPERTY NAMES AND NUMBERS

IMPENDLE DAM OPTION

1. Nxamalala Tribal Authority (Impendle Location 4673) Rem of Impendle No. 16535:
2. Compensation 14831: **Department of Regional and Land Affairs (Title deed: T3540/1979)**
3. CFP 138 7860:**Alpheus Molife (Title deed: T2223/1940) Herbert Malcolm Molife (Title deed: T2224/1940)**
4. The Forks 5510: **Alpheus Molife (Title deed: T2223/1940) Herbert Malcolm Molife (Title deed: T2222/1940)**
5. FP 390 12092: **Patryvlei Boerdery Pty Ltd (Title deed: T10696/1997)**
6. FP 21 8901:**Elfas Makaye (Title deed: T5352/1965)**
7. The Glen 6320**Mjono Zama (Title deed: T7395/1961)**
8. Hopewell A 8849 **Vayi Eric Ndlela (Title deed: T15603/1994)**
9. FP 47 7897 **Sappi Manufacturing Pty Ltd (Title deed: T1939/1997)**
10. Eden A 5970 **Department of Regional and Land Affairs (Title deed: T5623/1940)**
11. Eden B 5971 **Department of Regional and Land Affairs (Title deed: T5623/1940)**
12. Eden C 5973 **Department of Regional and Land Affairs (Title deed: T5623/1940)**
13. Eden D 5972 **Department of Regional and Land Affairs (Title deed: T5623/1940)**
14. S 5H 5234 **Simon Musiya and Elias Musiya (50/50) (Title deed: T9972/1946)**
15. S 5J 5320 **Isaac Molife (Title deed: T4387/1931)**
16. S4 5059 **David Molife (Title deed: T2226/1925)**
17. S3 5144 **Joseph Molife (Title deed: T2529/1930)**
18. GR 21 9729 **Property Management Services Pty Ltd (Title deed: T25624/1989)**
19. S2 BA 8956 **Department of Regional and Land Affairs (Title deed: T886/1940)**
20. S2 CA 5141 **Department of Regional and Land Affairs (Title deed: T886/1940)**
21. S2 AA 8955 **Department of Regional and Land Affairs (Title deed: T886/1940)**
22. Sub C of Lot S2 7429 **Richard Molife (Title deed: T1517/1975)**

23. S2 CB 5171 **Babili William Msomi (Title deed: T33/1988)**

24. Stephensdale 14118 **Florence Mandi Mkatshwa (1/5) (Title deed: T9723/1955) Bertha Tshabalala (1/5) (Title deed: T9721/1955) Petrus Didi (3/5) (Title deeds: T136/1971; T14024/1971; T7355/1957)**

25. The Spur 4604**Undilayi ? (no further details as indicated on deed title) (Title deed; G4604/1883) Unsalini (no further details as indicated on deed title) (Title deed; G4604/1883) Usoluntu (no further details as indicated on deed title) (Title deed; G4604/1883)**

26. GR 25 8841**Oriel Molife (Title deed: T2797/1946) Robert Molife (Title Deed: T2797/1946)**

27. Sibaya 6002 **Shukopa Moilfi (Title deed: G6002/90)**

28. FP 22 10892 **Katupane Molife (Title deed: T596/1927)**

29. Hopewell A 8849 **Vayi Eric Ndlela (Title deed: T15603/1994)**

30. Hopewell B 5372 (Rockleigh Lodge) **Vayi Eric Ndlela (Title deed: T15603/1994)**

31. Kromdraai 9268 **Vayi Eric Ndlela (Title deed: T15603/1994)**

SMITHFIELD DAM OPTION

1. Bhidla Tribal Authority Sub 2 of Upper Umkomaas Location No. 2 No. 16615

2. Crowle 2260 **Department of Regional and Land Affairs (Title deed: T28208/1984)**

3. Lot 85 1815: **Department of Regional and Land Affairs (Title deed: T18138/1984)**

4. Lot 93 1821: **Department of Regional and Land Affairs (Title deed: T28826/1984)**

5. Zashuke Tribal Authority Sub 3 of Upper Umkomaas Location No. 2 No. 16615 Tribal Land: Department of Traditional and Environmental Affairs

6. Smithfield 14796 Tribal Land: Department of Traditional and Environmental Affairs.

APPENDIX B

COSTINGS FOR COMPENSATION AND MANAGMENT OF SOCIAL IMPACTS

IMPENDLE DAM (High FSL)

Item	Number	Cost per Item	Total
Relocation of Homesteads	50	100000	**5000000**
Potential relocation of Mkomazi Village	50	100000	**?**
Purchase of formal farm buildings	2	250000	**500000**
Relocation of Graves	50	3000	**150000**
Compensation for "crops in the field"			**50000**
Purchase of freehold land			
arable land	150 ha	2500	**375000**
grazing land	2000 ha	1500	**3000000**
irrigation land	20 ha	5000	**100000**
Rural Development Programme			**1000000**
Community Education Programme			**250000**
Total			**10425000**

IMPENDLE DAM (Low FSL)

Item	Number	Cost per Item	Total
Relocation of Homesteads	30	100000	**3000000**
Potential relocation of Mkomazi Village	50	100000	**?**
Purchase of formal farm buildings	2	250000	**500000**
Relocation of Graves	30	3000	**90000**
Compensation for "crops in the field"			**50000**
Purchase of freehold land (below FSL and as compensation for tribal land lost)			
arable land	120 ha	2500	**300000**
grazing land	1800 ha	1500	**2700000**
irrigation land	20 ha	5000	**100000**
Rural Development Programme			**800000**
Community Education Programme			**250000**
Total			**7790000**

Smithfield Dam

Item	Number	Cost per item	Total
Relocation of Homesteads	2	100000	**200000**
Relocation of Graves	5	3000	**15000**
Compensation for "crops in the field"			**30000**
Purchase of freehold land (outside of basin but for expansion of settlement)			
arable land	100 ha	2500	**250000**
grazing land	1500 ha	1500	**2250000**
irrigation land	10 ha	5000	**50000**
Rural Development Programme			**750000**
Community Education Programme			**200000**
Conveyance (20 m servitude for which 30% of land value is paid)			
arable land (30% of conveyance)	6.3 km	15.01502	**9459.459**
grazing land (60% of conveyance)	2.1 km	8.992806	**1888.489**
irrigation land (10% of conveyance)	12.6 km	30.03003	**37837.84**
Total			**3794186**

A Pre-Feasibility Study of the Potential Impact

on Fauna and Flora of the Impendle and Smithfield Dam Sites

on the Mkomazi River, KwaZulu-Natal

A PREFEASIBILITY STUDY OF THE POTENTIAL IMPACT ON THE FAUNA AND FLORA OF THE MPENDHLE AND SMITHFIELD DAM SITES ON THE MKOMAZI RIVER, KWAZULU-NATAL

N. H. G Jacobsen
Ecological Consultant

November 1997

A PRE-FEASIBILITY STUDY OF THE POTENTIAL IMPACT ON THE FAUNA AND FLORA OF THE MPENDHLE AND SMITHFIELD DAM SITES ON THE MKOMAZI RIVER, KWAZULU-NATAL

N H G Jacobsen
Ecological Consultant
P O Box 49193
HERCULES 0030

EXECUTIVE SUMMARY

A prefeasibility study of the flora and fauna of the Mpendhle and Springfield dam terrains was undertaken in order to assess the biotic integrity of the areas and the occurrence of rare and endangered taxa. Both dam basins are severely degraded as a result of past and present agricultural practices and the presence of alien vegetation, and both contain Red Data Book species. The Mpendhle site contains a tributary, the Nzinga, which still has considerable biotic diversity including a Red Data Book plant species *Encephalartos ghellinckii*. The flora of this tributary requires additional surveys to ascertain what needs to be removed should a dam be considered. In addition, the Mpendhle site contains the roosting and breeding? sites of two Bald ibis *Geronticus calvus* colonies which will be inundated by the dam.

The Springfield site contains a Red Data Book plant species *Calpurnia woodii* as well as the rare plant *Hydrostachys polymorpha* both of which grow around the waterfall on the Luhane river, the latter on the crest attached to rocks in fast flowing water. This waterfall and its attendant plant species will be inundated by the dam.

Areas of biotic integrity are limited to a few small areas at both dam sites. Populations of Red Data Book species are small and it is likely that pressure on these will increase with time. The possibility exists that other Red Data Book species may occur on either of these areas but it is likely that populations will be small because of the degraded nature of the basins. The decision to construct these dams should be weighed up against the long term survival of these species. Areas identified as having high biotic diversity should be surveyed prior to any decision on the construction of the dam and the remaining plants and animals rescued and relocated where feasible to the nearest protected areas, and where not, to botanical institutions or for use by other interested and affected parties.

A PREFEASIBILTY STUDY OF THE POTENTIAL IMPACT ON THE FAUNA AND FLORA OF THE MPENDHLE AND SMITHFIELD DAM SITES ON THE MKOMAZI RIVER, KWAZULU-NATAL.

N.H.G.Jacobsen
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HERCULES 0030

INTRODUCTION

At the request of N. Kemper of the firm Watertest the two dam sites situated on the Mkomazi river on the farms Smithfield and Mpendhle approximately 20 km apart were visited and evaluated according to the condition and integrity of the areas. The early identification of a fatal flaw is paramount to the current system of evaluation of any development. It is however frequently difficult to identify and determine within the allocated time the existance of such a fatal flaw. Assessments of this nature are at the mercy of the prevailing weather conditions and time of the year. This makes the identification of plants difficult and could lead to oversight of important aspects such as Red Data Book species. Such a survey is therefore in essence very preliminary and may not reflect the importance of an area.
The Mpendhle and Smithfield sites lie within densely populated areas. It is therefore not surprising that little of the original vegetation remains. A survey of this nature attempts at identifying key areas which may retain some of the original biodiversity and possibly also rare and endangered taxa. This means that the available time can be used most productively with the best chance of success. The following report concerns the importance of the dam basins in their regional context and hopefully elucidates the impact of the proposed development. A visit was made to both sites over the period 4-9 November 1997 during which each site was surveyed and the results herewith incorporated. Unfortunately much of the area had been ploughed or burnt and grazed and hot dry weather affected the growth of many plant species with the result that many plants were still emerging from senescence and therefore not in flower. This was especially so for many geophytes and gladioli in particular. Despite these shortcomings it was possible to incorporate the following statements on the areas under consideration.

METHODS

At both sites the same basic approaches were used. An inspection of the 1: 50 000 topographical map and 1: 10 000 orthophotos produced a list of areas where the survey efforts were concentrated. Such sites were scattered over the length of the dam where it was felt that the full supply levels would impact most. Such areas were visited for varying duration according to their accessibility and topography. Surveys were conducted on foot and all fauna and flora observed were recorded on a pocket tape recorder together with any other applicable comments. These were later transcribed prior to the following days excursions. As many different habitats as possible were investigated in the available time in order to provide a complete coverage of the dam basins.

Lists of the herpetofauna, mammals and Red Data Book taxa were compiled from the literature and refined by ground truthing the area, particularly the condition and integrity of the available habitat. Human population density and associated habitat destruction were paramount in the assessment.

RESULTS

As mentioned previously both sites were extensively degraded, so much so that little of the original flora and therefore fauna remains. Only in the most inaccessible sites was it possible to compile lists of species. Settlements, fallow and cultivated lands, alien plant encroachment, burning and overgrazing have resulted in the destruction of more than 80% of the areas investigated.
Lists of the flora and fauna of the areas are provided in Tables 1 - 6. As the areas are relatively close separate lists of the faunas, with the exception of the birds, were not compiled as this would in essence be a duplication. Each site will be discussed in greater depth as follows:

MPENDHLE

Vegetation

The vegetation of the Mpendhle dam site appears to be intermediate between Veld types 5, Ngongoni Veld and 45, Natal Mist Belt 'Ngongoni veld' (Acocks 1975) or 42, Moist Upland Grassland (Bredenkamp, Granger, Lubke and Van Rooyen 1996). The difficulties in assigning the area to any specific system of classification is as a result of the large scale habitat modification which has taken place.
This dam site covers an area of 2250 ha at full supply level of 1190 m.a.s.l. of which at least 80 % has been ploughed and now lies fallow and extensively used for grazing. Such fallow lands are dominated by grasses such as *Eragrostis curvula*, *Cynodon dactylon*, *Paspalum* spp., *Hyparrhenia hirta* and others which have recolonised these areas. Ruderals which are most common under these conditions including *Plantago longissima*, *P. lanceolata*, *Helichrysum rugulosum*, *H. aureo-nitens* and *Richardia brasiliensis*. Soil erosion is eveywhere in evidence and donga formation along the steeper slopes is prevalent. Plants such as *Felicia filifolius* grow under these conditions stabilising the soil.
Many areas, particularly the banks of the Mkomazi and Loteni rivers, were covered by wattle *Acacia dealbata* and *A. mearnsii*, while small bluegum *Eucalyptus* sp. plantations such as at the dam wall site were also present. While some indigenous vegetation may be found along the Mkomazi river such as *Salix mucronata* ssp. *woodii* and *Acacia ataxacantha*, it is the tributaries, especially the Nzinga and Nkhomazana rivers and the slopes above them that are the bastions of floral diversity in the area. A hillock at the confluence of the Nzinga and Mkomazi rivers is covered with tussocks of *Watsonia pillansii*. Some remnants of the biodiversity of the area is also present along some of the smaller drainage lines but the most important are the former. Such drainage lines are characterised by the presence of trees and shrubs, particularly *Leucosidea sericea* and *Diospyros lycioides* ssp. *sericea* but also *Bowkeria verticillata*, *Rhus pyroides* ssp. *gracilis* and *Zizyphus mucronata*. The amount of woody vegetation varies according to the type of terrain with most being found along more rocky areas as discussed below.

Along the streams the grass *Miscanthus capensis* is most common but other smaller grasses including *Paspalum* spp. and *Eragrostis* sp. are common. Reeds *Phragmitis mauritianus* and *P. australis* are not very abundant but grow as a thin fringe along the Mkomazi river and in patches along tributaries. Sedges including *Fuirena pubescens*, *Scirpus* sp. and *Pycreus* sp. may be locally common but often only form a patchwork of taller tussocks with the grass inbetween having been grazed very short. In the river itself small islands contain *Miscanthus capensis*, *Salix mucronata*, *Acacia mearnsii* and *Gomphostigma virgatum*. In rare instances patches of wetlands adjacent to the river include species such as *Gunnera perpensa*.. The smaller drainage lines are frequently quite densely vegetated including species such as *Miscanthus capensis*, *Imperata cylindrica* and *Geranium ornithopodum* Along a few tributaries small wetlands are still in evidence although heavily grazed and trampled. Only grasses such as *Miscanthus capensis* and a few tussocky sedges together with plants such as *Kniphofia* sp. indicate their existance.

The vegetation of the rivers and streams which are the most important are those communities which grow along the rocky slopes of the valleys These communities range from open grassland on rocky slopes to closed dry woodland and scrub frequently associated with very steep slopes and cliffs, the degree of rockiness and aspect determining the type of vegetation cover. These are the bastions of biodiversity in the basin as they cannot be ploughed and livestock graze with difficulty. Slopes which are less steep have a higher grazing pressure.

The more open areas are characterised by the species richness of the flora. Many grass species such as *Tristachya leucothrix*, *Themeda triandra*, *Brachiaria serrata*, *Rendlia altera*, *Eulalia villosa*, *Alloteropsis alata*, *Eragrostis capensis*, *E. racemosa* and many others occur here. Forbs include a great variety such as *Kniphofia laxiflora*, *Gladiolus* spp., *Agapanthus campanulatus*, *Dierama* spp. *Watsonia pillansii*, *Anemone fanninii*, *Hoffmanseggia sandersonii*, *Vigna* spp., *Acalypha peduncularis*, *Euphorbia striata* and *Hibiscus aethiopicus*. Shrubs include *Diospyros lycioides*, *Maytenus heterophylla*, *Rhamnus prinoides*, *Passerina montana* and *Rhus dentata* to name a few.

The steep slopes and cliffs are mostly comprised of shale and covered by a variety of trees and shrubs, most commonly *Diospyros lycioides* but also many others such as *Bowkeria verticillata*, *Maytenus acuminata*, *Acacia ataxacantha*, *Ochna serrulata*, *Rhus* spp., *Euclea crispa*, *Grewia occidentalis* and many others. *Greyia sutherlandii* grows on west facing slopes together with the Drakensberg cycad *Encephalartos ghellinckii* along the Nzinga river.

Forbs common along cliffs and steep slopes include *Brunsvigia natalensis*, *Cotyledon barbeyi*, *C. orbiculata*, *Pelargonium* sp. and many others. Some plants such as *Grewia hispida*, *Felicia filifolius*, *Eriospermum* spp. and *Gladiolus* spp. frequently grow above the cliffs and on ledges.

In total 301 plant species were recorded from the Mpendhle dam site (Table 1) of which one or possibly two represent Red Data Book species (Table 7). These include *Encephalartos ghellinckii* and what appears to be *Gladiolus oppositiflorus* although the latter was not in flower. However the assumption that it was this species was based on its robust dichotomous appearance. The number of liliaceous plants not in flower precluded a more detailed analysis. What was noteworthy was the almost total exclusion of terrestrial orchids, only the relatively xeromorphic *Eulophia streptopetala* being found. It is however expected that some species may have been overlooked.

Twenty-nine alien species were recorded from the dam basin and the list is likely to be incomplete as a result of the large scale disturbance of the area. However apart from the plantations of wattle and bluegum at the junction of the Loteni and the Mkomazi rivers and at the dam wall site, alien woody species are mostly restricted to a relatively narrow strip along the Nkomazi and the lower reaches of the major tributaries. Along the Loteni river however wattle appears to be more prevalent and few natural areas remain.

Fauna

Very few signs of animals were observed during the survey. The extensive habitat destruction which has taken place, hunting with dogs and human population density is responsible for this. Apart from those listed in Tables 3 - 6 as possibly occurring within the dam basin or on occasion utilising the area no others are expected to occur. The area is therefore, at least in terms of mammals very depauperate. Habitat for small mammals, reptiles and amphibians exist in small areas usually associated with steep drainage lines. Here cover in the form of thick grass and rocks provide food and shelter. Over most of the terrain, cover is almost totally lacking as grass height is usually 50 mm or less with the result that diurnal species are very visible to potential predators. Nocturnal species may be more secure provided that they have shelter during the day, in the form of holes, under rocks or other debris. At best the species richness of the vertebrate fauna area can be classed as very depauperate.
Table 7 lists the Red Data Book fauna which may be found in the area. It is likely that some species such as the Yellow-bellied house snake *Lamprophis fuscus*, Midlands dwarf chameleon *Bradypodion thamnobates* and Bourquin's dwarf burrowing skink *Scelotes bourquini* (= *Scelotes guentheri*) may occur in the area where some suitable habitat may still be found. Similarly the Striped weasel *Poecilogale albinucha* may also be able to exist. The list of RDB - Birds is extensive. However it must be viewed with the knowledge that most of the species may visit the area but very few are resident. During the survey a Ground hornbill *Bucorvus leadbeateri* was seen not far from the dam basin, in adjacent forestry area. Similarly a Long-crested eagle *Lophaetus occipitalis* was also seen not far distant. Although not a Red Data Book species it is suggested that the status of the species should be monitored . The only Red Data Book bird species apparently resident on the site is the Bald ibis *Geronticus calvus*. Two groups of these birds were observed. One inhabits the cliffs at the dam wall site and numbers roughly 15 birds and the other a small cliff upstream on the Nkomazi river below the communal area of Sitofela. Here 19 birds were observed but there could have been more birds. A more detailed inspection of the site was not possible due to the steepness of the slope but it was established that the overhanging kranzes were being used. Many of the birds seen were juveniles and immatures from the previous breeding season. This indicates that the species may breed locally at the two sites.

Discussion and Recommendations

The dam area at full supply level would incorporate 2250 ha and is therefore the larger of the two sites. Upstream of the proposed dam wall most of the dam basin lies in wide valley formed by the Mkomazi river and its main tributary the Loteni river. This has resulted in lower gradients along the slopes on either side which as a result have been extensively cultivated. Such cultivations have totally altered the environment. Most of

these areas now lie fallow. Fallow lands and the remaining natural veld have been overgrazed resulting in considerable erosion. This extensive degradation of the area has resulted in an impoverished system. There are indications that the area was once floristically rich. Alien vegetation and altered communities are all that remain. Few Red Data Book species were recorded but the absence of many flowering plants due to environmental conditions and time of survey precluded a better analysis. However the extent of the degradation and the limited relatively natural veld remaining indicate that despite improved conditions only remnant populations may occur. The most important remaining areas are the two tributaries of the Mkomazi river, the Nzinga and Nkhomazana rivers. Preliminary surveys have been conducted which indicate areas of high biodiversity.

Faunistically the area does not have any surprises. A tenant farmer of the farm Rockley at the dam wall site complained that the local people were hunting with dogs on his property. Few signs of wildlife were observed, the largest being Scrub hare *Lepus saxatilis* and porcupine *Hystrix africaeaustralis*. As the basin is mostly covered in short grass and alien vegetation there is no cover for animals. Only nocturnal species may survive as long as they have cover to rest up in during the day. Other species seen included the Rock agama *Agama atra* and the Common river frog *Rana angolensis*. The dam will impact on these impoverished communities and cause further fragmentation. However in the long term such communities may well be destroyed by increasing human and livestock population densities. It is therefore important that should the dam be built , a more indepth survey of the portions of the Nzinga and Mkhomazana rivers and other smaller tributaries which will be inundated by the dam be undertaken and specific plants, especially rare and threatened taxa, be removed where possible for relocation. The area also supports many medicinal plants which would have to be removed.

SMITHFIELD

Vegetation

A total of 260 species of plants were recorded from the Smithfield dam site. This indicates that floristically the Smithfield site possibly has a greater species richness than that of the Mpendhle site but there are too many variables to come to such a conclusion..

Like that of Mpendhle, this dam site falls intermediate between Veld types 5 and 45, or Ngongoni veld and Mist Belt Ngongoni veld (Acocks 1975) respectively. The full supply level of the dam will lie at 940 m a.m.s.l. and cover an area of 700 ha. Like the previous dam site investigated, Smithfield lies in an area densely populated by people. Also similar to the Mpendhle dam site, the topography is varied, the Mkomazi river flowing in a relatively wide valley with steep sided bends opposite gently sloping land. The river passes through hilly country and most of the slopes within and surrounding the dam basin have been cultivated. Poor soils and incorrect agriculture together with or followed by overgrazing has resulted in the destruction of much of the topsoil. Erosion is everywhere to be seen and dongas are also apparent. In essence the area is very similar to that discussed for the previous dam. It differs only in that it is slightly lower in altitude and therefore more bushveld species were found. Particularly the woody vegetation differed substantially.

Most of the area is comprised of agricultural lands, mostly fallow, the remaining areas comprising human settlements and along the steeper and more rocky slopes natural veld used for the grazing of livestock. The fallow lands are similar to that of the Mpendhle dam, with a totally altered species composition comprising essentially *Eragrostis curvula, Cynodon dactylon, Helichrysum rugulosum* and *Plantago longissima*. In some areas *Hyparrhenia hirta* and *Paspalum* sp. *scrobiculatum* are common. In essence it is a totally changed system and with few exceptions almost devoid of species of the original grasslands.

At the dam wall site the rocky hill is covered with a relatively 'pristine' grassland although this too has been impacted on by fire and grazing pressure. Unfortunately at the time of the survey a recent fire mostly made it difficult to determine the species composition of the grassland. Typical species included *Tristachya leucothrix, Themeda triandra, Brachiaria serrata, Eulalia villosa, Setaria pallide-fusca* and *Melinis* sp. *nerviglume*. Forbs were many including *Scilla natalensis, Pentanisia angustifolia, Euphorbia woodii, Helichrysum pilosellum, Aloe saponaria, Vigna unguiculata, Acalypha peduncularis* and others. An area less rocky and lying just above the Mkomazi river contained such species as *Aloe kraussii, Pteridium aquilinum, Hoffmanseggia sandersonii, Setaria nigrirostris, Gerbera ambigua , Aster harveyanus , Hypoxis rigidula, Senecio coronatus* and many others. Of particular note were the large tussocks of *Watsonia pillansii* on the banks above the Mkomazi river, while along the steep banks itself *Kniphofia laxiflora* formed a small colony of individuals. Some seeps were in evidence in both of these areas, one along the lower slopes at the dam wall site. This was dominated by tall *Miscanthus capensis* with other species such as *Imperata cylindrica*. A more extensive site lies along the slope opposite the village of Machabasini on the farm Lot 85 1815 where springs emerge from the hillside and flow down towards the Nkomazi river. The vegetation is also dominated by *Miscanthus capensis* and *Imperata cylindrica* , as well as a tussocky *Kniphofia* sp. Where the slope is more gentle standing water permits the growth of bulrushes *Typha latifolia*. In both cases the seeps and springs have been extensively trampled by cattle, so much so that only the toughest vegetation survives to form a narrow fringe along the drainage lines. No marshy vegetation grows due to the trampling by livestock.

Along the Mkomazi river and main tributaries such as the Luhane river, wattle *Acacia mearnsii* infestations have taken place. Small river terraces exist, usually covered by *Sesbania punicea*, but including natural grassland with *Themeda triandra, Hyparrhenia rufa, Cymbopogon validus, Psoralea polysticta, Cliffortia* sp. and forbs such as *Euphorbia striata, Lotononis hirsuta, Vernonia capensis* and others.

The Luhane river falls over a waterfall approximately 10 m high with cliffs on both sides. An unidentified plant presumably a *Potamogeton* sp. with finely divided leaves grows on the rocks some of it submerged, resisting the force of the current. Also here a shrub *Calpurnia* sp. aff. *woodii* grows out of the rock face as well as forming a small colony along the river. Comparisons to existing material in the National Herbarium in Pretoria do not match up with that of typical *C. woodii*.

Similar to the Mpendhle site, the woody vegetation is mostly found along steep slopes and cliffs. Under more xeric conditions this woodland - scrub is dominated by thorns such as *Acacia caffra* and *A. ataxacantha*, with shrubs such as *Coddia rudis* common. Forbs include several *Crassula* spp. *Cotyledon barbeyi, Sansevieria hyacinthoides, Eulophia streptopetala* and an unidentified *Cyphostemma* sp. which may be an undescribed species.

Under more mesic conditions *Combretum erythrophyllum, Acacia caffra, Zizyphus mucronata, Rhoicissus tridentata, Rhus pentheri, Maytenus heterophylla, Diospyros lycioides* and many others dominate the woody vegetation. Forbs and grasses include *Jasminum breviflorum, Cheilanthes viridis* var *viridis, Gerbera piloselloides, Ceropegia linearis, Panicum deustum* and *Oplismenus hirtellus*. The vegetation differs on all the steep slopes according to aspect and bedrock, soil moisture relationships and other variables. The vegetation along cliffs above the Mkomazi river facing SE have an abundance of the Poison oak *Smodingium argutum* as well as other species such *Rhamnus prinoides, Bowkeria verticillata, Dalbergia obovata, Zizyphus mucronata, Carissa bispinosa, Maytenus mossambicensis, Cassinopsis ilicifolia, Pavetta gardeniifolia* and *Diospyros lycioides, Osyridocarpus schimperianus, Buddleja salviifolia, B. dysophylla* as well as *Combretum erythrophyllum*. Such woodland scrub tends to hug the cliffs and are therefore not very thick, opening out along the flats above the river. *Crassula* sp. and *Cotyledon barbeyi* are common and *Brunsvigia natalensis* frequently grows out of these cliffs in areas where deep pockets of soil are found.

More xeric north facing slopes have sparser woody vegetation mostly scrub, but including in areas of shale, *Ficus ingens* which covers large areas of the bedrock. *Aloe candelabrum* is ubiquitous. Elsewhere *Diospyros lycioides* is a common constiuent together with *Combretum erythrophyllum*.

A list of Red Data Book plants are incorporated in Table 7, which is the same as that for the Mpendhle dam site. Two RDB species namely *Calpurnia woodii* ? and *Smodingium argutum* occur on site, the former in a small population along the Luhane river and the latter along SE facing cliffs along the Mkomazi river. Confirmation of the identification of *C. woodii* was as yet not possible. Comparisons of specimens with existing material at the National Herbarium in Pretoria indicate discrepancies and differences were found in several respects from that of typical *woodii*. At the same time it does not resemble any of the other species. Material at the National Herbarium in Pietermaritzburg will also be consulted for positive identification. A *Cyphostemma* sp. found in a patch of dry forest may prove to be an undescribed taxon. However as floral material was unavailable at the time of the visit, it was felt that the collection of specimens could be left to December and January at a more appropriate time. Similar to the Mpendhle site, the lack of terrestrial orchids with the exception of *Eulophia strepiopetala* is of interest. Some habitat does exist and yet no other species was seen. Like that of the Mpendhle site, alien plant species are common and 20 species were recorded. Wattle species are also restricted to a narrow strip along the Mkomazi and the lower parts of the major tributary, the Luhane river. However, in contrast to Mpendhle, the Brazilian glory pea *Sesbania punicea* is common, growing extensively along both banks of the Mkomazi river.

Fauna

Lists of the herpetofauna and mammals of the area can be seen in Tables 3 and 4, and are the same as that recorded for the Mpendhle dam as this is roughly only about 20 km upstream although at a slightly higher elevation. A list of the birds seen during the survey are included in Table 6.

The fauna of the area is depauperate due to the large scale alteration of habitats and the density of the huma population. However the dam basin at least along the northern side provides a better quality habitat than was the case at the Mpendhle dam site.

During the time of the survey a bushbuck *Tragelaphus scriptus* was observed in the thicket above a cliff and faeces were also found during followup investigations. Water mongoose *Atilax paludinosus* spoor was found along the Mkomazi river and some small tributaries on the northern side. It is therefore apparent that habitat quality was better here than at the previous site. Several antbear *Orycteropus afer* burrows were seen in the grasslands above the Mkomazi river indicating that these animals had been present in the not too distant past. However no recent signs were found. Few other signs or animals were observed apart from a Striped field mouse *Rhabdomys pumilio*, Variable skink *Mabuya varia*, the Rock agama *Agama atra* and the Common river frog *Rana angolensis* which appeared to be quite common in the area. None of the cliffs along this section of the Mkomazi river were large enough to provide roosting and nesting sites to Bald ibis and no other birds of note were observed.
Table 7 lists the Red data Book species for the area, partially refined according to environmental conditions at the Smithfield dam site. While lists appear to be lengthy, the same comments made for the Mpendhle site pertain here. No RDB species were seen but it is possible that a few taxa may occur within the dam basin. However the condition of the available habitat indicates that should a rare or threatened taxon be found, the population is likely to be small.

Discussion and Recommendations

The large scale degradation of the area, indicates that few rare and threatened plants and animals are likely to be found. The occurrence of two Red Data Book plant species in the area is noted. The existance of a possibly undescribed species must also be taken into consideration.
Faunistically it is unlikely that the area will have any surprises. Impoverished by the extent of development and settlement in the area it is likely that some rare and threatened taxa occur, but similar to the Mpendhle site such populations will be small and could disperse into the surrounding veld.
Should the dam be constructed then attempts should be made to propagate and translocate plants and animals where applicable into similar areas. The inevitable fragmentation of a fragmented environment further reduces the chance of genetic interchange of material. It is therefore important that wherever possible plants and animals removed during construction should be relocated to an area as close as possible to that of the dam site.

DISCUSSION AND CONCLUSION

Both dam sites show a very high level of disturbance and their biotic integrity is limited to a few crucial areas such as the Nzinga and Mkhomazana rivers and the Bald ibis cliffs on the Mkomazi river on the Mpendhle site, and a portion of the Luhane river and some of the rocky areas on the dam site and along parts of the Mkomazi river at the Smithfield site. These sites need to be surveyed in greater detail prior to any construction taking place.
Two or more Red Data Book plants and Bald ibis colonies were established at the Mpendhle site. In a report on the Mpendhle dam site (Munro 1997), mention was made of the presence of two other Red Data Book species namely Peregrine falcon *Falco peregrinus* and Grass owl *Tyto capensis*. While none of these were observed during the current visit they must be considered prior to a decision being made. Little

available habitat for either of these species appears to be present and it is likely that populations are small.
Similarly two Red Data Book plant species occur at the Smithfield site and a possible unidescribed species of *Cyphostemma* is found. The waterfall on the Luhane appears quite unique and the plant species growing on the rocks in the waterfall needs to be identified.
Both sites have many plants which could be utilised by the National Botanical Gardens and by other interested and affected parties. Both sites have many medicinal plants including such important species as *Scilla natalensis*.
In conclusion both sites show similar degradation and both have a few Red Data Book species. In both instances populations of the species are relatively small and it is possible that these will come under increasing pressure in the future. The decision to build these dams should be weighed up against the survival of these species in the future. Should a decision be made to construct the dams then a commitment should also be undertaken to survey the sensitive areas and rescue what remains of the biodiversity for relocation where feasible to the nearest protected areas and where not, to botanical institutions or for use by other interested and affected parties.

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The Nzinga river with its well vegetated slopes - the last bastion of biodiversity at Mpendhle.

Encephalartos ghellinckii with *Greyia sutherlandii* in the background sprouting new leaves after the passage of a fire.

Remains of a wetland along a small tributary of the Mkomazi river. *Kniphofia* sp. grazed and trampled.

The fringe of wattle along the Mkomazi river upstream of the Loteni river confluence. Note the overgrazed

A view upstream of the Mkomazi river towards the confluence with the Loteni river. The recently burnt grassland in the foreground indicating the condition of the veld.

A view along the Loteni river showing the degraded nature of the river with many stands of wattle and remaining areas under cultivation. Note the short grass in the foreground.

The Smithfield dam wall site in left background with patch of bushveld woodland - scrub above the river. The foreground consists of fallow lands.

The waterfall on the Luhare river, locality of *Calpurnia* sp. aff. *woodii*. Water falling over a basalt sill.

Part of the settlement of Machabasini overlooking degraded fallow lands above the Mkomazi river.

Clumps of *Watsonia pillansii* growing on the banks of the Mkomazi river below and opposite to Machabasini. Note the grey shale scree along steep north facing slopes.

Table 1. List of plants recorded on the Mpendhle dam site on the Mkomazi river, Kwazulu-Natal.

Pteridophyta
Selaginellaceae

Selaginella dregei

Equisetaceae

Equisetum ramosissimum

Ophioglossaceae

Ophioglossum reticulatum

Schizaeaceae

Mohria caffrorum

Dennstaedtiaceae

Pteridium aquilinum

Adiantaceae

Adiantum sp. cf capillus-veneris
Cheilanthes eckloniana
" hirta var. hirta
" viridis var. macrophylla
" " var. viridis
Pellaea calomelanos
" quadripinnata
Pteris cretica

Aspleniaceae

Asplenium aethiopicum
Ceterach cordatum

Gymnospermae
Zamiaceae

Encephalartos ghellinckii

Monocotyledonae
Typhaceae

Typha latifolia

Poaceae

Agrostis lachnantha
Alloteropsis semialata
Andropogon sp.
Aristida junciformis
Brachiaria serrata
Cenchrus sp.
Cymbopogon plurinodis
" validus
Cynodon dactylon
Elionurus muticus
Enneapogon scoparius
Eragrostis capensis
" curvula
" racemosa
" sp. acraea
" sp.
Eulalia villosa
Eustachys paspaloides
Harpechloa falx
Helictotrichon turgidulum
Heteropogon contortus
Hyparrhenia filipendula
" hirta
" rufa
Imperata cylindrica
Melinis nerviglume
" repens
" sp.
Microchloa caffra
Miscanthus capensis
Paspalum dilatatum *
" sp. scrobiculatum *
Pennisetum clandestinum *
" sp.
Phragmitis australis
Rendlia altera
Setaria nigrirostris
Sporobolus pyramidalis
Themeda triandra
Tristachya leucothrix

Cyperaceae

Cyperus obtusiflorus var. obtusiflorus

" " var. flavissimus
Ficinia sp.
Fuirena pubescens
Pycreus mundii
Scirpus sp.
Scleria sp.

Araceae

Zantedeschia aethiopicum
" albomaculata

Commelinaceae

Commelina africana var. africana
Cyanotis speciosa

Asphodelaceae

Aloe arborescens
" candelabrum
" sp.
Anthericum cooperi
Kniphofia laxiflora
" sp.
Trachyandra sp. cf saltii var. saltii

Hyacinthaceae

Ledebouria ovatifolia
" sp. 2

Eriospermaceae

Eriospermum spp.

Alliaceae

Agapanthus campanulatus
Tulbaghia ludwigiana

Asparagaceae

Asparagus sp. cf laricinus
" virgatus
" sp.

Amaryllidaceae

Boophane disticha
Brunsvigia natalensis
Haemanthus hirsutus
Scadoxus puniceus

Hypoxidaceae

Hypoxis argentea
" hematocaridea
" sp.

Velloziaceae

Xerophyta retinervis

Iridaceae

Aristea woodii
Dierama reynoldsi
" sp. robustum
" sp.
Gladiolus sp. cf oppositiflorus
" spp.
Moraea sp.
Watsonia pillansii

Orchidaceae

Eulophia streptopetala

Dicotyledonae
Salicaceae

Populus sp. *
Salix mucronata ssp. woodii

Myricaceae

Myrica serrata

Moraceae

Ficus ingens
Morus alba *

Santalaceae

Osyris lanceolata

Polygonaceae

Polygonum salicifolium
" pulchrum
Rumex crispus *

Aizoaceae

Psmmotrpha myriantha

Mesembryanthemaceae

Delosperma sp.

Illecebraceae

Pollichia campestris

Caryophyllaceae

Dianthus sp. cf basuticus

Ranunculaceae

Anemone fanninnii
Clematis brachiata
Ranunculus multifidus

Papaveraceae

Argemone mexicana *

Crassulaceae

Cotyledon barbeyi
" orbiculata
Crassula sp. 1
" sp. 2
Kalanchoe rotundifolia

Rosaceae

Agrimonia odorata *
Cotoneaster pannosus *
Geum capense
Leucosidea sericea
Rubus cuneifolius *

" ludwigii
" rigidus
Prunus persica *

Fabaceae

Acacia ataxacantha
" dealbata *
" mearnsii *
Alysicarpus rugosus
Capurnia sericea
Chamaechrista sp.
Dolichos trilobus
" sp.
Elephantorrhiza elephantina
Eriosema saligna
" sp.
Hoffmanseggia sandersorii
Indigofera sp.
Lotononis dichiloides
" foliosa
Otholobium sp.
Psoralea polysticta
Rhynchosia minima
" totta
" sp. cf caribaea
Tephrosia semiglabra
" sp.
Vigna unguiculata
" vexillata
Zornia linearis

Geraniaceae

Geranium sp. cf ornithopodium
Pelargonium luridum
" zonale

Oxalidaceae

Oxalis corniculata

Rutaceae

Zanthoxylum capense

Polygalaceae

Polygala amatymbica

" uncinata

Meliaceae

Melia azederach *

Euphorbiaceae

Acalypha peduncularis
Euphorbia striata
Phyllanthus sp.

Anacardiaceae

Rhus discolor
" sp. pyroides ssp. gracile
" sp.

Celastraceae

Maytenus acuminata
" heterophylla
" sp. 1
" sp. 2

Sapindaceae

Hippobromus pauciflorus

Greyiaceae

Greyia sutherlandii

Rhamnaceae

Rhamnus prinoides
Zizyphus mucronata

Vitaceae

Rhoicissus tridentata

Tiliaceae

Corchorus asplenifolius
Grewia hispida
" occidentalis

Malvaceae

Hibiscus aethiopicus
" sp.

Sterculiaceae

Hermannia depressa
" sp. cf cristatus
" sp. 1
" sp. 2

Ochnaceae

Ochna serrulata

Clusiaceae

Hypericum aethiopicum

Flacourtiaceae

Dovyalis caffra
Scolopia zeyheri

Cactaceae

Opuntia ficus-indica *

Thymelaeaceae

Dais cotinifolia
Gnidia cano-argentea
" capitata
" sp. microcephala
Passerina montana

Onagraceae

Oenothera rosea *
" stricta *
" tetraptera *

Haloragaceae

Gunnera perpensa

Araliaceae

Cussonia paniculata

Apiaceae

Alepidea baurii
Centella sp.
Heteromorpha trifoliata
Peucedanum sp.
Sium repandum

Ebenaceae

Diospyros austro-africanum
" lycioides ssp. sericea
" whyteana
Euclea crispa

Oleaceae

Olea europea ssp. africana

Loganiaceae

Buddleja auriculata
" salviifolia
Gomphostigma virgatum

Gentianaceae

Sebaea sedoides

Periplocaceae

Raphionacme elata

Asclepiadaceae

Asclepias multicaulis
Cardiogyne sp.
Pachycarpus sp.
Xysmalobium sp. undulatum

Convolvulaceae

Turbina oblongata

Boraginaceae

Echium sp.

Verbenaceae

Lantana rugosa
Verbena braziliensis *
" officinale *

Lamiaceae

Ajuga ophrydis
Becium grandiflorum
Plectranthus sp. madagascariensis
Salvia sp.
Stachys runcinata

Solanaceae

Solanum incanum
Withania somnifera

Scrophulariaceae

Alectra sessiliflora
Bowkeria verticillata
Diclis rotundifolia
Graderia scabra
Halleria lucida
Striga asiatica

Gesneriaceae

Streptocarpus ployanthus ssp. comptonii

Acanthaceae

Barleria monticola
Chaetacanthus setiger
Ruellia cordata
" sp.
Thunbergia neglecta

Plantaginaceae

Plantago lanceolata *
" longissima *

Rubiaceae

Anthospermum herbaceum
" rigidum ssp. pumilum
Canthium gilfillanii

Galium capensis ssp. gariepense
Galopina circaeoides
Kohautia amatymbica
Pachystigma macrocalyx
Pavetta cooperi
Pentanisia angustifolia
" prunelloides
Richardia brasiliensis *
Rubia cordifolia ssp. conotricha

Dipsacaceae

Scabiosa columbaria

Cucurbitaceae

Cucumis hirsutus

Lobeliaceae

Cyphia longifolia
Lobelia sp. cf flaccida ssp flaccida
Monopsis decipiens

Asteraceae

Acanthospermum australe *
Artemisia afra
Aster bakerianus
" harveyanus
Athrixia spp.
Berkheya erysithsales
" setifera
" sp. 1
Bidens biternata
Cirsium vulgare *
Conyza floribunda *
" podocephala
Dicoma anomala
Felicia filifolius
" muricata
Gazania krebsiana
Gerbera piloselloides
Gnaphalium undulatum *
Helichrysum aureo-nitens
" caespitium
" herbaceum
" nudifolium
" pilosellum

" rugulosum
" sp.
Hypochoeris radicata *
Pseudognaphalium luteo-album
Schistostephium crataegifolium
" sp.
Schkuhria pinnata *
Senecio spp.
Sonchus sp.
Tagetes minuta *
Vernonia capensis
" natalensis
" sutherlandii

* denotes alien species

Table 2 . Preliminary list of plants recorded from the Smithfield dam site, Mkomazi river, Kwazulu-Natal.

Pteridophyta

Schizaeaceae

Mohria caffrorum

Dennstaedtiaceae

Pteridium aquilinum

Adiantaceae

Cheilanthes hirta var. hirta
" viridis var. viridis
Pellaea calomelanos
Pteris dentata

Polypodiaceae

Polypodium polypodioides

Thelypteridaceae

Thelypteris confluens

Monocotyledonae

Typhaceae

Typha latifoius

Poaceae

Alloteropsis semialata
Aristida congesta ssp. barbicollis
" junciformis
Bothriochloa insculpta
Brachiaria serrata
Cynodon dactylon
" hirsuta
Cymbopogon validus
Elionurus muticus
Eragrostis capensis
" curvula
" sp.
Eulalia villosa
Harpechloa falx
Heteropogon contortus

Hyparrhenia hirta
" rufa
Imperata cylindrica
Melica racemosa
Melinis repens
" sp. nerviglume
Microchloa caffra
Miscanthus capensis
Oplismenus hirtellus
Panicum deustum
Paspalum dilatatum *
Phragmitis mauritianus
Pogonarthria squarrosa
Setaria pallide-fusca
" megaphylla
" nigrirostris
Sporobolus sp. festivus
Themeda triandra
Tristachya leucothrix

Cyperaceae

Carex sp.
Cyperus obtusiflorus ssp. flavissimus
Fuirena pubescens
Pycreus mundii

Araceae

Zantedeschia albomaculata

Commelinaceae

Commelina africana

Asphodelaceae

Aloe arborescens
" candelabrum
" kraussii
" saponaria
" sp.
Anthericum cooperi
" sp.
Kniphofia laxiflora
" sp.

Hyacinthaceae

Albuca sp.
Ledebouria ovatifolia
" sp. 1
" sp. 2
Ornithogalum sp. cf inandense
Scilla natalensis

Alliaceae

Agapathus campanulatus
Tulbaghia ludwigiana

Dracaenaceae

Sansevieria hyacinthoides

Asparagaceae

Asparagus densiflorus
" virgatus
" sp.

Amaryllidaceae

Boophane disticha
Brunsvigia natalensis

Hypoxidaceae

Hypoxis argentea
" rigidula
" spp.

Velloziaceae

Xerophyta humilis

Dioscoreaceae

Dioscorea sp.

Iridaceae

Aristea woodii
Gladiolus aurantiacus
" spp.
Watsonia pillansii

Orchidaceae

Eulophia streptopetala

Dicotyledonae

Salicaceae

Salix mucronata ssp. woodii

Myricaceae

Myrica serrata

Ulmaceae

Celtis africana

Moraceae

Ficus ingens
Morus alba *

Santalaceae

Osyridocarpos schimperianus

Phytolaccaceae

Phytolacca octandra *

Polygonaceae

Persicaria lapathifolium *
Polygonum pulchrum

Ranunculaceae

Clematis brachiata

Papaveraceae

Argemone mexicana *
Papaver aculeatum

Crassulaceae

Cotyledon barbeyi
Crassula sp. 1
" sp. 2
" sp. 3

Kalanchoe rotundifolia

Pittosporaceae

Pittosporum viridiflorum

Rosaceae

Cliffortia sp.
Duchesnea indica *
Prunus persica *
Rubus cuneifolius *
" rigidus

Fabaceae

Acacia ataxacantha
" caffra
" mearnsii
Aeschynomene sp.
Alysicarpus rugosus
Argyrolobium pilosum
Caesalpinia decapetala *
Calpurnia sericea
" sp. aff. woodii
Dalbergia obovata
Elephantorrhiza elephantina
Eriosema salignum
Erythrina humeana
" lysistemon
Hoffmanseggia sandersonii
Indigofera sp. daleoides
Lotononis hirsutus
Pearsonia sp.
Pseudarthria hookeri
Psoralea polysticta
Rhynchosia minima
" spp.
Senna septemtrionalis *
Sesbania punicea *
Trifolium sp. *
Vigna unguiculata
" vexillata
Zornia linearis

Geraniaceae

Geranium sp. ornithopodium
Pelargonium luridum

" zonale

Rutaceae

Clausena anisata
Zanthoxylum capense

Meliaceae

Melia azederach *

Polygalaceae

Polygala hottentotta
" uncinata

Euphorbiaceae

Acalypha peduncularis
" sp.
Clutia affinis
Euphorbia tetragona
" woodii
" striata

Anacardiaceae

Rhus chirindensis
" dentata
" discolor
" pentheri
" pyroides ssp. gracilis
" rigida ssp. dentata
Smodingium argutum

Celastraceae

Maytenus heterophylla
" mossambicensis
Pterocelastrus echinatus

Icacinaceae

Cassinopsis ilicifolia

Sapindaceae

Hippobromus pauciflorus

Greyiaceae

Greyia sutherlandii

Rhamnaceae

Helinus integrifolius
Rhamnus prinoides
Zizyphus mucronata

Vitaceae

Cyphostemma sp.
Rhoicissus tridentata

Tiliaceae

Grewia occidentalis

Malvaceae

Sida dregei

Sterculiaceae

Dombeya rotundifolia

Ochnaceae

Ochna serrulata

Clusiaceae

Hypericum aethiopicum
" sp.

Flacourtiaceae

Scolopia zeyheri
Trimeria grandifolia

Cactaceae

Opuntia ficus-indica

Thymelaeaceae

Dais cotinifolia
Gnidia microcephala

" polyantha
Passerina montana

Combretaceae

Combretum erythrophyllum

Myrtaceae

Eugenia sp. cf albanensis

Onagraceae

Oenothera indecora *
" rosea *
" tetraptera *

Araliaceae

Cussonia paniculata
" spicata

Apiaceae

Alepidea baurii
Centella sp.
Heteromorpha trifoliata

Ebenaceae

Diospyros austro-africanum
" lycioides
Euclea crispa
" natalensis

Oleaceae

Jasminum breviflorum
" fluminense
Olea capensis
" europea ssp. africana

Loganiaceae

Buddleja auriculata
" dysophylla
" salviifolia
Gomphostigma virgatum

Apocynaceae

Carissa bispinosa

Periplocaceae

Raphionacme elata

Asclepiadaceae

Ceropegia linearis
Cynanchum sp.
Xysmalobium gerrardii
" undulatum

Convolvulaceae

Merremia sp.
Ipomoea purpurea

Boraginaceae

Ehretia rigida

Verbenaceae

Lantana rugosa
Verbena officinale *

Lamiaceae

Ajuga ophrydis
Becium obovatum
Tetradenia riparia

Solanaceae

Solanum mauritianum *
" nigrum *

Scrophulariaceae

Bowkeria verticillata
Graderia scabra
Halleria lucida

Gesneriaceae

Streptocarpus polyanthus ssp. comptonii

Acanthaceae

Adhatoda andromeda
Barleria monticola
Chaetacanthus setiger
Justicia sp.
Ruellia sp. cordata
" sp.

Rubiaceae

Anthospermum herbaceum
" rigidum ssp. pumilum
Canthium gilfillanii
" sp. mundianum
Coddia rudis
Diodia natalensis
Kohautia amatymbica
Pachystigma macrocalyx
Pavetta gardeniifolia
Pentanisia angustifolia
" prunelloides

Dipsacaceae

Scabiosa columbaria

Campanulaceae

Wahlenbergia virgata

Lobeliaceae

Lobelia sp.
Monopsis decipiens

Asteraceae

Artemisia afra
Aster harveyanus
Athrixia sp.
Berkheya setifera
" sp.
Cirsium vulgare *
Conyza floribunda *
Gerbera ambigua
" piloselloides
Helichrysum aureo-nitens

" piloselloides
" spp.
Hypochoeris radicata *
Lactuca capensis
Mikania cordata
Pseudognaphalium luteo-album
Senecio coronatus
Vernonia capensis
" hirsuta

* denotes alien species

Table 3 . List of species of reptiles and amphibians likely to occur in the area of the proposed dam basins on the Mkomazi river.

Reptilia	
Sauria	
Gekkonidae	
Afroedura nivaria	Snow flat gecko
Agamidae	
Agama a. atra	Rock agama * S M
" aculeata distanti	Distant's spiny agama
Chamaeleontidae	
Chamaeleo dilepis	Common chameleon
Bradypodion thamnobates	Midlands dwarf chameleon
Scincidae	
Scelotes bourquini	Bourquin's dwarf burrowing skink
Mabuya capensis	Three lined skink
" striata punctatissimus	Striped skink
" varia	Variable skink * S
Lacertidae	
Nucras lalandii	Delalande's long tailed lizard
Gerrhosauridae	
Gerrhosaurus flavigularis	Yellow-throated plated lizard
Tetradactylus seps	
Cordylidae	
Chamaesaura aenea	Transvaal snake-lizard
Varanidae	
Varanus niloticus	Water monitor * M
Serpentes	
Typhlopidae	
Typhlops bibronii	Bibron's blind snake
Leptotyphlopidae	

Leptotyphlops scutifrons	Peter's thread snake
Colubridae	
Lycodonomorphus laevissimus	Black water snake
" rufulus	Brown water snake
Lamprophis fuscus	Yellow-bellied house snake
" fuliginosus	Brown house snake
" guttatus	Spotted house snake
" inornatus	Olive house snake
Lycophidion capense	Cape wolf snake
Duberria l. lutrix	Common slug-eater
Amplorhinus multimaculatus	Many-spotted snake
Psammophylax rhombeatus	Spotted skaapsteker
Psammohis crucifer	Cross-marked sand snake
Philothamnus natalensis	Natal green snake
Homoroselaps lacteus	Spotted harlequin snake
Crotaphopeltis hotamboia	Herald snake
Dasypeltis scabra	Common egg-eater
Elapidae	
Hemachatus haemachatus	Rinkhals
Viperidae	
Bitis arietans	Puff adder
Amphibia	
Pipidae	
Xenopus l. laevis	Common clawed frog
Bufonidae	
Bufo gutturalis	Gutteral toad
" rangeri	Raucous toad * S
Schismaderma carens	Red toad
Microhylidae	
Breviceps a adspersus	Bushveld rain frog
" verrucosus	Plaintive rain frog
Ranidae	
Tomopterna natalensis	Natal sand frog

Rana angolensis	Common river frog	* S M
" fuscigula	Cape river frog	
Strongylopus fasciatus	Striped stream frog	
" grayii	Spotted stream frog	
Ptychadena porosissima	Striped grass frog	
Cacosternum boettgeri	Common caco	
" nanum	Bronze caco	
Arthroleptella hewitti	Natal chirping frog	

Hyperoliidae

Kassina senegalensis	Bubbling kassina
" wealei	Rattling kassina

* seen during survey. S = Smithfield; M = Mpendhle

Table 4 . List of possible mammal species likely to occur in the area of the two dam basins on the Mkomazi river.

Insectivora	
Soricidae	
Crocidura flavescens	Greater musk shrew
" mariquensis	Swamp musk shrew
" silacea	Grey musk shrew
Myosorex varius	Forest shrew
Suncus varilla	Lesser dwarf shrew
Chrysochloridae	
Amblyosomus hottentotus	Hottentot golden mole
Chiroptera	
Nycteridae	
Nycteris thebaica	Common slit-faced bat
Rhinolophidae	
Rhinolophus clivosus	Geoffroy's horseshoe bat
Vespertilionidae	
Eptesicus capensis	Cape serotine bat
Scotophilus dingani	Yellow house bat
Lagomorpha	
Leporidae	
Lepus saxatilus	Scrub hare * M
Rodentia	
Bathyergidae	
Cryptomys hottentotus	Common molerat * M
Hystricidae	
Hystrix africaeaustralis	Porcupine * M
Muscardinidae	
Graphiurus murinus	Common dormouse
Muridae	

Dendromus melanotis	Grey climbing mouse
" mystacalis	Chesnut climbing mouse
" mesomelas	Brant's climbing mouse
Praomys natalensis	Multimammate mouse
Mus minutoides	Pygmy mouse
Mystromys albicaudatus	White-tailed mouse
Otomys angoniensis	Angoni vlei rat * M
" irroratus	Vlei rat
Rhabdomys pumilio	Striped mouse * S
Steatomys krebsi	Dwarf fat mouse
Tubulidentata	
Orycteropus afer	Antbear * S
Carnivora	
Canidae	
Canis mesomelas	Black-backed jackal
Vupes chama	Cape fox
Mustelidae	
Aonyx capensis	Clawless otter
Ictonyx striatus	Striped polecat
Poecilogale albinucha	Striped weasel
Viverridae	
Atilax paludinosus	Water mongoose * S
Galarella sanguinea	Slender mongoose
Genetta genetta	Small spotted genet
" tigrina	Rusty-spotted genet
Felidae	
Felis lybica	African wild cat
Artiodactyla	
Bovidae	
Sylvicapra grimmia	Grey duiker
Tragelaphus scriptus	Bushbuck * S

* seen or signs thereof seen during this survey. S = Smithfield; M = Mpendhle

TABLE 5

LIST OF BIRDS RECORDED FROM THE MPENDHLE DAM SITE ON THE MKOMAZI RIVER.

VAGRANTS

ACCIDENTALS

PELAGIC WRECKS

OLD RECORDS

ESCAPEES

UNCONFIRMED SIGHTINGS

- [ ] Redtailed Tropicbird
- [ ] Slaty Egret
- [ ] Pintail
- [ ] Garganey
- [ ] European Shoveller
- [ ] Tufted Duck
- [ ] Bearded Vulture
- [ ] Egyptian Vulture
- [ ] Europ Marsh Harrier
- [ ] Sooty Falcon
- [ ] Blue Quail
- [ ] Striped Crake
- [ ] Ludwig's Bustard
- [ ] Longtoed Plover
- [ ] Knot
- [ ] Dunlin
- [ ] Pectoral Sandpiper
- [ ] Great Snipe
- [ ] Grey Phalarope
- [ ] Rednecked Phalarope
- [ ] Arctic Skua
- [ ] Swift Tern
- [ ] Arctic Tern
- [ ] Sooty Tern
- [ ] Roseringed Parakeet
- [ ] Rosyfaced Lovebird
- [ ] Silvercheeked Hornbill
- [ ] Angola Pitta
- [ ] Stark's Lark
- [ ] European Wheatear
- [ ] Collared Palm Thrush
- [ ] Europ Reed Warbler
- [ ] Redwinged Warbler
- [ ] Golden Pipit
- [ ] Lesser Blue-ea Starling
- [ ] Yellowbilled Oxpecker
- [ ] Cardinal

LOCALITY

- [ ] Ostrich
- [ ] Great Crested Grebe
- [ ] Blacknecked Grebe
- [ ] Dabchick
- [ ] White Pelican
- [ ] Pinkbacked Pelican
- [ ] Whitebr Cormorant
- [ ] Reed Cormorant
- [ ] Darter
- [ ] Grey Heron
- [ ] Blackheaded Heron
- [ ] Goliath Heron
- [ ] Purple Heron
- [ ] Great White Egret
- [ ] Little Egret
- [ ] Yellowbilled Egret
- [ ] Black Egret
- [x] Cattle Egret
- [ ] Squacco Heron
- [ ] Greenbacked Heron
- [ ] Rufousbellied Heron
- [ ] Blacker Night Heron
- [ ] Whitebkd Night Heron
- [ ] Little Bittern
- [ ] Dwarf Bittern
- [ ] Bittern
- [x] Hamerkop
- [ ] White Stork
- [ ] Black Stork
- [ ] Abdim's Stork
- [ ] Woollynecked Stork
- [ ] Openbilled Stork
- [ ] Saddlebilled Stork
- [ ] Marabou Stork
- [ ] Yellowbilled Stork
- [ ] Sacred Ibis
- [x] Bald Ibis
- [ ] Glossy Ibis
- [x] Hadeda Ibis
- [ ] African Spoonbill
- [ ] Greater Flamingo
- [ ] Lesser Flamingo
- [ ] Whitefaced Duck
- [ ] Fulvous Duck
- [ ] Whitebacked Duck
- [x] Egyptian Goose
- [ ] S African Shelduck
- [ ] Yellowbilled Duck
- [x] Black Duck
- [ ] Cape Teal
- [ ] Hottentot Teal
- [ ] Redbilled Teal
- [ ] Cape Shoveller
- [ ] Southern Pochard
- [ ] Pygmy Goose
- [ ] Knobbilled Duck
- [ ] Spurwinged Goose
- [ ] Maccoa Duck
- [ ] Secretarybird
- [ ] Hooded Vulture
- [ ] Cape Vulture
- [ ] Whitebacked Vulture
- [ ] Lappetfaced Vulture
- [ ] Whiteheaded Vulture
- [ ] Black Kite
- [ ] Yellowbilled Kite
- [ ] Blackshouldered Kite
- [ ] Cuckoo Hawk
- [ ] Bat Hawk
- [ ] Honey Buzzard
- [ ] Black Eagle
- [ ] Tawny Eagle
- [ ] Steppe Eagle
- [ ] Lesser Spotted Eagle
- [ ] Wahlberg's Eagle
- [ ] Booted Eagle
- [ ] African Hawk Eagle
- [ ] Ayres' Eagle
- [x] Longcrested Eagle
- [ ] Martial Eagle
- [ ] Crowned Eagle
- [ ] Brown Snake-Eagle
- [ ] Blacksr Snake-Eagle
- [ ] Bateleur
- [ ] Palmnut Vulture
- [ ] Fish Eagle
- [ ] Steppe Buzzard
- [ ] Forest Buzzard
- [ ] Jackal Buzzard
- [ ] Lizard Buzzard
- [ ] Redthighed Sparrowhawk
- [ ] Ovambo Sparrowhawk
- [ ] Little Sparrowhawk
- [ ] Black Sparrowhawk
- [ ] Little Banded Goshawk
- [ ] African Goshawk
- [ ] Gabar Goshawk
- [ ] Pale Chanting Goshawk
- [ ] Dark Chanting Goshawk
- [ ] African Marsh Harrier
- [ ] Montagu's Harrier
- [ ] Pallid Harrier
- [ ] Black Harrier
- [ ] Gymnogene
- [ ] Osprey
- [ ] Peregrine Falcon
- [x] Lanner Falcon
- [ ] European Hobby
- [ ] African Hobby
- [ ] Rednecked Falcon
- [ ] W Redfoot Kestrel
- [ ] E Redfoot Kestrel
- [ ] Rock Kestrel
- [ ] Greater Kestrel
- [ ] Lesser Kestrel
- [ ] Dickinson's Kestrel
- [ ] Pygmy Falcon
- [ ] Coqui Francolin
- [ ] Crested Francolin
- [ ] Greywinged Francolin
- [ ] Shelley's Francolin
- [ ] Redwinged Francolin
- [ ] Orange River Francolin
- [ ] Natal Francolin
- [ ] Rednecked Francolin
- [ ] Swainson's Francolin
- [ ] Common Quail
- [ ] Harlequin Quail
- [ ] Helmeted Guineafowl
- [ ] Crested Guineafowl
- [ ] Kurrichane Button-Quail
- [ ] Blackrump Button-Quail
- [ ] Wattled Crane
- [ ] Blue Crane
- [ ] Crowned Crane
- [ ] African Rail
- [ ] Cornecrake
- [ ] African Crake
- [ ] Black Crake
- [ ] Spotted Crake
- [ ] Baillon's Crake
- [ ] Redchested Flufftail
- [ ] Buffspotted Flufftail
- [ ] Striped Flufftail
- [ ] Whitewinged Flufftail
- [ ] Purple Gallinule
- [ ] Lesser Gallinule
- [ ] Moorhen
- [ ] Lesser Moorhen
- [ ] Redknobbed Coot
- [ ] African Finfoot
- [ ] Kori Bustard
- [ ] Stanley's Bustard
- [ ] Whitebellied Korhaan
- [ ] Blue Korhaan
- [ ] Redcrested Korhaan
- [ ] Blackbellied Korhaan
- [ ] Black Korhaan
- [ ] African Jacana
- [ ] Lesser Jacana
- [ ] Painted Snipe
- [ ] Ringed Plover
- [ ] Whitefronted Plover
- [ ] Chestnutbnd Plover
- [ ] Kittlitz's Plover
- [ ] Threebanded Plover
- [ ] Caspian Plover
- [ ] Grey Plover
- [ ] Crowned Plover
- [ ] Lesser Blackwng Plover
- [ ] Blackwinged Plover
- [ ] Blacksmith Plover
- [ ] Whitecrowned Plover
- [ ] Wattled Plover
- [ ] Turnstone
- [ ] Terek Sandpiper
- [ ] Common Sandpiper
- [ ] Green Sandpiper
- [ ] Wood Sandpiper
- [ ] Redshank
- [ ] Marsh Sandpiper
- [ ] Greenshank
- [ ] Curlew Sandpiper
- [ ] Little Stint
- [ ] Sanderling
- [ ] Ruff
- [ ] Ethiopian Snipe
- [ ] Blacktailed Godwit
- [ ] Bartailed Godwit
- [ ] Curlew
- [ ] Whimbrel
- [ ] Avocet
- [ ] Blackwinged Stilt
- [ ] Spotted Dikkop
- [ ] Water Dikkop
- [ ] Burchell's Courser
- [ ] Temminck's Courser
- [ ] Doublebanded Courser
- [ ] Threebanded Courser
- [ ] Bronzewinged Courser
- [ ] Redwinged Pratincole
- [ ] Blackwinged Pratincole
- [ ] Lesser Blackbkd Gull
- [ ] Greyhooded Gull
- [ ] Caspian Tern
- [ ] Black Tern
- [ ] Whiskered Tern
- [ ] Whitewinged Tern
- [ ] African Skimmer
- [ ] Namaqua Sandgrouse
- [ ] Burchell's Sandgrse
- [ ] Yellowthr Sandgrse
- [ ] Doublebnd Sandgrse
- [ ] Feral Pigeon
- [ ] Rock Pigeon
- [ ] Rameron Pigeon
- [ ] Delegorgue's Pigeon
- [ ] Redeyed Dove
- [ ] Mourning Dove
- [ ] Cape Turtle Dove
- [x] Laughing Dove
- [ ] Namaqua Dove
- [ ] Blue-spotted Dove
- [ ] Emerald-spotted Dove
- [ ] Tambourine Dove
- [ ] Cinnamon Dove
- [ ] Green Pigeon
- [ ] Cape Parrot
- [ ] Brownheaded Parrot
- [ ] Meyer's Parrot
- [ ] Knysna Lourie
- [ ] Purplecrested Lourie
- [ ] Grey Lourie
- [ ] European Cuckoo
- [ ] African Cuckoo
- [x] Redchested Cuckoo
- [ ] Black Cuckoo
- [ ] Great Spotted Cuckoo
- [ ] Striped Cuckoo
- [ ] Jacobin Cuckoo
- [ ] Thickbilled Cuckoo
- [ ] Emerald Cuckoo
- [ ] Klaas's Cuckoo
- [ ] Diederik Cuckoo
- [ ] Black Coucal
- [ ] Burchell's Coucal
- [ ] Barn Owl
- [ ] Grass Owl
- [ ] Wood Owl
- [ ] Marsh Owl
- [ ] Scops Owl
- [ ] Whitefaced Owl
- [ ] Pearlspotted Owl
- [ ] Barred Owl
- [ ] Cape Eagle Owl
- [ ] Spotted Eagle Owl
- [ ] Giant Eagle Owl
- [ ] Pel's Fishing Owl
- [ ] European Nightjar
- [ ] Pennyd Nightjar
- [ ] Rufousnecked Nightjar
- [ ] Freckled Nightjar
- [ ] Mozambique Nightjar
- [ ] Pennantwinged Nightjar
- [ ] European Swift
- [ ] Black Swift
- [ ] Bradfield's Swift
- [ ] Whiterumped Swift
- [ ] Horus Swift
- [ ] Little Swift
- [ ] Alpine Swift
- [ ] Palm Swift
- [ ] Mottled Spinetail
- [ ] Bohm's Spinetail
- [x] Speckled Mousebird
- [ ] Whitebkd Mousebird
- [ ] Redfaced Mousebird
- [ ] Narina Trogon
- [ ] Pied Kingfisher
- [ ] Giant Kingfisher
- [ ] Halfcollard Kingfisher
- [ ] Malachite Kingfisher
- [ ] Pygmy Kingfisher
- [ ] Woodland Kingfisher
- [ ] Mangrove Kingfisher
- [ ] Brownhood Kingfisher
- [ ] Greyhood Kingfisher
- [ ] Striped Kingfisher
- [ ] European Bee-eater
- [ ] Olive Bee-eater
- [ ] Blueheaded Bee-eater
- [ ] Carmine Bee-eater
- [ ] Whitefronted Bee-eater
- [ ] Little Bee-eater
- [ ] Swallowtld Bee-eater
- [ ] European Roller
- [ ] Lilacbreasted Roller
- [ ] Racquettailed Roller
- [ ] Purple Roller
- [ ] Broadbilled Roller
- [ ] Hoopoe
- [ ] Redbilled Woodhoopoe
- [ ] Scimitarb Woodhoopoe
- [ ] Trumpeter Hornbill
- [ ] Grey Hornbill
- [ ] Redbilled Hornbill

DATE

- [ ] Crowned Hornbill
- [x] Ground Hornbill
- [ ] Blackcollared Barbet
- [ ] Pied Barbet
- [ ] Whitebared Barbet
- [ ] Redfr Tinker Barbet
- [ ] Yellowfr Tinker Barbet
- [ ] Goldenrumped T Barbet
- [ ] Crested Barbet
- [ ] Greater Honeyguide
- [ ] Scalythr Honeyguide
- [ ] Lesser Honeyguide
- [ ] Sharpbill Honeyguide
- [ ] Ground Woodpecker
- [ ] Bennett's Woodpecker
- [ ] Goldenbkd Woodpecker
- [ ] Cardinal Woodpecker
- [ ] Bearded Woodpecker
- [ ] Olive Woodpecker
- [ ] Redthroated Wryneck
- [ ] African Broadbill
- [ ] Melodious Lark
- [ ] Monotonous Lark
- [ ] Rufousnaped Lark
- [ ] Clapper Lark
- [ ] Flapper Lark
- [ ] Pawncoloured Lark
- [ ] Sabota Lark
- [ ] Rudd's Lark
- [ ] Longbilled Lark
- [ ] Stonecleard Lark
- [ ] Dusky Lark
- [ ] Spikeheeled Lark
- [ ] Redcapped Lark
- [ ] Pinkbilled Lark
- [ ] Botha's Lark
- [ ] Chestnutbkd Finch-Lark
- [ ] Greybkd Finch-Lark
- [ ] Backeared Finch-Lark
- [ ] European Swallow
- [x] Whitethroat Swallow
- [ ] Blue Swallow
- [ ] Wiretailed Swallow
- [ ] Pearlbreasted Swallow
- [ ] Redbreasted Swallow
- [ ] Mosque Swallow
- [ ] Greater Str Swallow
- [ ] Lesser Str Swallow
- [x] S Afr Cliff Swallow
- [ ] Rock Martin
- [ ] House Martin
- [ ] Greyrumped Swallow
- [ ] Europ Sandmartin
- [ ] Brownthroated Martin
- [ ] Banded Martin
- [ ] Black Sawwing Swallow
- [ ] Black Cuckooshrike
- [ ] Whitebr Cuckooshrike
- [ ] Grey Cuckooshrike
- [ ] Forktailed Drongo
- [ ] Squaretailed Drongo
- [ ] Europ Golden Oriole
- [ ] African Golden Oriole
- [ ] Blackheaded Oriole
- [ ] Black Crow
- [x] Pied Crow
- [ ] Whitenecked Raven
- [ ] Southern Grey Tit
- [ ] Southern Black Tit
- [ ] Cape Penduline Tit
- [ ] Grey Penduline Tit
- [ ] Arrowmarked Babbler
- [ ] Pied Babbler
- [ ] Bush Blackcap
- [ ] Redeyed Bulbul
- [x] Blackeyed Bulbul
- [ ] Terrestrial Bulbul
- [ ] Yellowstreaked Bulbul
- [ ] Sombre Bulbul
- [ ] Yellowbellied Bulbul
- [ ] Yellowspotted Nicator
- [ ] Kurrichane Thrush
- [ ] Olive Thrush
- [ ] Orange Thrush
- [ ] Groundscraper Thrush
- [ ] Cape Rock Thrush
- [x] Sentinel Rock Thrush
- [ ] Shortlcwd Rock Thrush
- [ ] Mountain Chat
- [ ] Capped Wheatear
- [x] Buffstreaked Chat
- [ ] Familiar Chat
- [ ] Sicklewinged Chat
- [ ] Mocking Chat
- [ ] Arnot's Chat
- [ ] Anteating Chat
- [x] Stone Chat
- [ ] Chorister Robin
- [ ] Heuglin's Robin
- [ ] Natal Robin
- [ ] Cape Robin
- [ ] Whitethroated Robin
- [ ] Starred Robin
- [ ] Thrush Nightingale

OBSERVERS

- [ ] Whitebr Scrub Robin
- [ ] Kalahari Robin
- [ ] Brown Robin
- [ ] Bearded Robin
- [ ] Garden Warbler
- [ ] Whitethroat
- [ ] Tribabbler
- [ ] Mashona Hylia
- [ ] Icterine Warbler
- [ ] Olivetree Warbler
- [ ] River Warbler
- [ ] Great Reed Warbler
- [ ] African Marsh Warbler
- [ ] Europ Marsh Warbler
- [ ] Europ Sedge Warbler
- [ ] Cape Reed Warbler
- [ ] Yellow Warbler
- [ ] Afr Sedge Warbler
- [ ] Barratt's Warbler
- [ ] Broadtailed Warbler
- [ ] Willow Warbler
- [ ] Yellowthroated Warbler
- [ ] Barthroated Apalis
- [ ] Yellowbreasted Apalis
- [ ] Rudd's Apalis
- [ ] Crombec
- [ ] Yellowbell Eremomela
- [ ] Greencap Eremomela
- [ ] Burnineck Eremomela
- [ ] Rooting Rush Warbler
- [ ] Greybkd Bush Warbler
- [ ] Barred Warbler
- [ ] Stierling's Warbler
- [x] Grassbird
- [ ] Fantailed Cisticola
- [ ] Desert Cisticola
- [ ] Cloud Cisticola
- [ ] Ayres' Cisticola
- [ ] Palecrowned Cisticola
- [ ] Wailing Cisticola
- [ ] Tinkling Cisticola
- [ ] Rattling Cisticola
- [ ] Redfaced Cisticola
- [ ] Backbacked Cisticola
- [ ] Levaillant's Cisticola
- [ ] Croaking Cisticola
- [ ] Lazy Cisticola
- [ ] Neddicky
- [ ] Tawnyflanked Prinia
- [ ] Blackchested Prinia
- [ ] Spotted Prinia
- [ ] Rufousnaped Warbler
- [ ] Spotted Flycatcher
- [ ] Dusky Flycatcher
- [ ] Blueyrey Flycatcher
- [ ] Collared Flycatcher
- [ ] Fantailed Flycatcher
- [ ] Black Flycatcher
- [ ] Marico Flycatcher
- [ ] Pallid Flycatcher
- [ ] Chat Flycatcher
- [ ] Fiscal Flycatcher
- [ ] Cape Batis
- [ ] Chinspot Batis
- [ ] Pririt Batis
- [ ] Wattle-eyed Flycatcher
- [ ] Fairy Flycatcher
- [ ] Bluemantled Flycatcher
- [ ] Paradise Flycatcher
- [ ] African Pied Wagtail
- [ ] Longtailed Wagtail
- [x] Cape Wagtail
- [ ] Yellow Wagtail
- [ ] Richard's Pipit
- [ ] Longbilled Pipit
- [ ] Plainbacked Pipit
- [ ] Buffy Pipit
- [ ] Striped Pipit
- [ ] Rock Pipit
- [ ] Europ Tree Pipit
- [ ] Bushveld Pipit
- [ ] Shorttailed Pipit
- [ ] Yellowbreasted Pipit
- [ ] Orangethr Longclaw
- [ ] Yellowthr Longclaw
- [ ] Lesser Grey Shrike
- [x] Fiscal Shrike
- [ ] Redbacked Shrike
- [ ] Longtailed Shrike
- [ ] Southern Boubou
- [ ] Tropical Boubou
- [ ] Crimsonbreasted Shrike
- [ ] Puffbacked Shrike
- [ ] Brubru
- [ ] Southern Tchagra
- [ ] Threestreaked Tchagra
- [ ] Blackcrowned Tchagra
- [x] Bokmakierie
- [ ] Gorgeous Bush Shrike
- [ ] Orangebr Bush Shrike
- [ ] Blackfrnd Bush Shrike
- [ ] Olive Bush Shrike
- [ ] Greyhd Bush Shrike
- [ ] White Helmetshrike
- [ ] Redbilled Helmetshrike
- [ ] Whitecrowned Shrike
- [ ] Indian Myna
- [x] Pied Starling
- [ ] Wattled Starling
- [ ] Plumcoloured Starling
- [ ] Burchell's Starling
- [ ] Longtailed Starling
- [ ] Cape Glossy Starling
- [ ] Greater Blue-ear Starling
- [ ] Blackbellied Starling
- [ ] Redwinged Starling
- [ ] Palewinged Starling
- [ ] Redbilled Oxpecker
- [ ] Gurney's Sugarbird
- [ ] Malachite Sunbird
- [ ] Marico Sunbird
- [ ] Purplebacked Sunbird
- [ ] Lesser Doublecd Sunbird
- [ ] Greater Doublecd Sunbird
- [ ] Yellowbellied Sunbird
- [ ] Whitebellied Sunbird
- [ ] Dusky Sunbird
- [ ] Grey Sunbird
- [ ] Olive Sunbird
- [ ] Scarletthr Sunbird
- [ ] Black Sunbird
- [ ] Collared Sunbird
- [x] Cape White-eye
- [ ] Yellow White-eye
- [ ] Redbill Buffalo Weaver
- [ ] Whitebr Sparrow Weaver
- [ ] Sociable Weaver
- [x] House Sparrow
- [ ] Great Sparrow
- [x] Cape Sparrow
- [ ] Greyheaded Sparrow
- [ ] Yellowthr Sparrow
- [ ] Scalyfeathered Finch
- [ ] Thickbilled Weaver
- [ ] Forest Weaver
- [ ] Spectacled Weaver
- [ ] Sportedbacked Weaver
- [ ] Cape Weaver
- [ ] Masked Weaver
- [ ] Lesser Masked Weaver
- [ ] Golden Weaver
- [ ] Bronzethroated Weaver
- [ ] Redheaded Weaver
- [ ] Cuckoo Finch
- [ ] Redbilled Quelea
- [ ] Red Bishop
- [ ] Golden Bishop
- [ ] Yellowrumped Widow
- [ ] Redshouldered Widow
- [ ] Whitewinged Widow
- [ ] Redcollared Widow
- [ ] Longtailed Widow
- [ ] Goldenbacked Pytelia
- [ ] Melba Finch
- [ ] Green Twinspot
- [ ] Redthroated Twinspot
- [ ] Bluebilled Firefinch
- [ ] Jameson's Firefinch
- [ ] Redbilled Firefinch
- [ ] Blue Waxbill
- [ ] Violeteared Waxbill
- [ ] Common Waxbill
- [ ] Blackcheeked Waxbill
- [ ] Grey Waxbill
- [ ] Swee Waxbill
- [ ] Quail Finch
- [ ] Orangebreasted Waxbill
- [ ] Cutthroat Finch
- [ ] Redheaded Finch
- [ ] Bronze Mannikin
- [ ] Redbacked Mannikin
- [ ] Red Mannikin
- [ ] Pintailed Whydah
- [ ] Shaftailed Whydah
- [ ] Paradise Whydah
- [ ] Broadtld Paradise Whydah
- [ ] Black Widowfinch w.f.
- [ ] Purple Widowfinch w.w.
- [ ] Steelblue Widowfinch f.f.
- [ ] Yelloweyed Canary
- [ ] Blackthroated Canary
- [ ] Cape Canary
- [ ] Forest Canary
- [ ] Blackheaded Canary
- [ ] Bully Canary
- [ ] Yellow Canary
- [ ] Whitethr Canary
- [ ] Streakyhead Canary
- [ ] Goldenbreasted Bunting
- [ ] Cape Bunting
- [ ] Rock Bunting
- [ ] Larklike Bunting

TABLE 6

LIST OF BIRDS RECORDED FROM THE SMITHFIELD DAM SITE ON THE MKOMAZI RIVER.

VAGRANTS

ACCIDENTALS

PELAGIC 'WRECKS'

OLD RECORDS

ESCAPEES

UNCONFIRMED SIGHTINGS

LOCALITY

DATE

OBSERVERS

- Redtailed Tropicbird
- Slates Egret
- Pintail
- Garganey
- European Shoveler
- Tufted Duck
- Bearded Vulture
- Egyptian Vulture
- Europ Marsh Harrier
- Sooty Falcon
- Blue Quail
- Striped Crake
- Ludwig's Bustard
- Longtoed Plover
- Knot
- Dunlin
- Pectoral Sandpiper
- Great Snipe
- Grey Phalarope
- Rednecked Phalarope
- Arctic Skua
- Swift Tern
- Arctic Tern
- Sooty Tern
- Roseringed Parakeet
- Rosyfaced Lovebird
- Silverycheeked Hornbill
- Angola Pitta
- Stark's Lark
- European Wheatear
- Collared Palm Thrush
- Europ Reed Warbler
- Redwinged Warbler
- Golden Pipit
- Lesser Blue-e Starling
- Yellowbilled Oxpecker
- Cardinal

- Ostrich
- Great Crested Grebe
- Blacknecked Grebe
- Dabchick
- White Pelican
- Pinkbacked Pelican
- Whitenecked Cormorant
- Reed Cormorant
- Darter
- Grey Heron
- Blackheaded Heron
- Goliath Heron
- Purple Heron
- Great White Egret
- Little Egret
- Yellowbilled Egret
- Black Egret
- Cattle Egret
- Squacco Heron
- Greenbacked Heron
- Rufousbellied Heron
- Blacker Night Heron
- Whitebkd Night Heron
- Little Bittern
- Dwarf Bittern
- Bittern
- Hamerkop
- White Stork
- Black Stork
- Abdim's Stork
- Woollynecked Stork
- Openbilled Stork
- Saddlebilled Stork
- Marabou Stork
- Yellowbilled Stork
- Sacred Ibis
- Bald Ibis
- Glossy Ibis
- Hadeda Ibis
- African Spoonbill
- Greater Flamingo
- Lesser Flamingo
- Whitefaced Duck
- Fulvous Duck
- Whitebacked Duck
- Egyptian Goose
- S African Shelduck
- Yellowbilled Duck
- Black Duck
- Cape Teal
- Hottentot Teal
- Redbilled Teal
- Cape Shoveller
- Southern Pochard
- Pygmy Goose
- Knobbilled Duck
- Spurwinged Goose
- Maccoa Duck
- Secretarybird
- Hooded Vulture
- Cape Vulture
- Whitebacked Vulture
- Lappetfaced Vulture
- Whiteheaded Vulture
- Black Kite
- Yellowbilled Kite
- Blackshouldered Kite
- Cuckoo Hawk
- Bat Hawk
- Honey Buzzard
- Black Eagle
- Tawny Eagle
- Steppe Eagle
- Lesser Spotted Eagle
- Wahlberg's Eagle
- Booted Eagle
- African Hawk Eagle
- Ayres' Eagle
- Longcrested Eagle
- Martial Eagle
- Crowned Eagle
- Brown Snake-Eagle
- Blackbr Snake-Eagle
- Buteleur
- Palmnut Vulture
- Fish Eagle
- Steppe Buzzard
- Forest Buzzard
- Jackal Buzzard
- Lizard Buzzard
- Redbreasted Sparrowhawk
- Ovambo Sparrowhawk
- Little Sparrowhawk
- Black Sparrowhawk
- Little Banded Goshawk
- African Goshawk
- Gabar Goshawk
- Pale Chanting Goshawk
- Dark Chanting Goshawk
- African Marsh Harrier
- Montagu's Harrier
- Pallid Harrier
- Black Harrier
- Gymnogene
- Osprey
- Peregrine Falcon
- Lanner Falcon
- European Hobby
- African Hobby
- Rednecked Falcon
- W Redfoot Kestrel
- E Redfoot Kestrel
- Rock Kestrel
- Greater Kestrel
- Lesser Kestrel
- Dickinson's Kestrel
- Pygmy Falcon
- Coqui Francolin
- Crested Francolin
- Greywinged Francolin
- Shelley's Francolin
- Redwinged Francolin
- Orange River Francolin
- Natal Francolin
- Rednecked Francolin
- Swainson's Francolin
- Common Quail
- Harlequin Quail
- Helmeted Guineafowl
- Crested Guineafowl
- Kurrichane Button-Quail
- Blackrump Button-Quail
- Wattled Crane
- Blue Crane
- Crowned Crane
- African Rail
- Corncrake
- African Crake
- Black Crake
- Spotted Crake
- Baillon's Crake
- Redchested Flufftail
- Sultipooted Flufftail
- Striped Flufftail
- Whitewinged Flufftail
- Purple Gallinule
- Lesser Gallinule
- Moorhen
- Lesser Moorhen
- Rednobbed Coot
- African Finfoot
- Kori Bustard
- Stanley's Bustard
- Whitebellied Korhaan
- Blue Korhaan
- Redcrested Korhaan
- Blackbellied Korhaan
- Black Korhaan
- African Jacana
- Lesser Jacana
- Painted Snipe
- Ringed Plover
- Whitefronted Plover
- Grammutond Plover
- Kittlitz's Plover
- Threebanded Plover
- Caspian Plover
- Grey Plover
- Crowned Plover
- Lesser Blackwng Plover
- Blackwinged Plover
- Blacksmith Plover
- Whitecrowned Plover
- Wattled Plover
- Turnstone
- Terek Sandpiper
- Common Sandpiper
- Green Sandpiper
- Wood Sandpiper
- Redshank
- Marsh Sandpiper
- Greenshank
- Curlew Sandpiper
- Little Stint
- Sanderling
- Ruff
- Ethiopian Snipe
- Blacktailed Godwit
- Bartailed Godwit
- Curlew
- Whimbrel
- Avocet
- Blackwinged Stilt
- Spotted Dikkop
- Water Dikkop
- Burchell's Courser
- Temminck's Courser
- Doublebanded Courser
- Threebanded Courser
- Bronzewinged Courser
- Redwinged Pratincole
- Blackwinged Pratincole
- Lesser Blackbkd Gull
- Greyheaded Gull
- Black Tern
- Whiskered Tern
- Whitewinged Tern
- African Skimmer
- Namaqua Sandgrouse
- Burchell's Sandgrse
- Yellowthr Sandgrse
- Doublebnd Sandgrse
- Feral Pigeon
- Rock Pigeon
- Rameron Pigeon
- Delegorgue's Pigeon
- Redeyed Dove
- Mourning Dove
- Cape Turtle Dove
- Laughing Dove
- Namaqua Dove
- Blumspotted Dove
- Greenspotted Dove
- Tambourine Dove
- Cinnamon Dove
- Green Pigeon
- Cape Parrot
- Brownheaded Parrot
- Meyer's Parrot
- Knysna Lourie
- Purplecrested Lourie
- Grey Lourie
- European Cuckoo
- African Cuckoo
- Redchested Cuckoo
- Black Cuckoo
- Great Spotted Cuckoo
- Striped Cuckoo
- Jacobin Cuckoo
- Thickbilled Cuckoo
- Emerald Cuckoo
- Klaas's Cuckoo
- Diederik Cuckoo
- Black Coucal
- Burchell's Coucal
- Barn Owl
- Grass Owl
- Wood Owl
- Marsh Owl
- Scops Owl
- Whitefaced Owl
- Pearlspotted Owl
- Barred Owl
- Cape Eagle Owl
- Spotted Eagle Owl
- Giant Eagle Owl
- Pels Fishing Owl
- European Nightjar
- Fierynkd Nightjar
- Rufousckd Nightjar
- Freckled Nightjar
- Mozambique Nightjar
- Pennantwinged Nightjar
- European Swift
- Black Swift
- Bradfield's Swift
- Whitenumped Swift
- Horus Swift
- Little Swift
- Alpine Swift
- Palm Swift
- Mottled Spinetail
- Bohm's Spinetail
- Speckled Mousebird
- Whitebkd Mousebird
- Redfaced Mousebird
- Narina Trogon
- Pied Kingfisher
- Giant Kingfisher
- Halcyon Kingfisher
- Malachite Kingfisher
- Pygmy Kingfisher
- Woodland Kingfisher
- Mangrove Kingfisher
- Brownhood Kingfisher
- Greyhood Kingfisher
- Striped Kingfisher
- European Bee-eater
- Olive Bee-eater
- Bluecheekd Bee-eater
- Carmine Bee-eater
- Whitefrond Bee-eater
- Little Bee-eater
- Swallowtld Bee-eater
- European Roller
- Lilacbreasted Roller
- Racquettailed Roller
- Purple Roller
- Broadbilled Roller
- Hoopoe
- Redbilled Woodhoopoe
- Scimitarb Woodhoopoe
- Trumpeter Hornbill
- Grey Hornbill
- Crowned Hornbill
- Ground Hornbill
- Blackcollared Barbet
- Pied Barbet
- Whitefrec Barbet
- Recfr Tinker Barbet
- Yellowfr Tinker Barbet
- Goldenrumped T Barbet
- Crested Barbet
- Greater Honeyguide
- Scalythr Honeyguide
- Lesser Honeyguide
- Sharpbill Honeyguide
- Ground Woodpecker
- Bennett's Woodpecker
- Goldenbkd Woodpecker
- Cardinal Woodpecker
- Bearded Woodpecker
- Olive Woodpecker
- Redthroated Wryneck
- African Broadbill
- Melodious Lark
- Monotonous Lark
- Rufousnaped Lark
- Clapper Lark
- Flapper Lark
- Pawcoloured Lark
- Sabota Lark
- Rudd's Lark
- Longbilled Lark
- Spikeheeled Lark
- Dusky Lark
- Spikeheeled Lark
- Redcapped Lark
- Pinkbilled Lark
- Botha's Lark
- Chestnutbkd Finch-Lark
- Greybkd Finch-Lark
- Blackeared Finch-Lark
- European Swallow
- Whitethroat Swallow
- Blue Swallow
- Wiretailed Swallow
- Pearlbreasted Swallow
- Redbreasted Swallow
- Mosque Swallow
- Greater Str Swallow
- Lesser Str Swallow
- S Afr Cliff Swallow
- Rock Martin
- House Martin
- Greyrumped Swallow
- Europ Sandmartin
- Brownthroated Martin
- Banded Martin
- Black Sawwing Swallow
- Black Cuckooshrike
- Whitebr Cuckooshrike
- Grey Cuckooshrike
- Forktailed Drongo
- Squaretailed Drongo
- Europ Golden Oriole
- African Golden Oriole
- Blackheaded Oriole
- Black Crow
- Pied Crow
- Whitenecked Raven
- Southern Grey Tit
- Southern Black Tit
- Cape Penduline Tit
- Grey Penduline Tit
- Arrowmarked Babbler
- Pied Babbler
- Bush Blackcap
- Redeyed Bulbul
- Blackeyed Bulbul
- Terrestrial Bulbul
- Yellowstreaked Bulbul
- Sombre Bulbul
- Yellowbellied Bulbul
- Yellowspotted Nicator
- Kurrichane Thrush
- Olive Thrush
- Orange Thrush
- Groundscraper Thrush
- Cape Rock Thrush
- Sentinel Rock Thrush
- Shortpood Rock Thrush
- Mountain Chat
- Capped Wheatear
- Buffstreaked Chat
- Familiar Chat
- Sicklewinged Chat
- Mocking Chat
- Arnot's Chat
- Anteating Chat
- Sooty Chat
- Chorister Robin
- Heuglin's Robin
- Natal Robin
- Cape Robin
- Whitethroated Robin
- Starred Robin
- Thrush Nightingale
- Whitebr Scrub Robin
- Kalahari Robin
- Brown Robin
- Bearded Robin
- Garden Warbler
- Whitethroat
- Titbabbler
- Mashona Hyliota
- Icterine Warbler
- Olivetree Warbler
- River Warbler
- Great Reed Warbler
- African Marsh Warbler
- Europ Marsh Warbler
- Europ Sedge Warbler
- Cape Reed Warbler
- Yellow Warbler
- Afr Sedge Warbler
- Barratt's Warbler
- Broadtailed Warbler
- Willow Warbler
- Yellowthroated Warbler
- Barthroated Apalis
- Yellowbreasted Apalis
- Rudd's Apalis
- Crombec
- Yellowbell Eremomela
- Greencap Eremomela
- Burnincck Eremomela
- Blessing Bush Warbler
- Greybkc Bush Warbler
- Barred Warbler
- Stierling's Warbler
- Grassbird
- Fantailed Cisticola
- Desert Cisticola
- Cloud Cisticola
- Ayres' Cisticola
- Palecrowned Cisticola
- Wailing Cisticola
- Tinkling Cisticola
- Rattling Cisticola
- Redfaced Cisticola
- Blackbacked Cisticola
- Levaillant's Cisticola
- Croaking Cisticola
- Lazy Cisticola
- Neddicky
- Tawnyflanked Prinia
- Blackchested Prinia
- Spotted Prinia
- Rufousnaped Warbler
- Spotted Flycatcher
- Dusky Flycatcher
- Bluegrey Flycatcher
- Collared Flycatcher
- Fantailed Flycatcher
- Black Flycatcher
- Marico Flycatcher
- Pallid Flycatcher
- Chat Flycatcher
- Facal Flycatcher
- Cape Batis
- Chinspot Batis
- Pririt Batis
- Wattle-eyed Flycatcher
- Fairy Flycatcher
- Blueheaded Flycatcher
- Paradise Flycatcher
- African Pied Wagtail
- Longtailed Wagtail
- Cape Wagtail
- Yellow Wagtail
- Richard's Pipit
- Longbilled Pipit
- Plainbacked Pipit
- Buffy Pipit
- Striped Pipit
- Rock Pipit
- Europ Tree Pipit
- Buchveld Pipit
- Shortnailed Pipit
- Yellowbreasted Pipit
- Orangethr Longclaw
- Yellowthr Longclaw
- Lesser Grey Shrike
- Facal Shrike
- Redbacked Shrike
- Longtailed Shrike
- Southern Boubou
- Tropical Boubou
- Crimsonbreasted Shrike
- Puffbacked Shrike
- Brubru
- Southern Tchagra
- Threestreaked Tchagra
- Blackcrowned Tchagra
- Bokmakierie
- Gorgeous Bush Shrike
- Orangebr Bush Shrike
- Blackfrhd Bush Shrike
- Olive Bush Shrike
- Grayhd Bush Shrike
- White Helmetshrike
- Redbilled Helmetshrike
- Whitecrowned Shrike
- Indian Myna
- Pied Starling
- Wattled Starling
- Plumcoloured Starling
- Burchell's Starling
- Longtailed Starling
- Cape Glossy Starling
- Greater Blue-ear Starling
- Blackbellied Starling
- Redwinged Starling
- Palewinged Starling
- Redbilled Oxpecker
- Gurney's Sugarbird
- Malachite Sunbird
- Marico Sunbird
- Purplebanded Sunbird
- Lesser Doublecol Sunbird
- Greater Doublec Sunbird
- Yellowbellied Sunbird
- Whitebellied Sunbird
- Ducky Sunbird
- Grey Sunbird
- Olive Sunbird
- Scarlethr Sunbird
- Black Sunbird
- Collared Sunbird
- Cape White-eye
- Yellow White-eye
- Redbill Buffalo Weaver
- Whitebr Sparrow Weaver
- Sociable Weaver
- House Sparrow
- Great Sparrow
- Cape Sparrow
- Greyheaded Sparrow
- Yellowthr Sparrow
- Scalyfeathered Finch
- Thickbilled Weaver
- Forest Weaver
- Spectacled Weaver
- Spottedbacked Weaver
- Cape Weaver
- Masked Weaver
- Lesser Masked Weaver
- Golden Weaver
- Brownthroated Weaver
- Redheaded Weaver
- Cuckoo Finch
- Redbilled Quelea
- Red Bishop
- Golden Bishop
- Yellowrumped Widow
- Redshouldered Widow
- Whitewinged Widow
- Redcollared Widow
- Longtailed Widow
- Goldenbacked Pytilia
- Melba Finch
- Green Twinspot
- Pinkthroated Twinspot
- Redthroated Twinspot
- Bluebilled Firefinch
- Jameson's Firefinch
- Redbilled Firefinch
- Blue Waxbill
- Violeteared Waxbill
- Common Waxbill
- Blackcheeked Waxbill
- Grey Waxbill
- Swee Waxbill
- Quail Finch
- Orangebreasted Waxbill
- Cutthroat Finch
- Redheaded Finch
- Bronze Mannikin
- Redbacked Mannikin
- Red Mannikin
- Pintailed Whydah
- Shaftailed Whydah
- Paradise Whydah
- Broadtld Paradise Whydah
- Black Widowfinch w.c.
- Purple Widowfinch w.m.
- Steelblue Widowfinch
- Yelloweyed Canary
- Blackthroated Canary
- Cape Canary
- Forest Canary
- Blackheaded Canary
- Bully Canary
- Yellow Canary
- Whitethr Canary
- Streakyhead Canary
- Goldenbreasted Bunting
- Cape Bunting
- Rock Bunting
- Larklike Bunting

Table 7. Red Data Book fauna and flora likely to be found in the areas of the Mpendhle and Smithfield dam basins.

Plants	Category
Encephalartos ghellinckii	V *
Brunsvigia undulata	nt
Calpurnia woodii	V * ?
Cyrtanthus falcatus	nt
Disperis concinna	K
Eucomis humilis	nt
Eulophia zeyheriana	nt
Galtonia viridiflora	nt
Gerbera parva	nt
Gladiolus microcarpus ssp. microcarpus	nt
" oppositiflorus ssp. oppositiflorus	R * ?
Kniphofia fibrosa	nt
Nerine pancratioides	nt
Rhus krebsiana	nt
Satyrium microrrhynchum	K
Smodingium argutum	nt *
Vitellariopsis dispar	R

Birds

Bucorvus leadbeateri	Ground hornbill	V *
Ciconia nigra	Black stork	I
Falco peregrinus	Peregrine falcon	R
Geronticus calvus	Bald ibis	out of danger *
Gypaetus barbatus	Bearded vulture	R
Neophron percnopterus	Egyptian vulture	E
Gyps coprotheres	Cape vulture	V
Polemaetus bellicosus	Martial eagle	V
Turnix hottentotta	Black-rumped button quail	E
Grus carunculata	Wattled crane	E
Porzana pusilla	Baillon's crake	I
Sarothrura affinis	Striped flufftail	R
Neotis denhami	Stanley's bustard	V
Poicephalus robustus	Cape parrot	V
Tyto capensis	Grass owl	I
Hirundo atrocaerulea	Blue swallow	E
Anthus chloris	Yellow-breasted pipit	V

Herpetofauna

Lamprophis fuscus	Yellow-bellied house snake	R
Tetradactylus breyeri	Breyer's long tailed seps	R
Leptopelis xenodactylus	Long-toed tree frog	Restricted
Bradypodion thamnobates	Midlands dwarf chameleon	Restricted

Mammals

Mystromys albicaudatus	White-tailed mouse	V
Felis lybica	African wild cat	V
Orycteropus afer	Antbear	V *
Poccilogale albinucha	African striped weasel	R

* recorded during this survey. ? indicates that the plant observed could belong to that taxon but cannot be considered a certainty as no flowers were observed or that the plant does not match up fully to specimens in the National Herbarium, Pretoria.

E = endangered; V = vulnerable; R = rare; I = indeterminate; K – insufficiently known ; nt = not threatened at the time of the report; Restricted = the species has a restricted distribution; Out of danger = the species is considered safe at the time of the report but should be monitored in case the situation changes.