# 5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

## 5.1 CLIMATE

The Groot Letaba River is an international river with headwaters in the high rainfall Izintaba Zokhahlamba (Drakensberg) mountain range. The river then flows through drier arid regions into the Kruger National Park (KNP) and then on to Mozambique.

### 5.1.1 Temperature

Temperature ranges from the Tzaneen Station are indicated in **Table 5.1**.

**Table 5.1: Temperature of the Groot Letaba catchment area**

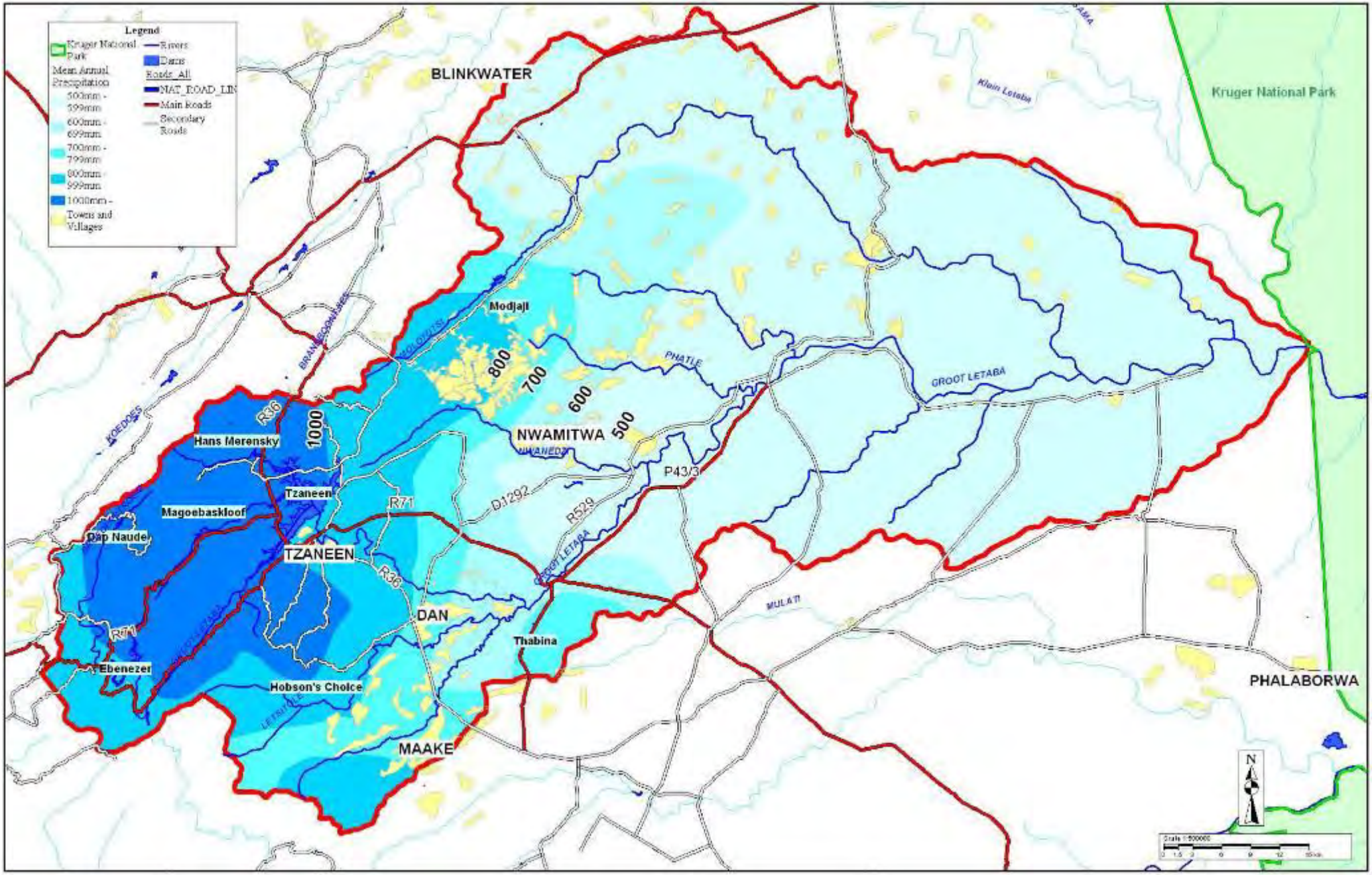
| | Minimum ($^0$C) | Maximum ($^0$C) | Average ($^0$C) |
|---|---|---|---|
| Summer | 20.3 | 27.9 | 26.3 |
| Winter | 15.3 | 20.8 | 17.6 |

### 5.1.2 Rainfall

The mountainous topography results in a much higher rainfall with the Mean Average Precipitation (MAP) varying between 700 mm – 1500 mm in the mountainous region. The MAP for the remainder of the catchment varies from 450 mm – 800 mm. The data is evidence that most of the rainfall occurs in the western mountainous region of the study area (**Figure 5.1**).

Most of the rainfall is seasonal with more than 85 % occurring during the summer months. The peak rainfall months are January and February.

The rate of evaporation increases from 1500 mm/a in the western plains to 1900 mm/a in the mountainous east. Approximately 60 % of the evaporation occurs during the summer months from October to March.




| | | | | |
|---|---|---|---|---|
| water & forestry | ILISO CONSULTING | GROOT LETABE RIVER WATER DEVELOPMENT PROJECT (GLeWaP) | RAINFALL DISTRIBUTION | FIGURE 5.1 |

## 5.2 GEOLOGY, SOILS AND TOPOGRAPHY

The Greater Tzaneen Local Municipality area, is characterised by mountainous, inaccessible terrain in the west and south, and even topography (gentle slopes) to the north and east. The Greater Letaba, Greater Giyani and Ba-Phalaborwa municipal areas are flatter than the rest of the study area.

The geology of the proposed Nwamitwa dam site consists of Goudplaa Gneiss from the Swazian age. Underlying this is granite gneiss and diabase dykes. The Granite rocks surround various formations of the Petersburg group. The most widespread type is Leucocratic biotite genies, probably tonalitic in composition and shows clear intrusive relationships. The area is also characterised by numerous diabase dykes parallel to the Tzaneen lineament.

In the Southwest of the study area these granites are expected to be deeply weathered (up to 20 m) resulting in silty soils. The rest of the Groot Letaba catchment is made up of granites that allow shallow weathering (less than 10 m) and the soils formed are expected to be more sandy.

The Groot Letaba Catchment area can be divided into three zones.

- The Mountainous zone, which forms the headwater and originated at about 1600 masl in the Broederstroom Woodbrush forestry area. The two headwaters are the Broederstroom and Helpmekaar streams. These two streams join in the Ebenezer Dam to form the Groot Letaba River. From here the river drops steeply through the mountainous zone to the Tzaneen Dam. From the Tzaneen Dam the Groot Letaba flows through the

- From the Tzaneen Dam the Groot Letaba River flows through the Low mountainous foothills zone to the confluence of the Letsitele River. From here it meanders across the

- From the confluence of the Letsitele River, the Groot Letaba River meanders across the plains for a distance of 400 km before flowing into the Olifants River 7 km upstream of the Mozambique border. The proposed Nwamitwa Dam will

inundate an area of the Nwanedzi River (upstream from the GLR/Nwanedzi confluence) from where it meanders through the plains zone. The Plains zone extends eastwards and northwards to the Lebombo and Soutpansberg mountains. Slopes rarely exceed a 5% gradient and the altitude ranges from 200 m in the east to 600 m in the west.

The soils in the drier part of the proposed Nwanedzi Dam site are generally alkaline, shallow silty to sandy. The residual soils, where present, are usually between 1,5 to 2 m thick, coarsely textured, non-cohesive and consist mostly of quartz and feldspar aggregates.

The soil forms mainly present are the Hutton and Shortlands. Hutton soils have Orthic A horizon overlaying a red apedal B and have series Faringham, Balmoraa, Msinga, Doveton and Vimy. The Shortlands soil form has an Orthic A horizon over a red structured B horizon and have series Argent, Richmond and Shortlands present in the area. Possible problems can be that the sandy soils present upstream from the GLR in the Nwanedzi River as these are very permeable, resulting in a high infiltration and thus reducing run off. The silty soils will be able to absorb large quantities of water but once saturated runoff will increase. It should be noted that where vegetation cover is destroyed, the soils are susceptible to extreme erosion which in turn will cause an increase in sedimentation in the river channels which might require rehabilitation measures.

## 5.3 SURFACE WATER

The Groot Letaba River rises in the western part of the catchment and flows in an easterly direction. The most important tributaries of the Groot Letaba River are the Letsitele River and the Nwanedzi River.

The Letaba River Catchment has a surface area of approximately 13 500 $km^2$. The relevant sub-catchments relevant to this study are:

- Groot Letaba River (upper 650 $km^2$ and lower 2 260 $km^2$);
- Letsitele River (480 $km^2$); and
- Nwanedzi River (410 $km^2$).

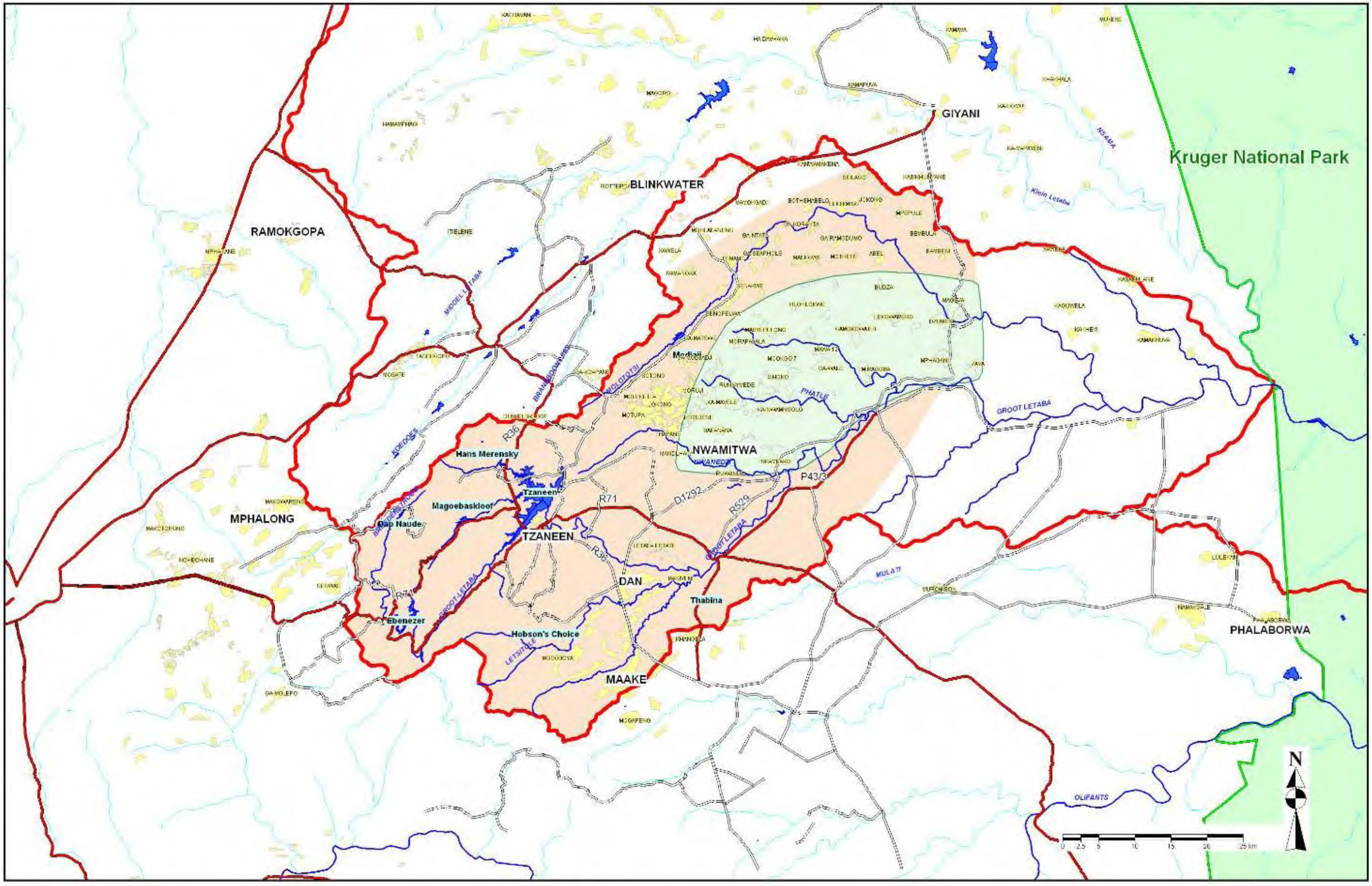
The proposed dam site falls within the Groot Letaba River (lower) sub-catchment which is a relatively large sub-catchment measuring about 2 260 $km^2$ in extent

According to the Internal Strategic Perspective (ISP) (DWAF: 2004) the surface water resources within this sub-catchment are extensively developed with a large number of small to major dams constructed to meet domestic (urban and rural), irrigation and industrial water needs. This is seen in **Figure 5.2.** The water supply schemes generally consist of dams for storage, bulk water pipelines and canals for conveyance.

The gross surface water availability in the Groot Letaba sub-area is estimated at 168 million $m^3$ per annum which is derived from the yield of the Tzaneen and Ebenezer dams as well as significant run-of-river abstractions. The Tzaneen Dam, if operated in isolation, provides a yield of approximately 60 million $m^3$ annum. However, when operated in a systems context to supply water to irrigators downstream only when the run-of-river flows are inadequate, the total yield is much greater.

Invasive Alien Plants reduce the yield by a further 10 million $m^3$ per annum, resulting in the available surface water resource being 133 million $m^3$ per annum (at a 1:50 year assurance). The historical yield of the Ebenezer Dam is quoted in the Groot Letaba Feasibility Study report as 23, 9 million $m^3$ per annum, which is much less than the 31, 7 million $m^3$ per annum given in White Paper WP I '84. Allocations have been based on the yield of 31, 7 million $m^3$ per annum and the dam is therefore now over-allocated.

Return flows are available for re-use and, in general, contribute to the available resource. In the Groot Letaba catchment there are undoubtedly substantial return flows from irrigation in the catchment. These are estimated to contribute 13 million $m^3$ per annum to the available water resources in the Groot Letaba. This estimate is based on a 10% return flow, which is typical of return flows from irrigation. However, it should be noted that irrigation practices in the Groot Letaba are known to be very efficient and that the return flow estimate used in the NWRS could be too high.




**Legend**

- Kruger National Park
- Groot Letaba Catchment
- Project Area
- Towns and Villages
- Bulk Water Distribution Area
- WMA_Letaba
- Rivers
- Dams
- Roads_All
- NAT_ROAD_LINKS
- Main Roads
- Secondary Roads

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**GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)**

**DAMS IN THE GROOT LETABA CATCHMENT**

**FIGURE 5.2**

Date: September 2007
Map Ref: P:\...\Letaba.mxd
System: WGS 84 Lat/Long

## 5.4 WATER QUALITY

The water quality in the Groot Letaba River is of a good quality with respect to irrigation, domestic use and the aquatic ecology, especially in the upper reaches. The quality of the water deteriorates somewhat in the lower reaches due to salination from natural sources, as well as nutrient enrichment due to human activities such as the discharge of treated domestic wastewater and run-off from agricultural areas.

## 5.5 BIODIVERSITY

Although the proposed project will only impact on the terrestrial ecology in the direct local vicinity of the dam, road re-alignment and bulk water supply infrastructure, this section describes the entire study area as indicated on **Figure 1.1**. The extensive lists of species used for the scoping process are included in **Appendix A** which is not attached to the draft report for public comment.

### 5.5.1 Centres of Endemism

The project area is not situated in any Centres of Plant Endemism[2] (sensu Van Wyk & Smith, 2001).

### 5.5.2 Vegetation Types

According to the new vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006), the project area covers ten different vegetation types (**Table 5.2** and **Figure 5.3**).

[2] A centre of plant endemism is an area that is distinguished by high concentrations of endemic plant species

**Table 5.2: Status and extent of vegetation types represented in the project area**

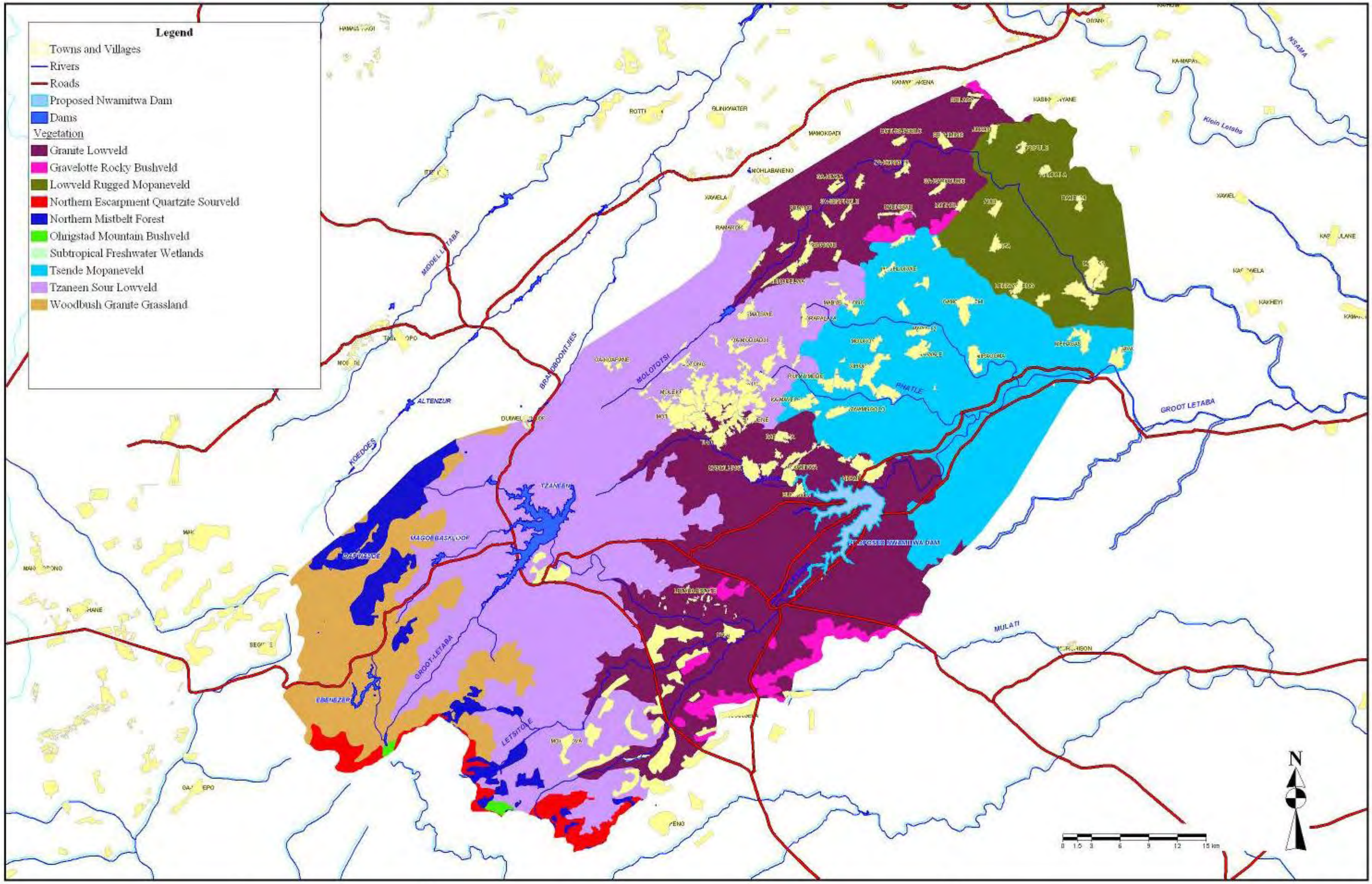
| Vegetation Type | Ecosystem Status | Area (ha) | % of total |
|---|---|---|---|
| Granite Lowveld | Vulnerable | 24 104 | 6.92 |
| Gravelotte Rocky Bushveld | Least Threatened | 4 480 | 1.29 |
| Lowveld Rugged Mopaneveld | Least Threatened | 17 737 | 5.09 |
| Northern Escarpment Quartzite Sourveld | Vulnerable | 4 424 | 1.27 |
| Northern Mistbelt Forest | Least Threatened | 9 988 | 2.87 |
| Origstad Mountain Bushveld | Least Threatened | 403 | 0.12 |
| Subtropical Freshwater Wetlands | Least Threatened | 63 | 0.02 |
| Tsende Mopaneveld | Least Threatened | 23 903 | 6.86 |
| Tzaneen Sour Bushveld | Endangered | 53 368 | 15.31 |
| Woodbush Granite Grassland | Critically Endangered | 6 097 | 1.75 |
| Transformed and Degraded | Not Threatened | 203 955 | 58.50 |
| Total | | 348 522 | 100.00 |

**Legend**

- Towns and Villages
- Rivers
- Roads
- Proposed Nwamitwa Dam
- Dams

Vegetation

- Granite Lowveld
- Gravelotte Rocky Bushveld
- Lowveld Rugged Mopaneveld
- Northern Escarpment Quartzite Sourveld
- Northern Mistbelt Forest
- Olnigstad Mountain Bushveld
- Subtropical Freshwater Wetlands
- Tsende Mopaneveld
- Tzaneen Sour Lowveld
- Woodbush Granite Grassland




| | | | | |
|---|---|---|---|---|
| Legend | water & forestry<br>Department:<br>Water Affairs and Forestry<br>REPUBLIC OF SOUTH AFRICA | ILISO CONSULTING | **GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)** | **VEGETATION MAP** | **FIGURE 5.3**<br>Date September 2007<br>Map Ref P:/..\Letaba.map<br>System WGS 84 Lat/Long<br>COPYRIGHT RESERVED |

A list of conservation-important plant species is derived from the South African Biodiversity Institute's (2007) interim Red Data list and from the PRECIS database for the quarter-degree squares 2329DD, 2330AD, BC, CA, CB, CC, CD, DA, DC, 2430AA is included in **Appendix A-1**. Species were screened to only include those likely to be associated with the vegetation type and habitats represented in the project area. Protected[3] species, Endemic species, and Red Data species were highlighted in the lists, using the above references.

### 5.5.3 Fauna

The lists of conservation-important animals potentially occurring in the study area comprises mammals (**Appendix A-2**), birds (**Appendix A-3**), reptiles and amphibians (**Appendix A-4**) and Invertebrates (**Appendix A-5**).

### 5.5.4 Conservation Importance

Based on assessment criteria developed for the baseline study (**Table 5.3** and **Table** 5.4), each conservation-important plant and animal species listed in the Appendices was assigned a conservation importance status (eg. High, Medium, Low) per vegetation type the species would potentially occur in. Vegetation types were then ranked according to inherent species importance distributions[4]; the highest rank going to the vegetation type with the greatest number of species of Very High importance, and so on (**Table 5.11 – Table 5.15**).

Rankings were then subjectively clustered into High, Medium and Low categories[5] on the basis of the numbers and importance levels of species represented within each of their respective vegetation types. Thus each vegetation type was assigned a conservation importance rating for each biotic element represented.

[3] Either in terms of the Limpopo Environmental Management Act (No. 7 of 2003) or the National Forests Act (Act 84 of 1998).
[4] The invertebrate specialist applied a scoring system whereby importance levels were multiplied by probability of occurrence (High importance and High probability scoring high, and vice versa).
[5] It must be emphasised that these categories are only applicable at project scale

### Table 5.3: Framework of criteria for assessing Conservation Importance[6] of Flora

| IUCN Red Data Status | Flora | | | |
|---|---|---|---|---|
| | Distribution in SA confined to Limpopo Province | | Widely distributed in SA | |
| | Non-protected | Protected | Non-protected | Protected |
| CR, EN | Very High | Very High | Very High | Very High |
| VU, NT | High | Very High | Medium | High |
| LC, DD, STBA | Medium | High | Low | Medium |
| None | Low | Medium | Very Low | Low |

CR = Critically Endangered

EN = Endangered

VU = Vulnerable

NT = Near-Threatened

LC = Least Concern

DD = Data Deficient

STBA = Status to be announced

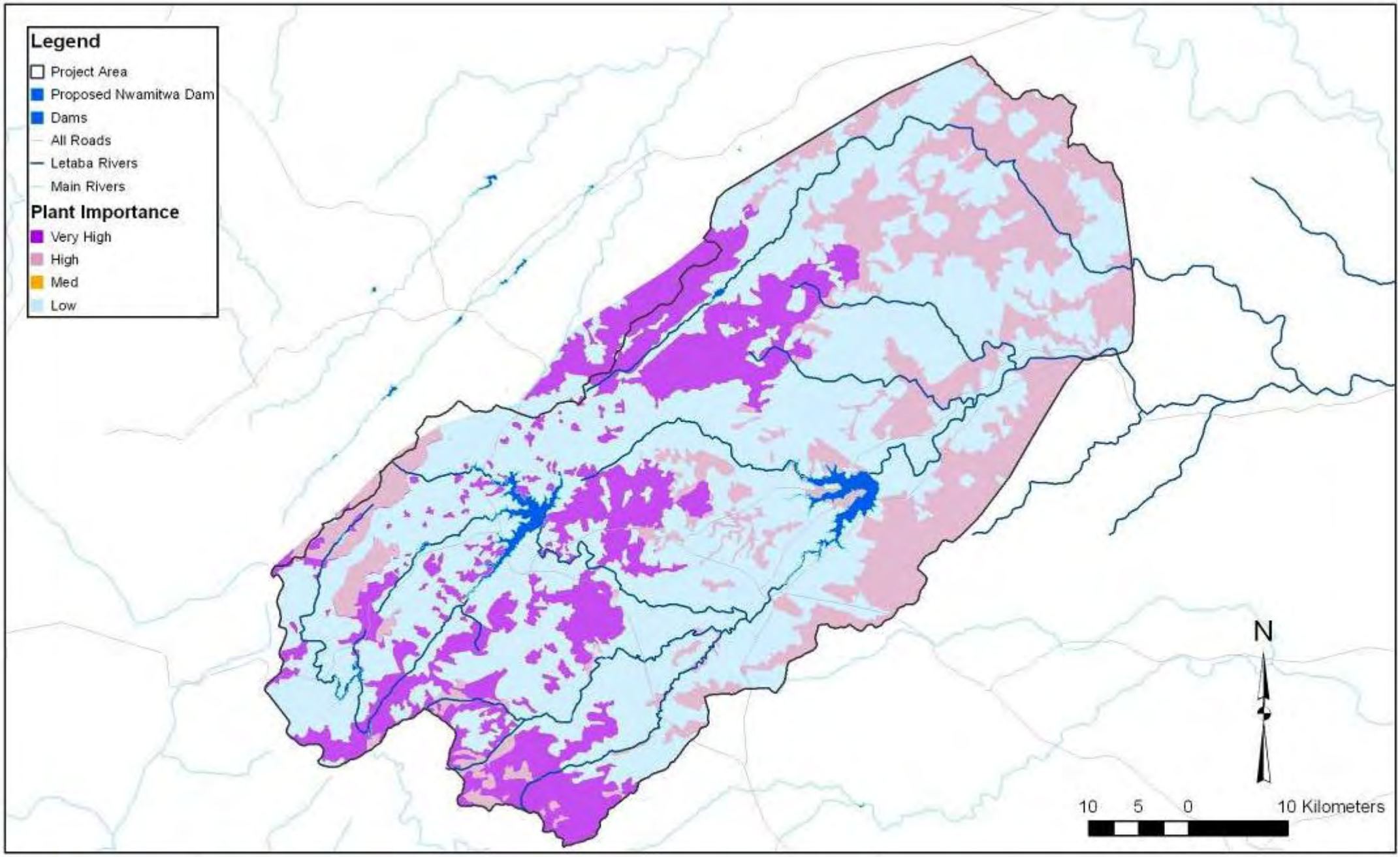
### Table 5.4: Framework of criteria for assessing Conservation Importance of Fauna

| Red Data Status | Breeding / Foraging | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Local Endemic | | Regional Endemic | | National Endemic | | Global | |
| | NonProt | Prot | NonProt | Prot | NonProt | Prot | NonProt | Prot |
| CR, EN | Very High | Very High | Very High | Very High | Very High | Very High | Very High | Very High |
| VU, NT | High | Very High | High | Very High | High | High | High | High |
| DD | Medium | High | Medium | High | Medium | Medium | Medium | Medium |
| LC, None | Medium | High | Low | Medium | Low | Medium | Low | Medium |

[6] The conservation-importance ratings of plant species listed by SANBI (2007) as 'rare' were elevated by one level

| Red Data Status | Foraging Only | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Local Endemic | | Regional Endemic | | National Endemic | | Global | |
| | NonProt | Prot | NonProt | Prot | NonProt | Prot | NonProt | Prot |
| CR, EN | High | High | High | High | High | High | High | High |
| VU, NT | Medium | High | Medium | High | Medium | Medium | Medium | Medium |
| DD | Low | Medium | Low | Medium | Low | Low | Low | Low |
| LC, None | Low | Medium | Very Low | Low | Very Low | Low | None | Low |

The conservation importance levels assigned to each vegetation type were then applied to the vegetation types on the vegetation map (**Figure 5.3**) to provide a first-approximation spatial 'sensitivity' profile for each of the biota represented in the project area (**Figure 5.4** to **Figure 5.8**).

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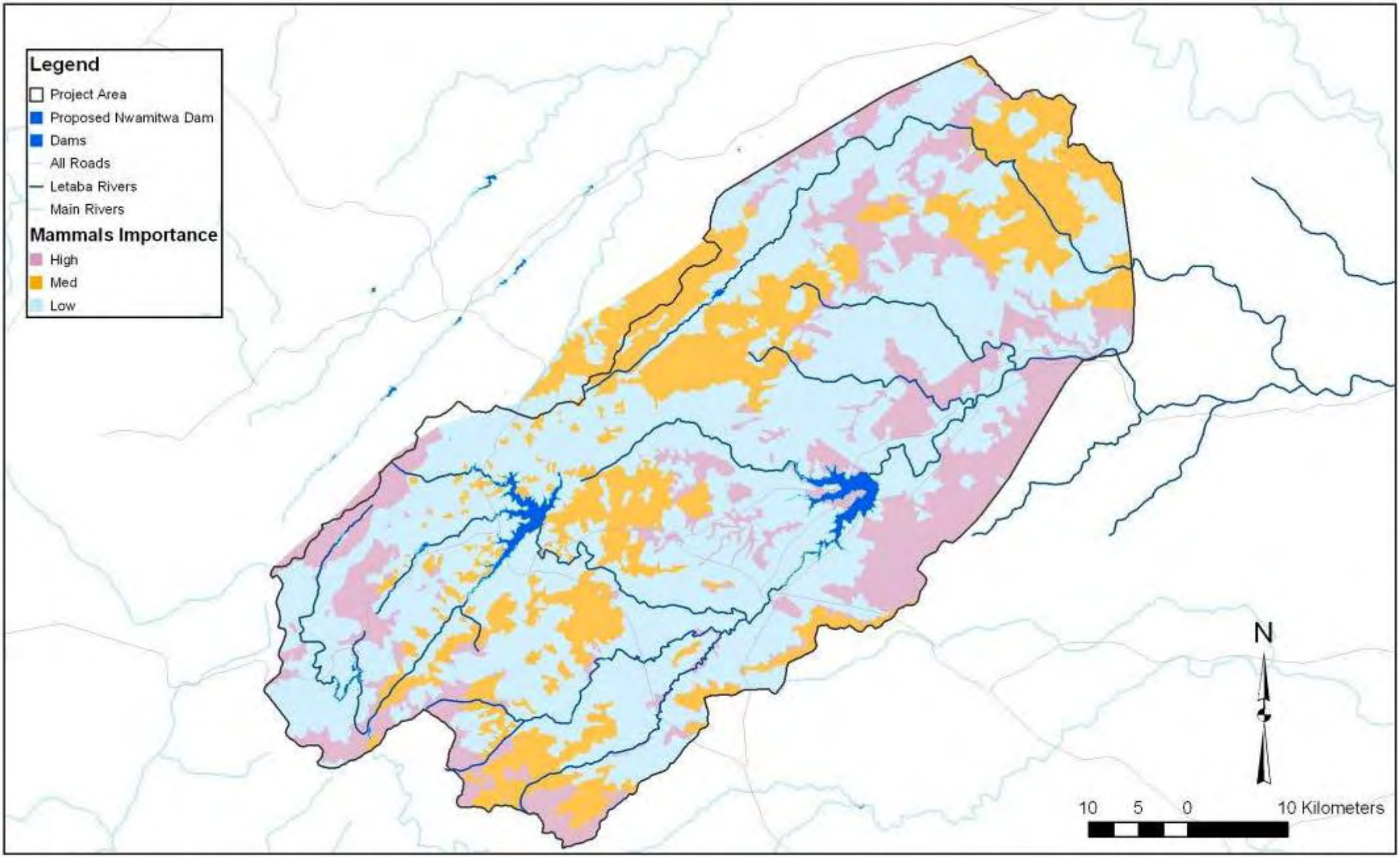
**GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)**

**CONSERVATION IMPORTANCE OF PLANTS**

**FIGURE 5.4**

Date : September 2007
Map Ref : P:/Letaba_Plants.mxd
System : ArcGIS

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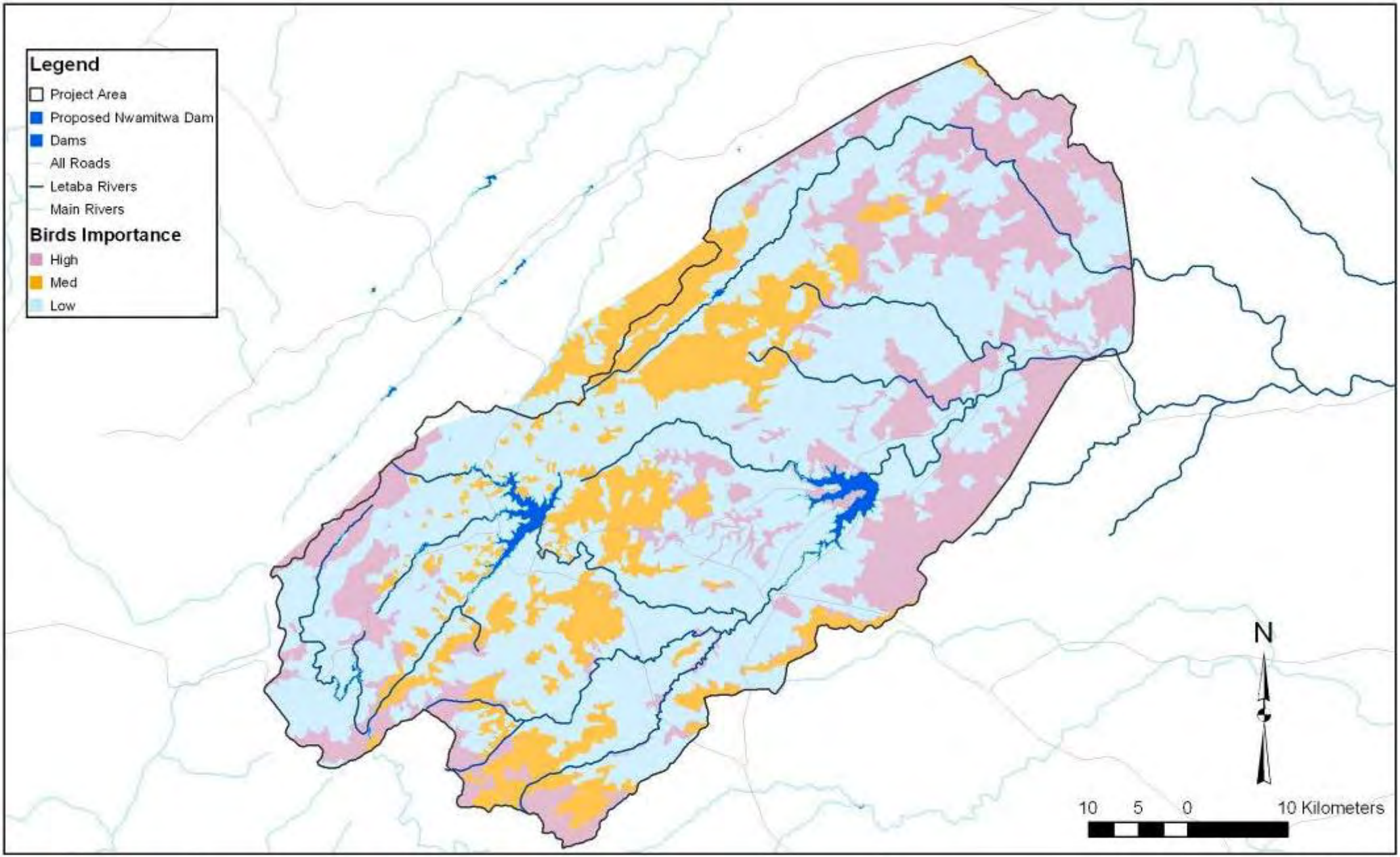
**GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)**

**CONSERVATION IMPORTANCE OF MAMMALS**

**FIGURE 5.5**

Date : September 2007
Map Ref : P:/ /Letaba_Plants.mxd
System : ArcGIS

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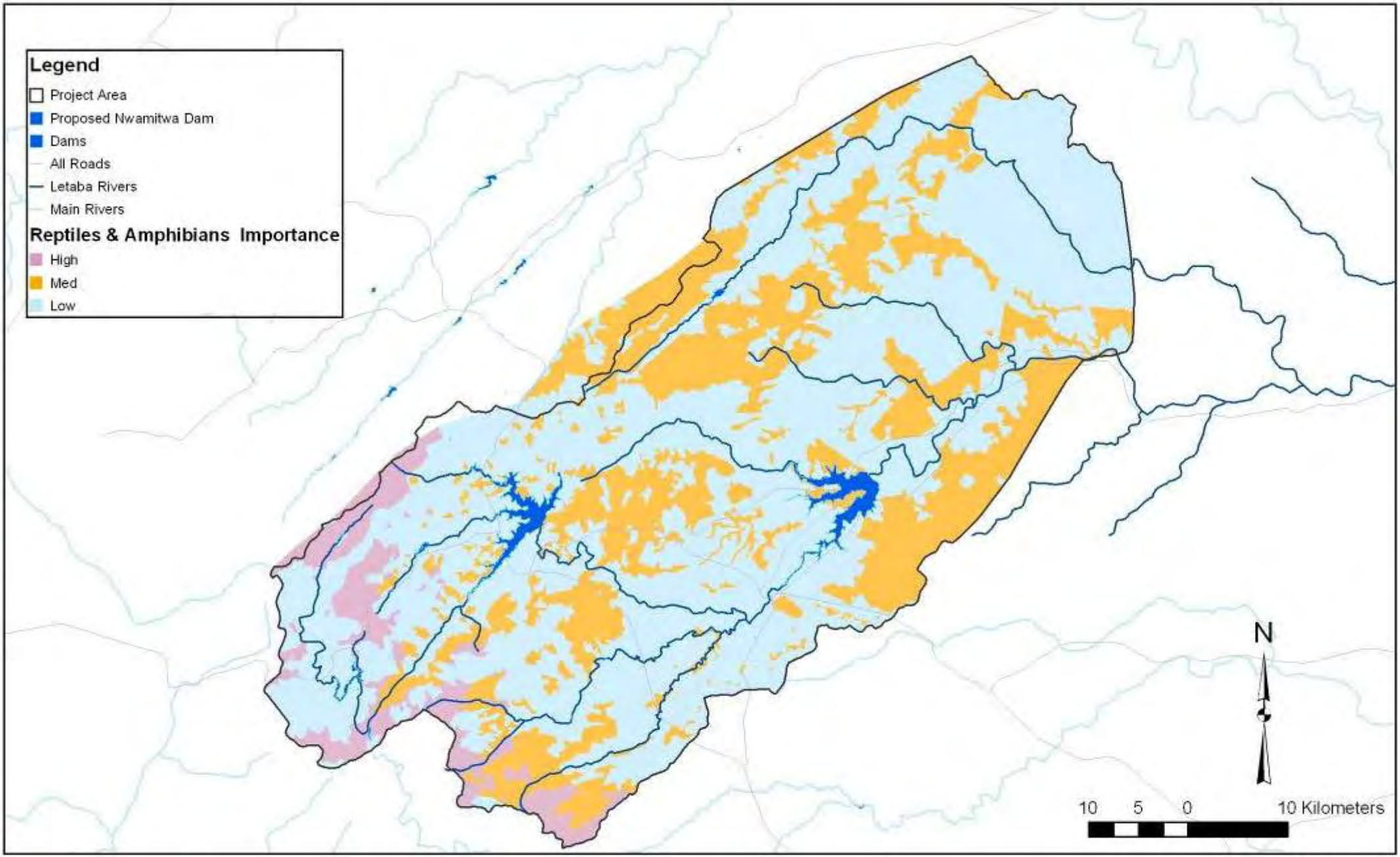
**GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)**

**CONSERVATION IMPORTANCE OF BIRDS**

**FIGURE 5.6**

Date : September 2007
Map Ref : P:/Letaba_Plants.mxd
System : ArcGIS

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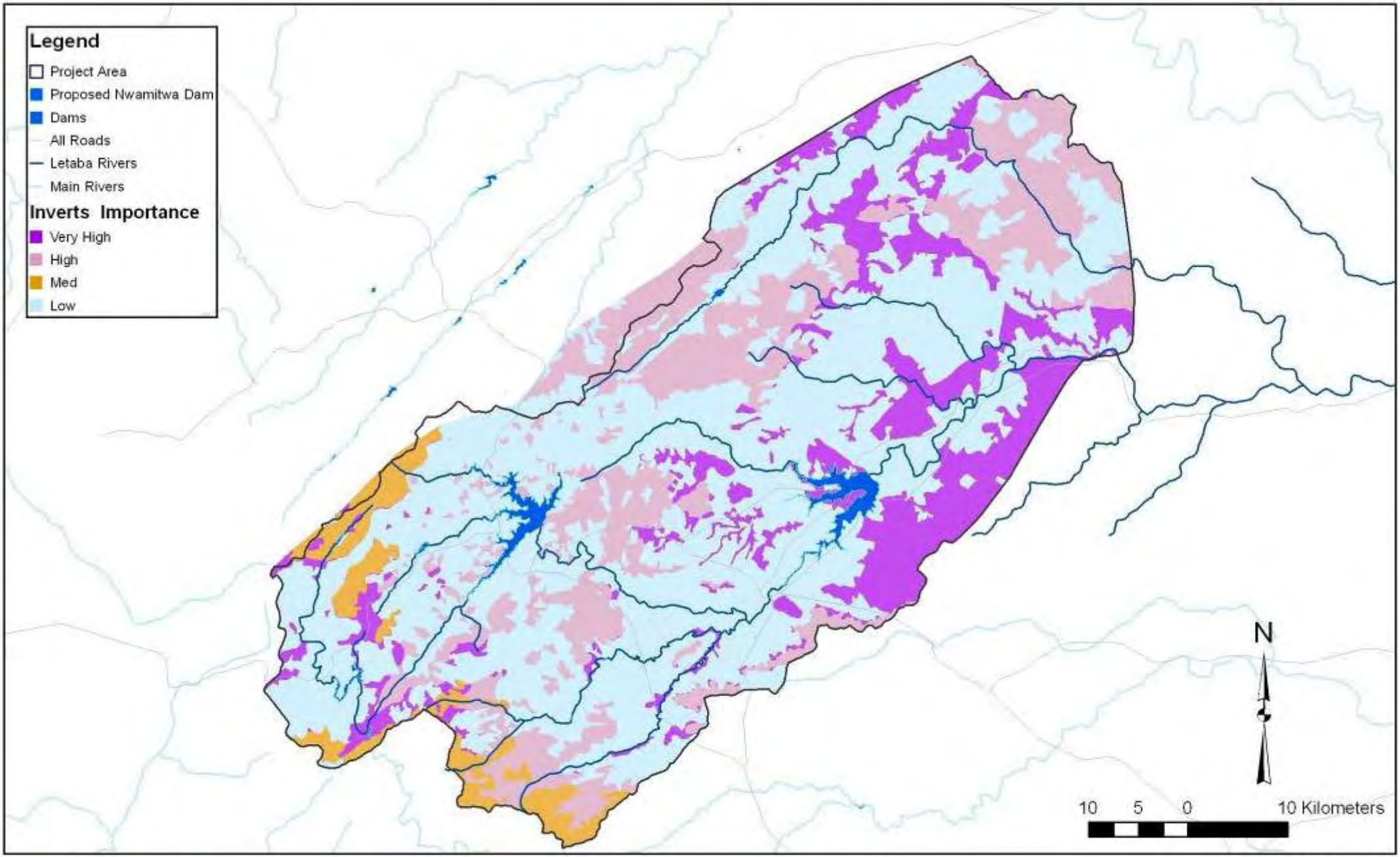
**GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)**

**CONSERVATION IMPORTANCE OF REPTILES & AMPHIBIANS**

**FIGURE 5.7**

Date : September 2007
Map Ref : P:/ /Letaba_Plants.mxd
System : ArcGIS

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**GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)**

**CONSERVATION IMPORTANCE OF INVERTS**

**FIGURE 5.8**

Date : September 2007
Map Ref : P:/ /Letaba_Plants.mxd
System : ArcGIS

### 5.5.5 Potential Biodiversity

**Table 5.5** provides a summary of the important plant and animal species that could potentially occur in the study area. Applying the precautionary principle, a total of 256 species of Red Data flora and fauna species could potentially occur (147 plant, 45 mammal, 48 bird, 9 reptile & amphibian, and 7 invertebrate). Moreover, at least 107 species could be endemic or near-endemic (locally or regionally), and 284 are likely to be protected.

**Table 5.5: Numbers of important biotic taxa potentially present in the project area**

| Biotic group | Red Data | Endemic/Near-endemic7 | Protected | Total |
|---|---|---|---|---|
| Plants | 147 | 30 | 176 | 271 |
| Mammals | 45 | 4 | 34 | 64 |
| Birds | 48 | 15 | 33 | 62 |
| Reptiles | 9 | 36 | 8 | 43 |
| Invertebrates | 7 | 22 | 33 | 42 |
| Total: | 256 | 107 | 284 | 482 |

#### Plants

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.6**

[7] Floristic endemism is determined at the scale of Limpopo Province, whilst faunal endemism is determined at a national (SA) or provincial (LIM) scale

**Table 5.6: Numbers of conservation-important plant species potentially occurring in each vegetation type**

| Category | Vegetation Types | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Origstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Bushveld | Woodbush Granite Grassland |
| Red Data | 18 | 18 | 15 | 58 | 35 | 52 | 12 | 16 | 51 | 47 |
| Endemic | 4 | 2 | 3 | 10 | 7 | 8 | 0 | 4 | 11 | 7 |
| Protected | 27 | 21 | 21 | 58 | 66 | 41 | 11 | 24 | 59 | 53 |
| TOTAL | 36 | 31 | 29 | 98 | 83 | 84 | 18 | 33 | 91 | 86 |

**Mammals**

At least 64 conservation-important mammal species potentially occur within the project area. Of these, a significant proportion (45 species) has Red Data status (**Table 5.5**). However, 22 of these mammals have been assigned the status Data Deficient, as insufficient data are available to assess their Red Data status. Some of these species, particularly the shrews and some of the rodents, may prove to be more common than thought and not justify inclusion on the national Red Data list in the future. Seven species have urgent threat status, three of which are considered Endangered and four are Vulnerable. Only four of the mammals potentially occurring are endemic to South Africa, and 34 are protected, either under the National Environmental Management: Biodiversity Act (Act 10 of 2004) or the Limpopo Environmental Management Act (Act 7 of 2003).

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.7**.

**Table 5.7: Numbers of conservation-important mammal species potentially occurring in each vegetation type**

| Category | Vegetation Types | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Lowveld | Woodbush Granite Grassland |
| Red Data | 36 | 31 | 34 | 22 | 11 | 29 | 16 | 36 | 34 | 24 |
| Endemic | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 3 |
| Protected | 27 | 20 | 25 | 16 | 6 | 15 | 5 | 27 | 19 | 17 |
| TOTAL | 52 | 43 | 49 | 32 | 15 | 39 | 19 | 52 | 46 | 34 |

### Birds

Approximately 62 conservation-important bird species potentially occur within the study area (**Table 5.5**). Of these, 48 species (77%) have Red Data status. Twenty-five of these have urgent threat status. Two are considered Critically Endangered, deserving urgent conservation attention. One species is considered Endangered and 22 are Vulnerable. Fifteen of the bird species potentially occurring are endemic to South Africa, and 33 are protected under the National Environmental Management: Biodiversity Act (Act 10 of 2004) or the Limpopo Environmental Management Act (Act 7 of 2003).

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.8**.

**Table 5.8: Numbers of conservation-important bird species potentially occurring in each vegetation type**

| Category | Vegetation Types | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Lowveld | Woodbush Granite Grassland |
| Red Data | 34 | 17 | 28 | 14 | 8 | 18 | 19 | 32 | 34 | 16 |
| Endemic | 1 | 1 | 1 | 9 | 10 | 3 | 0 | 1 | 9 | 8 |
| Protected | 24 | 13 | 19 | 10 | 3 | 10 | 12 | 23 | 21 | 12 |
| TOTAL | 38 | 19 | 31 | 21 | 16 | 20 | 20 | 36 | 42 | 23 |

**Reptiles & Amphibians**

Approximately 43 conservation-important reptiles and amphibians potentially occur within the project area (Table 4). Nine of these have Red Data status, one of which is considered Extinct. Five species have urgent threat status, and are considered Vulnerable. The remaining three species are Near-threatened. However, a conservation assessment of South Africa's reptiles is underway, and a number of other species may obtain Red Data status in the near future. Thirty-six reptile and amphibian species are endemic to South Africa, of which four are confined to the mountains between Woodbush and the Wolkberg. Eight species are protected under the National Environmental Management: Biodiversity Act (Act 10 of 2004) or the Limpopo Environmental Management Act (Act 7 of 2003).

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.9**.

**Table 5.9: Numbers of conservation-important reptile and amphibian species potentially occurring in each vegetation type**

| Category | Vegetation Types | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Lowveld | Woodbush Granite Grassland |
| Red Data | 3 | 1 | 2 | 5 | 3 | 1 | 3 | 3 | 2 | 6 |
| Endemic | 3 | 6 | 5 | 25 | 9 | 9 | 0 | 3 | 16 | 27 |
| Protected | 7 | 4 | 6 | 2 | 1 | 2 | 4 | 7 | 7 | 2 |
| TOTAL | 10 | 9 | 10 | 26 | 9 | 11 | 4 | 10 | 21 | 28 |

**Invertebrates**

Twenty Red-Listed invertebrate species (9 butterfly, 6 dragonfly and 5 damselfly species) are known to occur in Limpopo Province (G. Henning pers com, M. Samways pers comm.). However, the brevity of this list is largely due to the paucity of data on the conservation status of invertebrate species, and additional groups that include species of concern in South Africa were therefore also considered in this desktop study. The invertebrate groups considered were scorpions (Arachnida: Scorpiones), trapdoor and baboon spiders (Arachnida: Araneae: Mygalomorphae), dragonflies and damselflies (Odonata), ground beetles (Coleoptera: Carabidae) and butterflies (Lepidoptera: Papilionoidea and Hesperiodea). The assessment thus covers all invertebrate taxa including currently Red Data listed and Protected species in the Province.

At least 42 conservation-important invertebrate species potentially occur within the greater project area (**Table 5.5**). Among these are seven currently Red Data listed species, 22 endemic either to Limpopo Province or to north-eastern South Africa and 33 protected under the National Environmental Management: Biodiversity Act (Act 10 of 2004). None of the invertebrate species predicted for the project area are listed by CITES.

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.10**.

**Table 5.10: Numbers of conservation-important invertebrate species potentially occurring in each vegetation type**

| Category | Vegetation Types | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granita Lowveld | Gravelotte Rocky Bushveld | Lowveld Ruggd Mopaneveld | Norhtern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Moutain Bushveld | Subtropical Freshwater Wetlands * | Tsende Mopaneveld | Tzaneen Sour Bushveld | Woodbush Granite Grassland |
| Red Data | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 4 |
| Endemic | 13 | 13 | 11 | 12 | 2 | 9 | (9) | 11 | 16 | 17 |
| Protected | 30 | 30 | 29 | 18 | 1 | 18 | (19) | 29 | 33 | 26 |
| TOTAL | 31 | 31 | 29 | 23 | 5 | 20 | (19) | 29 | 34 | 32 |

* All species of concern predicted for this vegetation type would be expected to inhabit only the periphery of the wetlands.

### 5.5.6 Conservation Importance per vegetation type

#### Plants

The conservation importance of each of the species predicted for the project area is indicated in **Appendix A-1**. Red Data categories are in accordance with IUCN 2001 categories (IUCN, 2000) and are based on the South African National Biodiversity Institute's interim Red Data list (SANBI, 2007).

Vegetation types are ranked and assigned importance ratings ranging from Medium to Very High (**Table5.15**).

**Table 5.11: Plant importance per vegetation type**

| Importance value | Number of species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Origstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Bushveld | Woodbush Granite Grassland |
| Very high | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 2 | 2 |
| High | 4 | 3 | 3 | 8 | 7 | 5 | 1 | 3 | 8 | 5 |
| Med | 6 | 6 | 4 | 17 | 12 | 11 | 4 | 6 | 12 | 15 |
| Low | 26 | 22 | 22 | 71 | 63 | 66 | 13 | 24 | 69 | 64 |
| RANK | 6 | 8 | 9 | 1 | 4 | 5 | 10 | 7 | 2 | 3 |
| Overall importance | High | High | High | Very High | High | High | Med | High | Very High | Very High |

The three most important vegetation types for potential plants of conservation concern are Northern Escarpment Quartzite Sourveld, Woodbush Granite Grassland (both grassland types), and Tzaneen Sour Bushveld (savanna type). The Very High importance value of the grassland vegetation types is driven by the possible occurrence of the leguminous suffrutex Argyrolobium muddii (Endangered) and the ground orchid Disa aristata (Vulnerable, Protected, Endemic). The epiphytic orchid Oberonia disticha (Near-Threatened, Protected, Endemic) and the succulent Aloe monotropa (Vulnerable, Protected, Endemic) are the species that, if present, would give the savanna type a rating of Very High importance.

Northern Mistbelt Forest, Origstad Mountain Bushveld, Granite Lowveld, Tsende Mopaneveld, Gravelotte Rocky Bushveld and Lowveld Rugged Mopaneveld appear to be slightly less important, whilst Subtropical Freshwater Wetlands are of least importance (**Figure 5.4**).

### Mammals

The conservation importance of each of the mammal species predicted for the project area is indicated in **Appendix A-2**. Red Data status was derived from Friedman & Daly (2004) and is in accordance with IUCN 2001 categories (IUCN, 2000).

Vegetation types are ranked and assigned importance ratings ranging from Low to High (**Table 5.12**).

**Table 5.12: Mammal importance per vegetation type**

| Importance Value | Number of species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Bushveld | Woodbush Granite Grassland |
| Very High | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| High | 18 | 15 | 17 | 8 | 3 | 13 | 9 | 18 | 17 | 10 |
| Medium | 33 | 28 | 32 | 22 | 11 | 25 | 10 | 33 | 29 | 23 |
| Low | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANK | 1 | 8 | 6 | 4 | 5 | 9 | 10 | 2 | 7 | 3 |
| Overall Importance | High | Med | Med | High | High | Med | Low | High | Med | High |

The most important vegetation types for conservation-important mammals appear to be two savannah types, namely Granite Lowveld and Tsende Mopaneveld (**Figure** 5.5). These importance values are driven by the presence of an Endangered mammal, Tsessebe (Damaliscus lunatus), and a number of other Vulnerable mammals, within protected areas in the Lowveld (e.g. Ndzalama Private Game Reserve, Hans Merensky Game Reserve). Two high-altitude grassland types also have High importance, particularly because of the presence of an Endangered, locally endemic mammal: Gunning's Golden Mole (Neamblysomus gunningi). Even though Northern Mistbelt Forest has the lowest number of conservation-important mammals, it has a High importance value because it supports significant population of an Endangered mammal: Samango Monkey (Cercopithecus mitis labiatus). Four

savannah vegetation types have a Medium importance value because of the occurrence of numerous Vulnerable, Near Threatened and Data Deficient mammals. Subtropical Freshwater Wetlands rate as having Low importance mainly because of the small size of the wetlands, and the low number of aquatic-associated mammals.

### Birds

The conservation importance of each of the bird species predicted for the project area is indicated in **Appendix A-3**. Red Data status was derived from Barnes (2000) and is in accordance with IUCN 2001 categories (IUCN, 2000).

Vegetation types are ranked and assigned importance ratings ranging from Low to High (**Table 5.13**).

**Table 5.13: Bird importance per vegetation type**

| Importance Value | Number of species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Bushveld | Woodbush Granite Grassland |
| Very High | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| High | 23 | 14 | 21 | 8 | 7 | 9 | 4 | 19 | 14 | 9 |
| Medium | 12 | 3 | 7 | 5 | 0 | 9 | 16 | 14 | 21 | 6 |
| Low | 2 | 2 | 2 | 6 | 6 | 2 | 0 | 2 | 6 | 6 |
| Very Low | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 |
| RANK | 1 | 8 | 3 | 5 | 6 | 9 | 10 | 2 | 7 | 4 |
| Overall Importance | High | Med | High | High | High | Med | Low | High | Med | High |

As with mammals, the most important vegetation types for conservation-important birds are savannahs, particularly Granite Lowveld, Tsende Mopaneveld and Lowveld Rugged Mopaneveld (

**Figure 5.10**). The High importance value for these vegetation types is most applicable to protected areas, particularly for Vulnerable birds of prey that rarely breed outside of these areas. One Endangered bird, the Saddle-billed Stork (Ephippiorhynchus senegalensis) is also most likely to breed along rivers in protected areas. The high-altitude grasslands have a High importance value because of the presence of a Critically Endangered bird, the Blue Swallow (Hirundo atrocaerulea), which is an irregular breeding visitor or passage migrant to the Haenertsburg grasslands and the Wolkberg range. The sixth vegetation type that has a High importance rating is Northern Mistbelt Forest. This importance value is driven by the presence of a stable population of Cape Parrot (Poicephalus robustus), which is Endangered. Three other savannah types have a Medium importance value, while Subtropical Freshwater Wetlands has the lowest importance for conservation-important birds.

**Reptiles and Amphibians**

The conservation importance of each of the reptiles and amphibians predicted for the project area is indicated in **Appendix A-4**. Red Data status was derived from Minter et.al.(2004), Branch (1988) and the IUCN 2004 list (www.redlist.org), and is in accordance with IUCN 2001 categories (IUCN, 2000).

Vegetation types are ranked and assigned importance ratings ranging from Low to High (**Table 5.14**).

**Table 5.14: Reptile and Amphibian importance per vegetation type**

| Importance Value | Number of species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granite Lowveld | Gravelotte Rocky Bushveld | Lowveld Rugged Mopaneveld | Northern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Mountain Bushveld | Subtropical Freshwater Wetlands | Tsende Mopaneveld | Tzaneen Sour Bushveld | Woodbush Granite Grassland |
| Very High | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| High | 3 | 1 | 2 | 5 | 3 | 1 | 3 | 3 | 3 | 6 |
| Medium | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| Low | 6 | 9 | 8 | 19 | 4 | 10 | 0 | 6 | 18 | 20 |
| RANK | 5 | 10 | 8 | 2 | 3 | 9 | 7 | 6 | 4 | 1 |
| Overall Importance | Med | Low | Low | High | High | Low | Med | Med | Med | High |

High-altitude grasslands and Northern Mistbelt Forests appear to be the most important vegetation types for reptiles and amphibians of conservation concern (**Figure 5.7**). Woodbush Granite Grassland has the highest importance value, followed closely by Northern Escarpment Quartzite Sourveld. The High importance value of these vegetation types is driven by the possible persistence of Eastwood's Long-tailed Seps (Tetradactylus eastwoodae), which is currently considered Extinct, but is thought by some herpetologists to persist in the area (Vincent Egan pers.comm.). Two Vulnerable reptiles, Woodbush Legless Skink (Acontophiops lineatus) and Methuen's Dwarf Gecko (Lygodactylus methueni), and a Vulnerable amphibian, Northern Forest Rain Frog (Breviceps sylvestris), are other key species that contribute to the High importance rating of this vegetation type. Three savannah types are considered to have a Medium importance, and another three rate as Low.

**Invertebrates**

The conservation importance of each of the species predicted for the site is indicated in **Appendix A-5**. Many of the taxa have not yet been evaluated for Red Data status either nationally or by the IUCN, while others have been evaluated either nationally or by the IUCN, and some by both. Personal judgment thus had to be exercised as to

which Red Data assessment should be used for these evaluations, as the outcome in some cases differed greatly depending on whether the National or IUCN rating was applied. Differences were due in some cases (e.g. some Odonata) to species that are widespread further north being represented in South Africa (at the very limit of their distributions) by extremely limited populations, while in other cases (e.g. some butterflies) the differences were due mainly to national assessments being more up-to-date than the IUCN. The decision was thus taken to use the IUCN evaluations for the Odonata, but national assessments for the butterflies. It should be noted that if Red List assessments had been carried out for the non-evaluated taxa, many (with the probable exception of Opistophthalmus glabrifrons, O. wahlbergi, Opistacanthus validus, Ceratogyrus bechuanicus, C. brachycephala and the more widespread beetle species) would, on the basis of limited distributions and in some cases extreme rarity, then receive a higher importance ranking than has presently been assigned.

Vegetation types are ranked and assigned importance ratings ranging from Low to Very High (**Table 5.15**). Some caution should however be exercised in applying these rankings:

- The large number of Dromica species predicted for Granite Lowveld and Gravelotte Rocky Bushveld may be an artefact of high collecting effort in the vicinity of Ofcolaco , which falls within the same band of Granite Lowveld vegetation (and adjacent to a patch of Gravelotte Rocky Bushveld) as the proposed dam site. The inclusion of both widespread and restricted species of Dromica on the protected species list may thus erroneously raise the ranking of these vegetation types.

- The importance of the Subtropical Freshwater Wetlands from a terrestrial invertebrate perspective is largely due to the probability of tiger beetle species, particularly Dromica, utilizing the fringe of the wetlands for foraging, and once again the high number of Dromica species predicted for Granite Lowveld, within which the only area of Subtropical Freshwater Wetlands in the project area falls, may artificially raise the importance of this vegetation type.

**Table 5.15: Invertebrate importance per vegetation type**

| Importance value | Number of species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Granita Lowveld | Gravelotte Rocky Bushveld | Lowveld Ruggd Mopaneveld | Norhtern Escarpment Quartzite Sourveld | Northern Mistbelt Forest | Ohrigstad Moutain Bushveld | Subtropical Freshwater wetlands* | Tsende Mopaneveld | Tzaneen Sour Bushveld | Woodbush Granite Grassland |
| Very high | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 4 |
| High | 3 | 3 | 3 | 0 | 1 | 0 | (3) | 3 | 3 | 0 |
| Med | 28 | 28 | 26 | 19 | 1 | 19 | (16) | 26 | 31 | 27 |
| Low | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| Score[8] | 67.00 | 41.75 | 37.75 | 29.25 | 16.75 | 19.00 | 47.50 | 47.00 | 43.00 | 48.25 |
| RANK | 1 | 6 | 7 | 8 | 10 | 9 | 3 | 4 | 5 | 2 |
| Overall importance | Very High | High | High | Med | Med | Med | Very High | Very High | High | Very High |

* All species of concern predicted for this vegetation type would be expected to inhabit only the periphery of the wetlands.

The most important vegetation types for potential invertebrates of conservation concern are thus Granite Lowveld, Woodbush Granite Grasslands, Tsende Mopaneveld and possibly the Subtropical Freshwater Wetlands (**Figure 5.8**).

## 5.6 DEMOGRAPHIC PROCESSES

Demographic processes relate to the number of people and composition of a community and include an overview of the population size and the educational profile of the affected communities.

The proposed project mainly falls within the Greater Letaba Local Municipality (LIM332) and the Greater Tzaneen Local Municipality (LIM333).

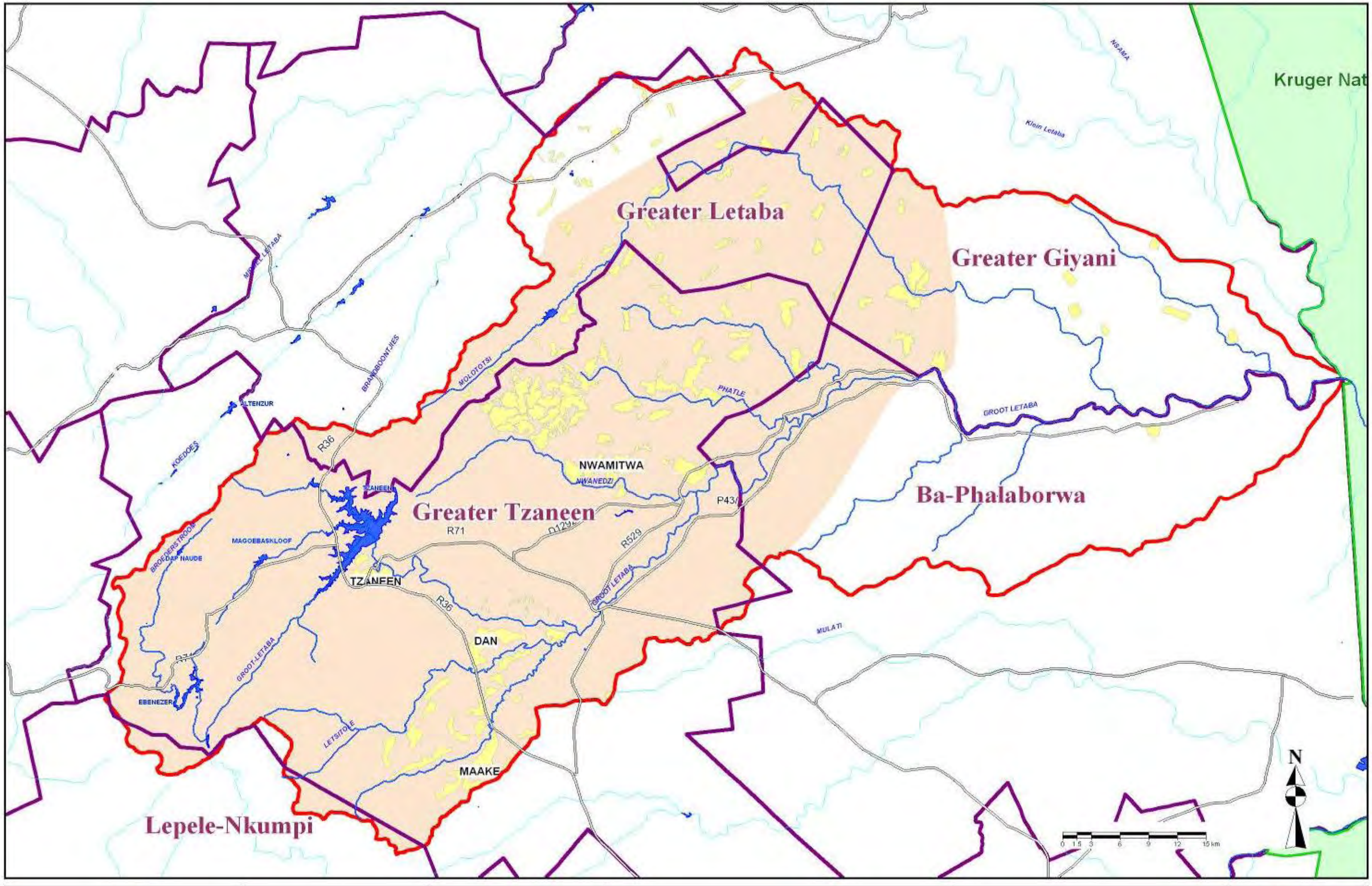
Small parts of the Greater Giyani (NP331) and the Ba-Phalaborwa (N334) municipalities also fall in the study area (**Figure 5.9**). These last two mentioned

[8] Based on scoring system incorporating importance levels and probability of occurrence

municipalities do not form part of the demographic and economic discussions in this Chapter, in order not to skew the social profile. The discussion of only the Greater Tzaneen and Letaba Municipalities will give a more realistic reflection of the communities in the study area. However, the Integrated Development Plans (IDPs) of all four local municipalities will be accessed.

The Greater Tzaneen and Letaba Local Municipalities form part of the Mopani District Municipality (DC33) in the Limpopo Province. The Limpopo Province (LP) is the northern most province of the Republic of South Africa and is bordered by Botswana to the west and north-west, Zimbabwe to the north, and Mozambique to the east. To the south lies the Gauteng Province. The locality of the LP makes it the link between South Africa and other African countries.

The Greater Letaba Local Municipality (GLLM) covers an area of approximately 1 891 $km^2$ and consists of 26 wards. The Greater Tzaneen Local Municipality (GTLM) is approximately 3 242 $km^2$ in size and comprises of 34 wards in total. These municipalities are in the Groot Letaba catchment, which fall within the Luvubu-Letaba Water Management Area (WMA).




Legend

- Project Area
- Groot Letaba Catchment
- Towns and Villages
- Kruger National Park
- Dams
- Rivers
- Roads
- NKP Text_Base

water & forestry
Department: Water Affairs and Forestry
REPUBLIC OF SOUTH AFRICA

ILISO CONSULTING

**GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)**

MUNICIPALITIES

**FIGURE 5.9**

Date: September 2007
Map Ref: P:/.../Letaba.map
System: WGS 84 Lat/Long

The discussion of this section is guided by **Table 5.16**, which provides an overview of the population characteristics of the two main local municipalities within which likely areas to be provided with domestic water supplies fall. The Greater Letaba Local Municipality (GLLM) and Greater Tzaneen Local Municipality (GTLM) are discussed in relation to South Africa (SA) as a whole, the province and the district municipality.

**Table 5.16: Summary of Population Characteristics**

| | SA | LP | MDM | GLLM | GTLM |
|---|---|---|---|---|---|
| Area size (km2) | 1 219 912 | 122 839 (10% of SA) | 11 098 (9% of LP) | 1 891 (17% of MDM) | 3 242 (29% of MDM) |
| Total population | 47 390 900 | 4 994 326 (11% of SA) | 1 060 409 (21% of LP) | 220 094 (21% of MDM) | 375 580 (35% of MDM) |
| Population density (people per km2) | 38.9 | 40.7 | 95.5 | 116.4 | 115.8 |
| Total households | 11 205 705 | 1 193 351 | 261 070 | 53 743 | 97 422 |
| Avg. persons per household | 4.0 | 4.2 | 4.1 | 4.1 (4.9)* | 3.9 (5.1)* |
| Population group | Black African (79.5%) | Black African (97.0%) | Black African (97.5%) | Black African (98.9%) | Black African (97.6%) |
| Gender | Female (50.8%) | Female (54.3%) | Female (54.3%) | Female (55.1%) | Female (54.2%) |
| Age | 0-19 (42.6%) | 0-19 (52.2%) | 0-19 (51.5%) | 0-19 (53.9%) | 0-19 (48.7%) |

*according to population projections by Pieterse, du Toit and Associates cc Town and Regional Planners as reflected in the MDM IDP

The Limpopo Province (LP) covers an area of approximately 122 839 km², with a total population of approximately 4 994 326 and average population density of 40.7 people per km². The Province is largely rural in nature, with only 11% of its population residing in urban areas. The predominant population group is Black African (97.0%) followed by White (2.6%). Females dominate at 54.3%. More than half (52.2%) of the total population is below the age of 19.

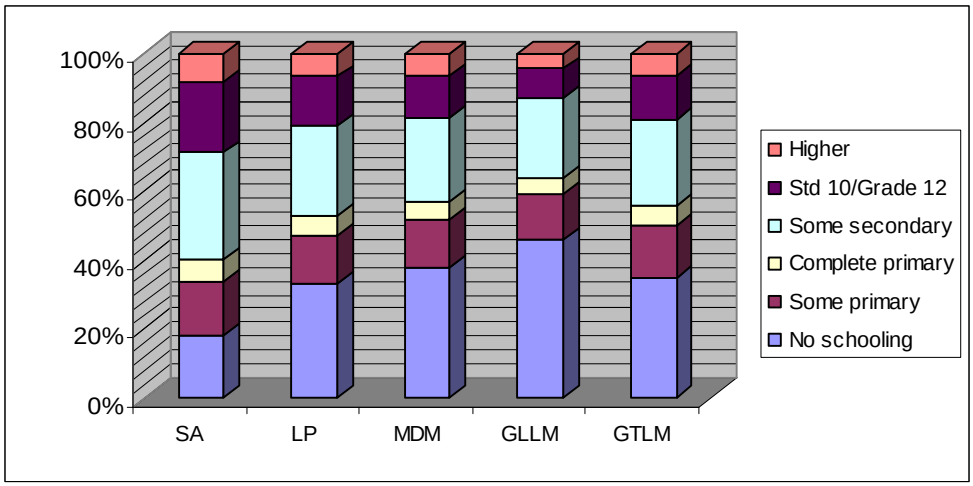
The Mopani District Municipality (MDM), which is situated within the LP, extends over 11 098km² and has a total population of approximately 1 060 409 with a high population density of 95.5 people per km². The racial distribution within the MDM, much like the LP as a whole, consists of a large majority of Black African (97.5%) followed by a distribution of 2.3% White. As is the case with the LP as a whole, more than half (51.5%) of the total population is below the age of 19. Again females dominate at 54.3%.

Greater Tzaneen and Greater Letaba LMs are the most densely populated municipalities in the district. The GTLM has almost half of the district population. This municipality extends over 3 242 km² with a total population of 375 580 at much the same population density as the GLLM with 115.8 people per km². There are about 110 settlements with an average of approximately 3 700 people per settlement. Approximately 24 settlements have 5 000 and more people (Pieterse, du Toit and Associates cc as quoted in the MDM). The racial distribution remains in line with the racial distribution of the Province and District Municipality as a whole with 97.6% Black African and 2.1% White. Again the majority (48.7%) of the total population is below the age of 19, as well as 54.2% being female.

The GLLM covers an area of approximately 1 891 km² with a total population of 220 094 people at a fairly high population density of approximately 116.4 people per square kilometre. There are about 80 settlements with an average of approximately 2 700 people per settlement. Approximately nine settlements have 5000 and more people (Pieterse, du Toit and Associates cc as quoted in the MDM IDP). The predominant population group is Black African (98.9%), followed by White (1.0%). Again more than half (53.9%) of the total population are aged 19 or younger. There are more females (55.1%) than males.

An overview of the educational profile of the local municipalities in the study area in relation to the district, the province and South Africa as a whole, is presented in **Table 5.10**.

**Figure 5.10: Overview of the Educational Profile**




A third (33.1%) of the adult population in the LP has no schooling, closely followed by just over a quarter (26.3%) of the adult population who completed at least some secondary schooling. A total of 20.9% completed an education equivalent to Grade 12 (14.1%) and higher (6.8%). More or less the same educational profile holds true for the MDM, where 37.8% of the adult population had no schooling, followed by 24.2% who completed some secondary schooling. A total of 18.8% completed Grade 12 or higher.

Within the GLLM close on half of the adult population (45.8%) has no schooling. Close on a quarter (23.4%) completed some secondary schooling. In the GTLM, 35.0% of the adult population had no schooling, followed by 25.3% who completed some secondary education.

## 5.7 MUNICIPAL SERVICES

The GLLM municipal services profile looks much the same as that of the MDM and the province as a whole, as is the case for the GTLM (**Table 5.17**).

**Table 5.17: Overview of Municipal Services**

| | LP | MDM | GLLM | GTLM |
|---|---|---|---|---|
| Energy cooking | Wood (57.1%) | Wood (70.0%) | Wood (78.8%) | Wood (69.1%) |
| Energy heating | Wood (57.8%) | Wood (67.2%) | Wood (74.9%) | Wood (66.7%) |
| Energy lighting | Electricity (63.2%) | Electricity (68.1%) | Electricity (65.9%) | Electricity (69.1%) |
| Refuse | Own dump (66.7%) | Own dump (61.6%) | Own dump (64.2%) | Own dump (64.5%) |
| Toilet | Pit without ventilation (49.0%) | Pit without ventilation (37.8%) | Pit without ventilation (51.6%) | Pit without ventilation (45.5%) |
| Water | Pipe in yard (15.5%) | Pipe in yard (16.1%) | Pipe in yard and <200m (13.8%) | Pipe in yard (15.7%) |

Despite the fact that almost two thirds of all households (63.2%) within the LP have access to electricity and make use of it for lighting, the majority of households make use of wood for cooking (57.1%) and heating (57.8%). In terms of other municipal services, two thirds (66.7%) of households make use of their own refuse dump for waste removal.

The MDM profile for energy sources is the same as that of the province as a whole. Also, in the MDM approximately 61.6% of all households make use of their own refuse dump. There is an almost equal split between households that have no access to sanitation services (34.7%) and those who have to use a pit latrine without ventilation (37.8%).

Pit latrines are below Reconstruction and Development Programme standards (RDP) standard and could contaminate ground water. The RDP standard is Ventilation Improved Latrines (VIPs), and above RDP standard is a water-borne sewage system. Water pollution in the district therefore affects most people because many of them

stay in the rural areas and depend on river water. The major cause of this problem is the sewage leakage into the rivers, streams and groundwater.

Very few households have direct access to water within either their dwelling or yard and have to make use of a communal standtap, a borehole or a river/stream. Some villages make use of river water because of the quality of ground water they get at the communal standtap. Water is generally fetched by women or by young boys. The boys load 20 litre jerrycans on donkey carts and sell the jerrycans of water in the villages.

The GLLM IDP states that 47% of households have access to less than 10 litres of water per day, a further 47% to between 10 litres and 25 litres per day, while only 6% of households are above the RDP standard. Of the households, 35% of households live within 200 - 500m from a water source, while 28% reside further than 500m from a source. One can assume that GTLM has a similar profile.

The access to water in these communities is therefore below standard for most. The Section 9(1) Regulations of the WSA (Guidelines for Compulsory National Standards) set the minimum standard for basic water supply as "*a minimum quantity of potable water of 25 litres per person per day or 6 kilolitres per household per month (households with les than eight occupants)...*"

Concerning the distance of a tap from home, the DWAF has set and implemented a maximum distance of 200 m away from a household as policy.

The shortage of bulk water supply affects settlements, agricultural production of commercial farmers and emerging black farmers, as well as the tourism industry between the Drakensberg Escarpment and the Kruger National Park. Even if the necessary supply infrastructure is built, the water will not be available to meet the demand. In the Letaba River catchment 14.8 million $m^3$ per annum was allocated, on an ad hoc basis, for release from Tzaneen Dam to the Kruger National Park but little if any of these releases reached the Park with real beneficial effect.

The provision of bulk water supply to villages is therefore a priority to the affected municipalities. The MDM IDP states that "*Water has emerged as probably the most*

*pressing need, with causal factors for inadequate supply ranging from insufficient capacity of purification plants, to absence of reticulation networks. The collapse and/or threatening collapse of water schemes are mainly caused by:*

- *lack of maintenance;*
- *inadequate cost recovery;*
- *unauthorised water connections;*
- *The fragmented water supply system (i.e. schemes are not connected or linked) – this maybe clarifies why there might be a shortage of bulk water supply in one area, while a surplus exists in another;*
- *Lack of cooperative governance. "Local government is supposed to set the agenda, the DWAF is the licensing authority and supplier of raw water and the environmental aspects need to be approved by DEAT. The Treasury plays a major role in financial monitoring and administration of surpluses or deficits. Water Boards operate as abstractors, purifiers and distributors of the raw water (reporting to the DWAF), whilst municipalities can undertake these functions themselves. This practice in the institutional arrangements does not lend themselves to cooperation between organisations, especially where there is an overlap of responsibility and organisations deem it necessary to protect their territory, rather than to cooperate and synergise their efforts" (Applying the World Commission on Dams Report in South Africa, 2004).*"

## 5.8 ECONOMIC CONTEXT

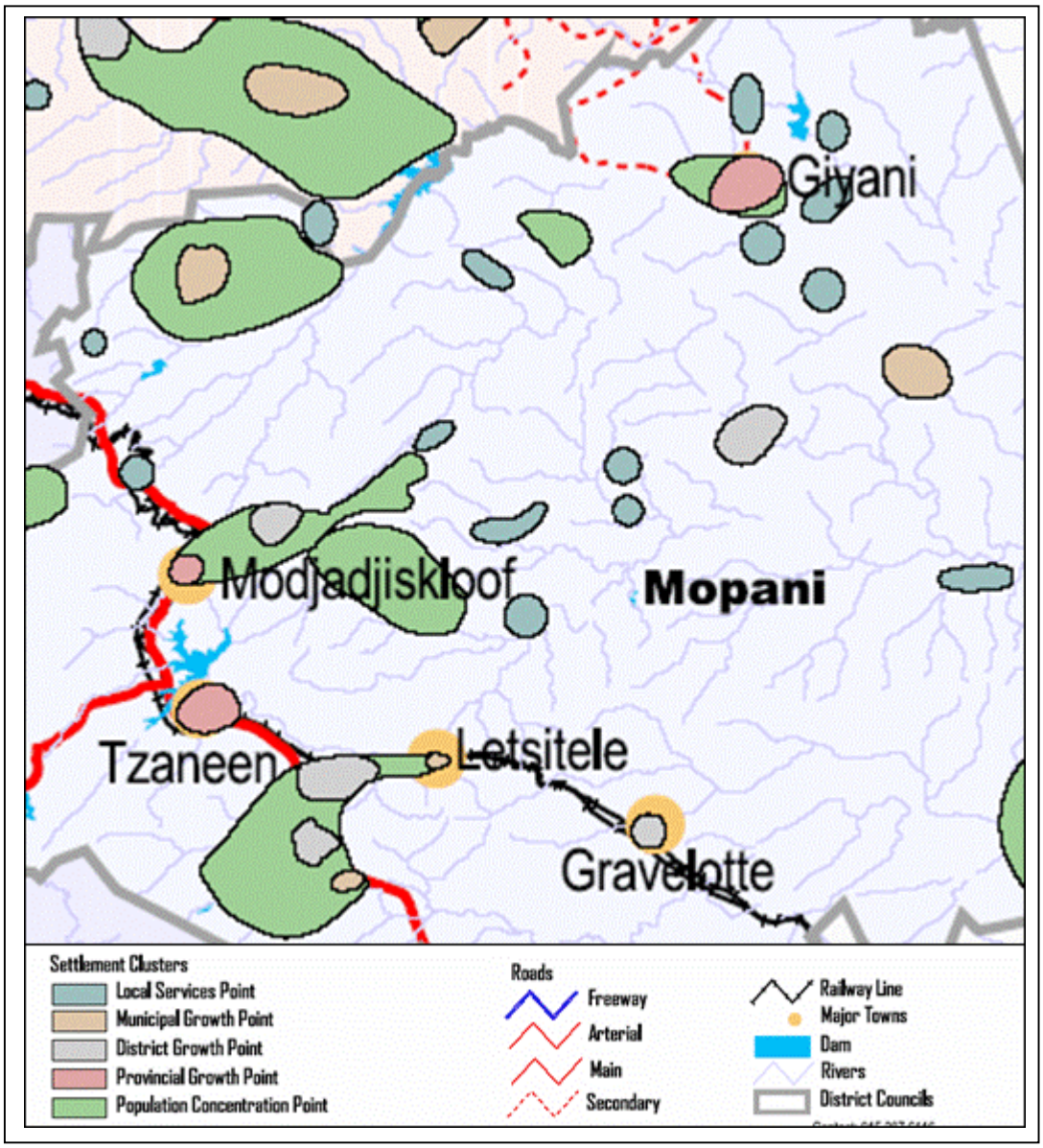
### 5.8.1 Population and settlement pattern

An overview of the population characteristics are provided in **Table 5.16**. Within Greater Tzaneen Local Municipality, the Limpopo Provincial Rationale identified six growth points (see **Figure 5.11**). The Growth Points are identified as being located within first order settlements. The First Order Settlements (Growth Points) are individual settlements or a group of settlements located relatively close to each other where meaningful economic, social and institutional activities and a substantial

number of people are grouped together. The growth point settlements are further classified as Provincial, District and Municipal Growth Points.

The town of Tzaneen is the only provincial growth point. The Provincial Growth Points are settlements with relatively large economies employing a large residential area. These settlements have regional and some Provincial service delivery elements. This includes at least local municipal offices which perform all municipal services such as water, electricity, sanitation, refuse removal, road maintenance, etc.

The District growth points within the study area are Nkowankowa and Lenyenye, and three Municipal growth points are Haenerstburg, Burgersdorp and Letsitele. Within Greater Tzaneen there are also two population concentration points, namely: Mogoboya and Nwamitwa.




Source: Pieterse du Toit and Associates, 2002

**Figure 5.11: Tzaneen Local Municipality Growth Points**

The essential features of the current settlement pattern can be summarised as follows (Greater Tzaneen SDF, 2007):

- Political interventions mainly between 1960 and 1980, have resulted in a polarised and unnatural settlement pattern where most of the poor people live in small rural settlements (villages);

- Low levels of income and lack of skills inhibit the development of local economic activity at the village level, which confines the potential for sustainable growth within settlements (villages);

- People survived by migrating to work in other areas or by commuting while leaving their families in the village; and

- With the constitutional change in 1994, higher income people relocated to Tzaneen town and other areas. Other people with less income have moved to the fringes of Nkowankowa and Lenyenye where they squat next to job opportunities.

The implication of this settlement pattern is that the vast majority of settlements within GTM area are economically unsustainable, but they accommodate people who are desperately in need of improved infrastructure and improved social services. Economic growth stimulation will be confined to those villages where the residents reflect an adequate range in the distribution of their income and skills and where local resources can be converted to consumer and manufactured goods.

### 5.8.2 Employment profile

A person that is employed receives remuneration and a part of that remuneration is regarded as disposable income. Disposable income can be defined as the net income available to a particular person to either save or spend. Employment within an area can therefore be translated into disposable income, which impacts directly on household consumption. Additionally, the level of unemployment prevalent in an area is also a very good indicator as to the intensity of the demand for job creation.

**Table 5.18** indicates the employment status of the population for each of the local municipalities within the Mopani District.

**Table 5.18: Percentage distribution of employment status, 1996 and 2001**

| Local Area | Employed | | Unemployed | | Not Working/Other | |
|---|---|---|---|---|---|---|
| Year | 1996 | 2001 | 1996 | 2001 | 1996 | 2001 |
| Greater Giyani | 9.2% | 16.2% | 9.5% | 24.7% | 81.4% | 59.1% |
| Greater Letaba | 9.0% | 22.7% | 8.9% | 16.6% | 82.1% | 60.7% |
| Greater Tzaneen | 16.3% | 29.4% | 9.5% | 21.7% | 74.3% | 49.0% |
| Ba-Phalaborwa | 24.5% | 36.9% | 10.1% | 25.0% | 65.4% | 38.1% |
| Maruleng | 12.8% | 27.9% | 9.4% | 18.7% | 77.8% | 53.4% |
| MOPANI DISTRICT | 14% | 26% | 9% | 21% | 77% | 52% |

Source: Census 1996, 2001

In Greater Tzaneen, nearly 30% of the population are unemployed. (Census 2001 as in Tzaneen SDF, 2007).

This unemployment rate also seems to be growing each year while the provincial and local economy's ability to create jobs is not keeping pace with job requirements.

**Table 5.19** provides an indication of the labour force (economic active population) per sector and indicates that employment in Greater Tzaneen is mostly generated in the agriculture sector, followed by community, personal and social services sector and the wholesale, retail and trade sector.

**Table 5.19: Labour Force per sector, 2001**

| Industry | Greater Giyani | Greater Letaba | Greater Tzaneen | Ba-Phalaborwa | Maruleng | Mopani District |
|---|---|---|---|---|---|---|
| Agriculture | 1797 | 10798 | 19321 | 3286 | 6077 | 41279 |
| Mining | 233 | 55 | 804 | 5977 | 131 | 7200 |
| Manufacturing | 640 | 1371 | 7741 | 2653 | 465 | 12870 |

| Industry | Greater Giyani | Greater Letaba | Greater Tzaneen | Ba-Phalaborwa | Maruleng | Mopani District |
|---|---|---|---|---|---|---|
| Electricity and water | 357 | 299 | 471 | 264 | 78 | 1469 |
| Construction | 1350 | 1315 | 2771 | 1673 | 572 | 7681 |
| Wholesale and retail trade | 2950 | 4632 | 8547 | 3433 | 1194 | 20756 |
| Transport and communication | 620 | 742 | 1669 | 765 | 1117 | 4913 |
| Financial and business services | 1208 | 819 | 3018 | 1695 | 435 | 7175 |
| Community, social and personal services | 8042 | 4583 | 10686 | 5702 | 2579 | 31592 |
| Private Households | 1905 | 1522 | 5174 | 2592 | 1153 | 12346 |
| Undetermined | 1799 | 1336 | 5069 | 2666 | 1087 | 11957 |
| Not applicable | 108324 | 93255 | 157167 | 52385 | 38431 | 449562 |
| TOTAL | 129225 | 120727 | 222438 | 83091 | 53319 | 608800 |

Source: Census 2001

### 5.8.3 Economic profile

The sectoral GDP contribution per sector for each municipality in the Mopani District is represented **Table 5.20**.

**Table 5.20: GDP contribution (in R million) per sector, 2004**

| Industry | Greater Giyani | Greater Letaba | Greater Tzaneen | Ba-Phalaborwa | Maruleng | Mopani District |
|---|---|---|---|---|---|---|
| Agriculture | 68 | 175 | 494 | 99 | 217 | 1055 |
| Mining | 119 | 51 | 462 | 8222 | 114 | 8969 |
| Manufacturing | 153 | 269 | 985 | 867 | 97 | 2373 |
| Electricity & water | 143 | 73 | 249 | 217 | 33 | 715 |
| Construction | 131 | 75 | 1013 | 179 | 28 | 1428 |

| Industry | Greater Giyani | Greater Letaba | Greater Tzaneen | Ba-Phalaborwa | Maruleng | Mopani District |
|---|---|---|---|---|---|---|
| Wholesale & retail trade | 448 | 350 | 1474 | 716 | 214 | 3204 |
| Transport & communication | 295 | 383 | 708 | 465 | 523 | 2376 |
| Finance and business services | 583 | 229 | 1402 | 1030 | 226 | 3472 |
| Community, social & personal | 172 | 116 | 492 | 408 | 101 | 1290 |
| Government services | 901 | 393 | 1159 | 621 | 408 | 3485 |

Source: Quantec database, 2006

In relation to the other municipalities within the Mopani District, Greater Tzaneen Municipality contributed the majority of the GDP (approximately 30%) to the Mopani District in 2006. Greater Tzaneen also contributed the most to the District's share of GDP from the following sectors in the economy: wholesale, retail and trade sector; finance and business services sector; government services; construction sector; manufacturing sector; agricultural sector; and community, social and personal services sector.

**Table 5.21** indicates the growth in contribution to the GDP per sector as well as the Tress Index in for each local municipality and the District. (The Tress Index indicates the level of concentration of diversification in an economy. It is estimated by ranking the sectors according to their contributions to GDP or employment adding the values cumulatively and indexing them. An index of zero represents a totally diversified economy, while a number closer to 100 indicates a high level of concentration.)

**Table 5.21: Percentage sectoral GDP growth per annum (1997-2004)**

| Industry | Greater Giyani | Greater Letaba | Greater Tzaneen | Ba-Phalaborwa | Maruleng | Mopani District |
|---|---|---|---|---|---|---|
| Agriculture | 9.6% | 5.1% | 5.7% | -0.6% | 5.0% | 4.9% |
| Mining | 5.1% | -2.6% | 3.0% | 5.2% | 2.9% | 5.0% |

| Industry | Greater Giyani | Greater Letaba | Greater Tzaneen | Ba-Phalaborwa | Maruleng | Mopani District |
|---|---|---|---|---|---|---|
| Manufacturing | 5.9% | 4.6% | 3.0% | 10.8% | 8.4% | 6.0% |
| Electricity & water | 4.6% | 4.8% | 2.5% | 5.4% | 3.4% | 4.0% |
| Construction | -1.0% | -0.6% | 7.4% | -1.7% | -2.2% | 4.2% |
| Wholesale & retail trade | 6.6% | 1.0% | 4.6% | 7.9% | 4.9% | 5.1% |
| Transport & communication | 15.8% | 14.3% | 8.9% | 15.1% | 8.4% | 11.4% |
| Finance and business services | 2.4% | 4.3% | 4.2% | 3.2% | 8.8% | 3.8% |
| Community, social & personal services | 3.4% | 6.2% | 6.7% | 9.3% | 3.9% | 6.7% |
| General government services | 1.4% | 1.1% | 2.6% | 3.6% | 8.5% | 2.8% |
| Tress Index | 45 | 46 | 36 | 72 | 53 | 44 |

Source: Quantec database, 2006 and Kayamandi calculations

In comparison with other municipalities, the economy of Greater Tzaneen is highly diversified, with a Tress Index of 36. All the sectors in the Graeter Tzaneen Municipality indicated a positive growth. The sectors with the largest growth in contribution are the Transport and Communication Sector (8.9%), the Construction sector (7.4%), and the community, social and personal services sector (6.7%). Greater Tzaneen is also the only municipality in which there was positive growth in the Construction Sector. It should be noted that Tzaneen is currently the largest town in the Mopani District with the largest population, which directly relates to a higher demand for construction related activities.

### 5.8.4 Development perspective

The Groot Letaba River catchment is a highly productive agricultural area with mixed farming including cattle ranching, game farming, dryland crop production and a wide variety of crops produced under irrigation. Citrus and sub-tropical fruit are most widely produced under irrigation together with vegetables and other high-value crops such as tea. Agriculture and the irrigation sector in particular is the main base of the economy of the region and provides the major portion of local employment opportunities.

Irrigation is the largest water user and will remain so for the foreseeable future. Numerous irrigation schemes and irrigation boards exist in the catchment, some of which are supplied from storage and others depend on run-of-river abstractions. The irrigation schemes earmarked for revitalisation in Greater Tzaneen Local Municipality include: Thabina, Solani, Berlyn Citrus, Coombe Bank, Mariveni, and Naphuno farms. The majority of the irrigation schemes within the Mopani District are situated in Greater Tzaneen where the majority of intensive agriculture (mostly citrus fruit) are grown in the District.

The timber industry in the Letaba River Catchment area includes a significant capital investment in infrastructure including sawmills and provides highly valued employment opportunities. Afforestation (including indigenous) decreases the mean annual runoff with the maximum impact being on low flow periods during seasons of relatively low rainfall.

Greater Tzaneen also has numerous areas with exceptional natural beauty, with considerable untapped tourism potential.

## 5.9 LAND USE ACTIVITIES

### 5.9.1 Agriculture

The total land area of the Limpopo Province is 11 960 600 hectares of which 88.2 % (10,548,290 ha) constitute farmland. Irrigated farming is predominant in the province (http://www.lda.gov.za/index).

The land capacity categorization constitutes the following proportions (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006):

- 37,7% suitable for arable farming
- 50,1% suitable for grazing
- 12, 2% suitable for wildlife.

"*Limpopo is mostly semi-arid, and is prone to drought and floods. In this respect irrigation and soil and water conservation are paramount to the socio-economic development of rural areas in the Province. In Limpopo Province the total potential agricultural land is 10.55 million hectares of which 1.7 million ha is for crop production and 8.85 million ha is for grazing purposes. Of 1.7 million ha of potential cropland, 1.17 million ha is under commercial farming while 0.53 million is under communal farming. Of 8.85 million ha of potential grazing, 6 million ha is under commercial farming while 2.85 million is under communal farming. The total potential irrigation land in the province is, 137,000 ha.*

*A very conservative estimate of agricultural production in the province reveals that it can easily produce over R13.26 Billion worth of Agricultural raw products per annum, of which R3.91 billion can be from rain fed agriculture, R8.22 billion from irrigation agriculture and R1.13 billion from stock farming*" (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006).

The Department of Agriculture, Limpopo Province Strategic Plan 2005/2006 states that two systems of agricultural land use have evolved as a result of past policies of the previous governments under the apartheid regime:

"*White farmers who practice large scale farming systems using the most advanced production technology occupy approximately 70% of the total land area. These commercial farmers operate large farms, which are well organized and situated on prime land. At present, there are approximately 5 000 commercial farming units in Limpopo Province.*

*The smallholder farms are located mostly in the former homeland areas and they cover approximately 30% of the provincial land surface area. Farming under the smallholder system is characterized by low levels of production technology and small size of farm holding of approximately 1.5 hectares per farmer; with production primarily for subsistence and little marketable surplus. It has been estimated that there were approximately 303 000 smallholder farmers in Limpopo Province by 2000. Women constitute 80% of these smallholder farmers. Given the fact that 89% of the population of Limpopo Province is classified as rural, agriculture plays a major role in*

*the economic development of rural areas of the province.*" (Statistics South Africa: 2002).

The Department of Agriculture, Limpopo Province Strategic Plan 2005/2006 further states that the outcomes of Land reform and the acquisition of interests by Black entrepreneurs in agribusiness will over time remove the anomaly between the two systems of agricultural use:

"*The upliftment and support of primary and secondary agriculture is the goal of Department of Agriculture. The most limiting resource in the province is water. Irrigation is needed for about 137 000 hectares of which 58 000 hectares are in the hands of black small-scale farmers.*

*There are 126 smallholder irrigation schemes in Limpopo Province with a total irrigable area of 19 460 ha. In addition some of the ARDC (Agriculture and Rural Development Corporation) schemes could well form part of Irrigation Schemes. There are about 45 schemes totalling 1 838 ha in this category. Most of these schemes, which were well constructed originally, have degraded infrastructure through lack of maintenance in recent years. The schemes were mostly government managed and maintained up to the mid 1990's, with the beneficiary farmers having little or no involvement in the day-to-day operation and maintenance of their scheme infrastructure.*

*The farmers are poorly trained, have no institutional structures through which to manage their schemes, have no financial resources for scheme maintenance and have extremely poor support services such as mechanisation services, production loan facilities and input supply facilities. Under these circumstances and combined with a very low self-esteem the productivity of the Province's smallholder schemes is extremely low. This situation, combined with high levels of poverty, results in a desperate need for support and assistance with the revitalisation of these schemes. However, any initiative to assist farmers with the revitalisation of their schemes must be focused first on 'people' development and empowerment and thereafter on the rehabilitation of infrastructure. The past focus on 'bricks and mortar' and not on the infrastructure use is largely the cause of widespread collapse of smallholder irrigation schemes throughout South Africa.*

*An integrated revitalization of Irrigation Schemes program has been initiated in the Department of Agriculture with a total budgetary estimate of R1.08 billion for a period of over 6 years. In this program which is farmers led and departmentally facilitated one, the following services are rendered to the existing irrigation schemes and their areas of influence within the neighbouring communities: Provision of bulk water supply to the Irrigation schemes; Provision of infield irrigation; Provision of access road to the schemes; Provision of rain water harvesting for rain-fed farmers; Provision of stock watering systems for the communities; Provision of dipping tank systems for the communities; Provision of training and capacity building for both irrigation and rain-fed farmers; Provision of institutional arrangements and structure in the form of Water Users Association or any; Other appropriate institutional structure in the irrigation schemes and training of their members; Provision of rain-fed farming support to the communities; Rendering of or facilitation for mechanization services on the other hand need to be normalized and supported within the emerging farming communities*" (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006).

The commercial farming sector has reached its full potential. Growth is dependent on improvements in technology. Agriculture in historically disadvantaged communities is largely confined to subsistence farming. Better utilization of State land (almost 40% of the land area of the Greater Tzaneen area of jurisdiction) holds the key to the expansion/ growth of the agricultural sector and the economy. The under-utilized potential of 10 000 - 170 000 hectares referred to in the Phalaborwa SDI is State land (tribal land) and estates owned by the Province. Forward linkages to other sectors, especially manufacturing and trade, represent economic development potentials. The GTLM IDP states that "*Large areas of the GTLM area are taken up by land with high agricultural potential. It is imperative that this resource be protected for the economic well-being of the area. The dependence of the local economy on Agriculture, and the current location of high potential agricultural land in relation to existing development and service networks, ensures that this factor will also influence future development initiatives*" (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006).

### 5.9.2 Spatial development

For the affected municipalities, the availability of land and the development of a beneficial spatial pattern is limited because of under-utilization of land by establishing limited business on large farm portions, providing extensive residential plots, overprovision of parks, inhibitive land cost (privately owned land) and statutory deterrents (state - owned land under tribal custodianship).

### 5.9.3 Road infrastructure

The study area is largely characterised by gravel roads, particularly within scattered villages. Most of these roads seem to be poorly maintained. Apart from these internal gravel roads, a fair tarred road network links most of the areas within the district. The R529 passes through the proposed dam basin. The transport plan for the area was not available at the time of writing this report.

### 5.9.4 Tourism

Whilst there appears to be some indication that the tourism sector has grown fairly considerably in the past five years, there appears to be general consensus that tourism demand is well below what would be expected from an area with such outstanding natural potential (MDM IDP). The tourism areas in the Province inlcude: Tzaneen, Duiwelskloof, Ebenezer Dam, Eiland, George's Valley, Gravelotte, Haenertsburg, Hans Merensky, Letaba River, Letsitele, Leydsdorp, Murchison Range, Ofcolaco, Phalaborwa, Sapekoe, Selati, Soekmekaar, The Downs (http://www.tzaneen.com/tourism/).

Nature/game Reserves in the area include: Wolkberg Wilderness Area, Lekgalameetse Nature Reserve, Karongwe, Makalali Game Reserve, Selati Nature Reserve, Ndzalama Nature Reserve, Hans Merensky Nature Reserve, Modjajdji Cycad Reserve, and the Kruger National Park. Cattle farming has largely been replaced by game farming.