

5. Catchment Characteristics

5.1 Physical Characteristics

The physical characteristics of the Thukela Water Management Area are displayed in figures Figure 10 and Figure 11 on pages 26 and 27.

The Thukela River is a principal river of KwaZulu-Natal province, South Africa and is ranked as the largest river by volume in the country (www.britannica.com). Historically, the Thukela (in Zulu, Thukela means "something that startles") marked the southern boundary of Zululand. The total drainage basin of more than 29,000 square km includes most of western KwaZulu-Natal. It rises as a stream on the 3,050-metre high Mont-aux-Sources plateau near the merger point of the Lesotho-Free State province borders. Its upper course, which lies within Royal Natal National Park in the Northern Drakensberg, hurtles down a series of waterfalls as it drops a total of 948 m. The river then cuts through the Thukela Gorge at the foot of the escarpment (about 1,500 m above sea level), is quickly joined by many tributaries, passes through the Ladysmith Basin, and, below Colenso, becomes narrow and deep. At Jameson's Drift it enters the wide, open Thukela Trough, at the eastern end of which it cuts deeply through a great block of sandstone to issue onto the coastal plain. Estimates of the Mean Annual Runoff (MAR) are between 3850 and 4400 MCM per annum which is only 17% of the precipitation that falls on the catchment.

The Thukela ends its course of 502 km at the Indian Ocean, about 84 km north of Durban, its mouth obstructed in times of normal flow by a sandbar. The river is navigable only in the lagoon formed behind the sandbar. Deposits from the river form a large oceanic sand bank some kilometers from the shore that is home to significant prawn production.

The major tributary of the Thukela is the Buffalo. Other smaller but important tributaries include the Bushman's, Mooi, Little Thukela, Klip, Sundays and Blood Rivers.

A great variety of soils are found in the Thukela catchment, the bulk of them being highly erodable Mispah and Glenrosa soils. Differences in climate are responsible for the occurrence of soils which have developed in widely diverging directions. The soils in the catchment can thus be classified according to the ecological regions in which they are found. These are the Highlands and Midlands Mist Belt, the Interior Basin, the Valley Region and the Coast Region (see map). The narrow valleys and scanty alluvial deposits restrict irrigation in a large part of the Thukela catchment, although localized areas such as that at Muden are well irrigated.

Woodstock and Spioenkop Dams regulate flow in the upper reaches of the river and act as a supply to the Thukela/Vaal pumping scheme that supplies water to the more highly developed Vaal basin. Plans are afoot to develop the water resources further by constructing more dams in the upper/middle reaches of the Thukela and its tributaries (see section 7.2).

PHYSICAL PROPERTIES

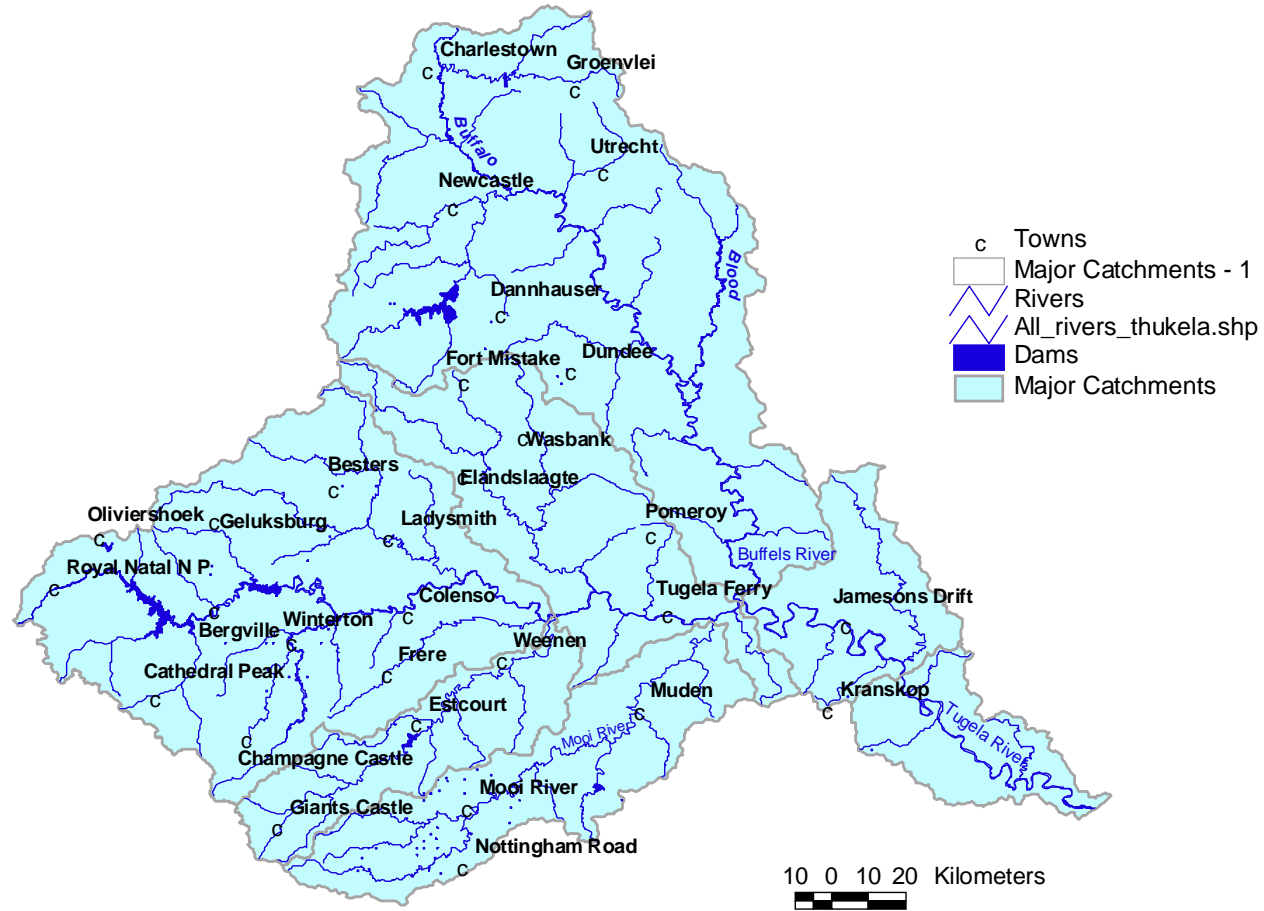
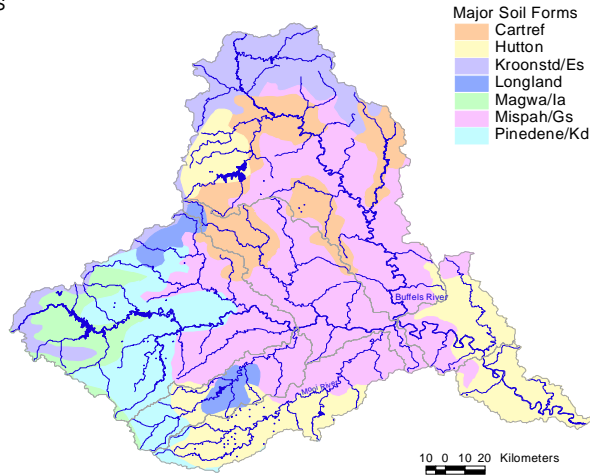
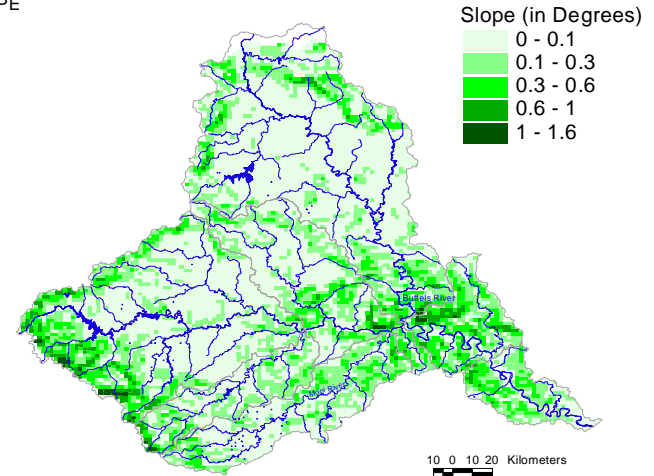


Figure 10 : Thukela WMA Rivers and Catchments

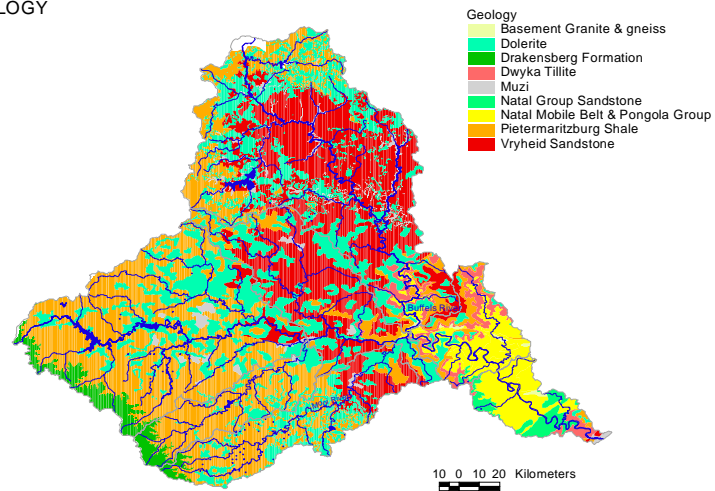
SOILS



SLOPE



GEOLOGY



POTENTIAL SOIL EROSION

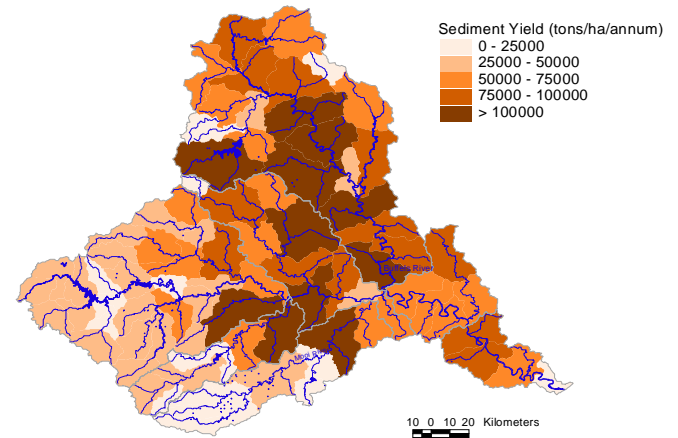


Figure 11 : Thukela WMA Physical Characteristics

5.2 Land Use

The Land use figure attached shows that this WMA includes the urban settlements of Ladysmith, Newcastle, Estcourt, and Mandini. A number of minor urban settlements are spread inland, including Dundee, Mooi River, Colenso, Winterton, Glencoe & Utrecht. All the remaining smaller settlements are largely farming cooperative areas. There are many rural settlements in this WMA, and some are densely populated, especially in the areas around Ladysmith and Newcastle.

There is some heavy industry in the urban areas of Newcastle and Dundee as well as a few bulk users around Estcourt and Ladysmith in the west and Mandini on the coast. Coal mining concerns can be found in the northern parts of this WMA. There are two mothballed Power stations (Colenso & Ngagane) in this WMA.

The majority of land is used for agriculture with areas of grassland. There is a small amount of forestry in this WMA that can be found in the southern and eastern areas. The agriculture includes large areas of beef and dairy pastures, some sugar cane near the coast and around Weenen (both dry land and irrigated), vegetables and nuts and there is some citrus farming on the coast near Mandini. The majority of irrigation is carried out using sprinkler irrigation systems, but center pivot irrigation is also used in the western areas (especially around the Thukela River).

There are some game reserves and nature parks in this WMA (see section 5.3). The largest of these is the Drakensberg Reserve area.

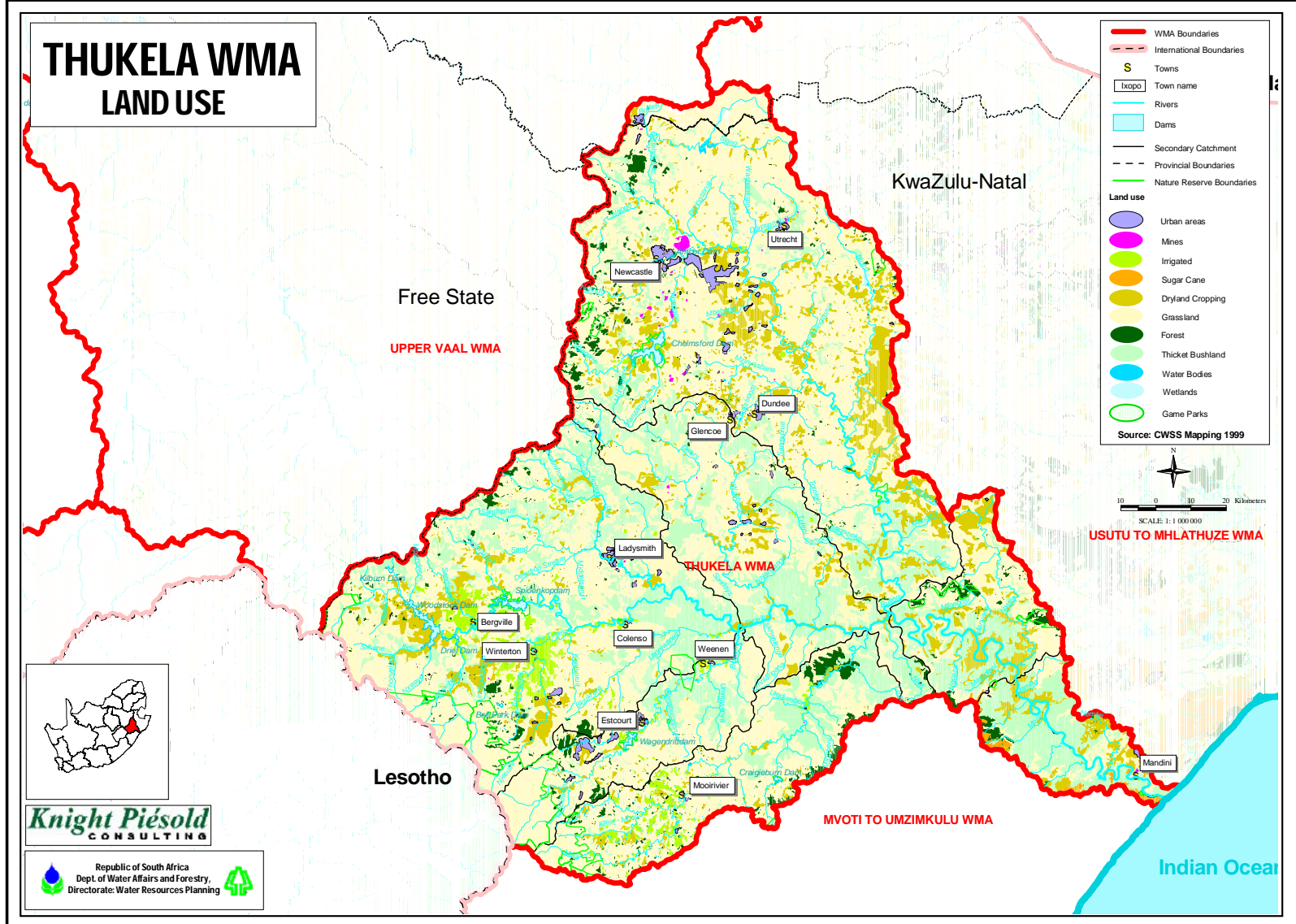


Figure 12 : Thukela Land Use

5.3 The Natural Environment

The characteristics of the natural environment in the Thukela Water Management Area are displayed in Figure 13 on page 33.

The coastline near the Thukela River is a continuation of the long, unprotected sandy beaches further north. The most productive estuarine location, depending on the shifting sandbank at the mouth, is the area around the mouth on the southern side. The river mouth and the area a couple of kilometers out to sea are often discoloured creating conditions favourable for kob and sharks. The fish which may be caught in the vicinity of the river mouth are; large kob, garrick and shad during winter. During summer, large sharks, including the blackfin and ragged tooth and flatfish make up the catches **(TRPC, 1967)**

The Blood River vlei ca 6000 ha in extent, is situated in the upper Thukela catchment. The wetland provides a variety of habitats including permanently wet reed marsh, temporarily wet grasslands, seepage slope areas and several oxbow "lakes" of various depths and water regimes **(WRC, 1994)**.

The characteristic vegetation of the Drakensberg escarpment is Themeda-Festuca alpine veld. This is restricted to the high ground bounding the catchment. The vegetation of most of the catchments of the upper Bushmans and Mooi rivers and of small areas of the upper margins of the Thukela, Venterspruit and Sand spruit, as well as the Sundays rivers on the plains, is Highland Sourveld and Dohne Sourveld. Some of the higher areas in the lower Buffalo and Insuzi river catchments are similar. The vegetation of most of the remaining areas is Southern Tall grassveld. Most of the upper part of the Buffalo river basin is somewhat different and has a perimeter of tall grassveld on high ground surrounding the main valley where the vegetation is Sour Sandveld.

The vegetation of the more broken, hilly and drier catchments of the lower-Thukela, Klip, Sundays, Bushmans, Mooi and Buffalo rivers is Dry Thorn or Valley Bushveld. Ngongoni Bushveld occurs in small areas on high ground in the lower river below Ngobevu and Ngongoni veld of the Natal mist belt occurs on the heights of Kranskop. A small area of Coastal Forest and Thornveld is found on the sandy coastal soils where the rainfall is higher. Most of the rather narrow coastal belt is used for the cultivation of sugar cane **(Acocks, 1953)**.

There are numerous protected areas in the uThukela Water Management Area as outlined in table 4 below (State of the Environment, 1998);

Table 4: Nature Reserves in the Thukela WMA

<i>Nature Reserve</i>	<i>Area (ha)</i>	<i>Year established</i>
Chelmsford dam	6845	1975
Moor Park	264	1967
Ncandu	1875	1925
Spioenkop	7283	1975
Thukela Drift	41	1973
Wagendrift	764	1973
Weenen	4183	1975
Cathedral Peak State Forest (partly within the catchment)	32246	1927
Giants Castle Game Reserve (partly within the catchment)	34638	1903
Royal Natal National Park	8094	1916

Mapping of the extent of the alien infestation has been carried out for the following quaternary catchments for the Thukela CMA area; V11A, V11B, V11C, V11D, V11E, V11F, V11J, V11K and V11L. Coverage reveals that the presence of weed species is a significant problem in these catchments **(Abeeda Kadir, DWAF, personal comm.)**

Invasive alien plants occupy about 11% of the Thukela catchment with 9% of the area described as totally invaded and 2% as condensed invasion. *Solanum mauritianum* is the most common species in these areas, while *Acacia dealbata* and *Acacia mearnsii* are noted for being widespread. *Chromolaena* is also widespread and common to the Zululand coast, spreading inland along the Thukela River. Generally, the conditions in the Drakensberg area may be described as "controllable and even eradicable" while the Midlands and Coastal Zone may be described as major problem areas. Alien vegetation threatens water security not only for large-scale agricultural production but also for local communities and landowners. The riparian areas will therefore need to be more closely monitored for alien vegetation since it impacts negatively on water production in high-yielding (high rainfall) catchments and consumes available water in low-yielding catchments **(WRC, 1998)**.

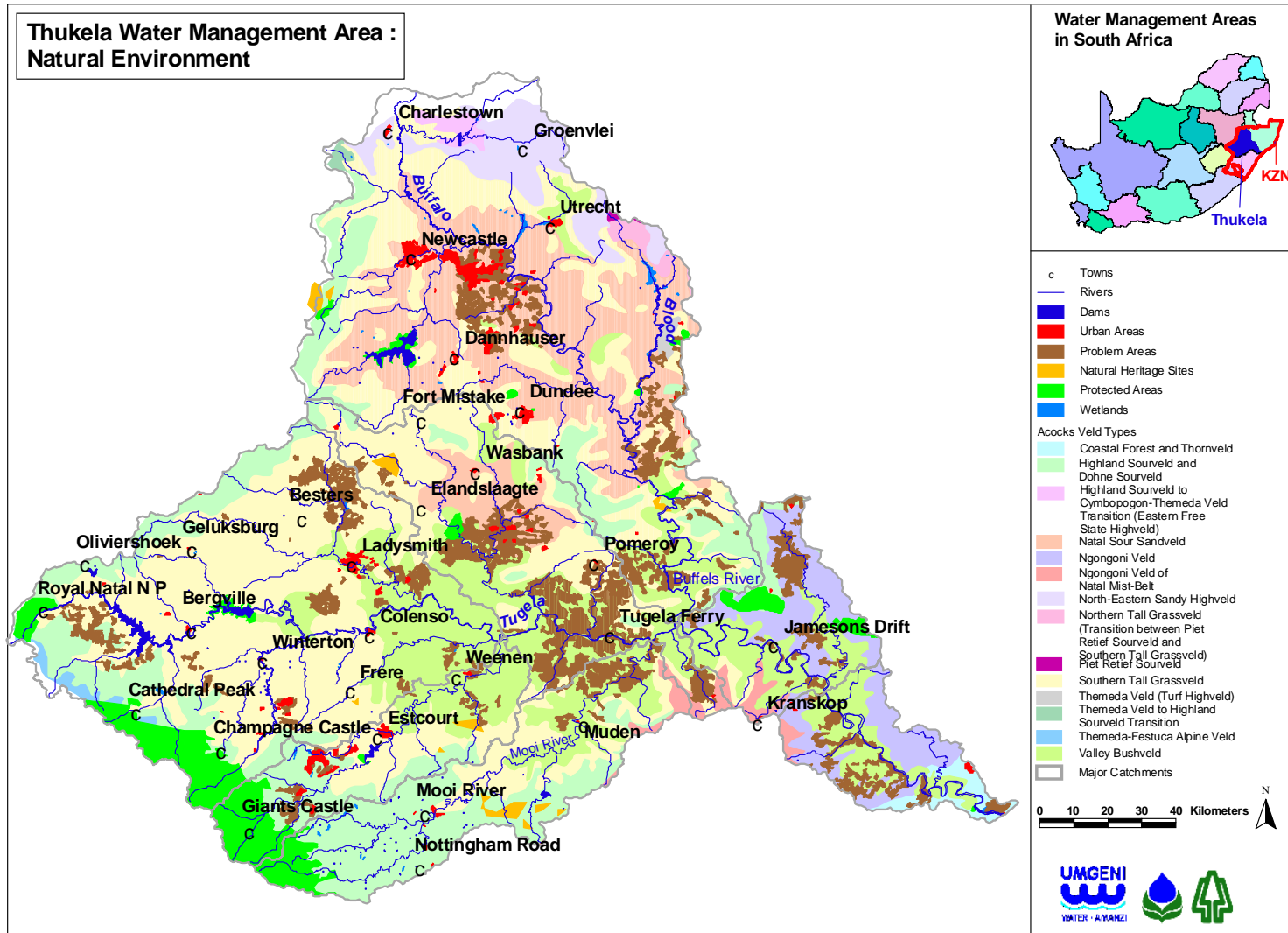


Figure 13 : Natural Environment of the Thukela WMA