Overview of Spring Grove Dam

Where are we now?

Section 2

2. OVERVIEW OF SPRING GROVE DAM

2.1 Background to Spring Grove Dam

The Mgeni Water System in KwaZulu-Natal (KZN) supplies water to approximately five million people, as well as the industrial sectors in the Durban and Pietermaritzburg regions, the economic hubs of the province. The growth in water demand and intermittent drought periods since 2003 made it necessary for DWA to implement Phase 2 of the Mooi Mgeni Transfer Scheme (MMTS-2), which comprised the construction of a 37 metre roller compacted concrete dam (named Spring Grove Dam) with a gross storage capacity of 139,5 million m^3 on the Mooi River upstream of the Mearns Weir with an associated Water Transfer System to Mpofana River. The purpose of the MMTS-2 is to augment the growing water requirements of the Mgeni System by 60 million m^3 per annum.

A positive Record of Decision (RoD) was issued by the then Department of Environmental Affairs and Tourism on 15 June 2009, which authorised the undertaking of the relevant activities as part of the MMTS-2 project, subject to certain conditions. Impoundment commenced in March 2013 and full impoundment was initiated in June 2013.

2.2 Dam Location

Spring Grove Dam falls within the jurisdiction of the uMgungundlovu District Municipality (DC22), and is situated in two local municipalities, namely Mpofana Local Municipality (KZN223) and uMngeni Local Municipality (KZN222).

The site co-ordinates for the dam wall are 29°58’12” east and 29°19’12” south, which lies 8 km south of the existing Mearns Weir site. The dam is located 2 km south west of the Rosetta on the farms Rosetta and Spring Vale. Portions of the Vaale Kop, Inchbrakie, Riverholm, Ebernburg and Spring Grove are inundated by the impoundment with the backwaters extending upstream to above the Inchbrakie falls. See maps contained in **Figures 2 - 3**.

Figure 2: **Regional Map**

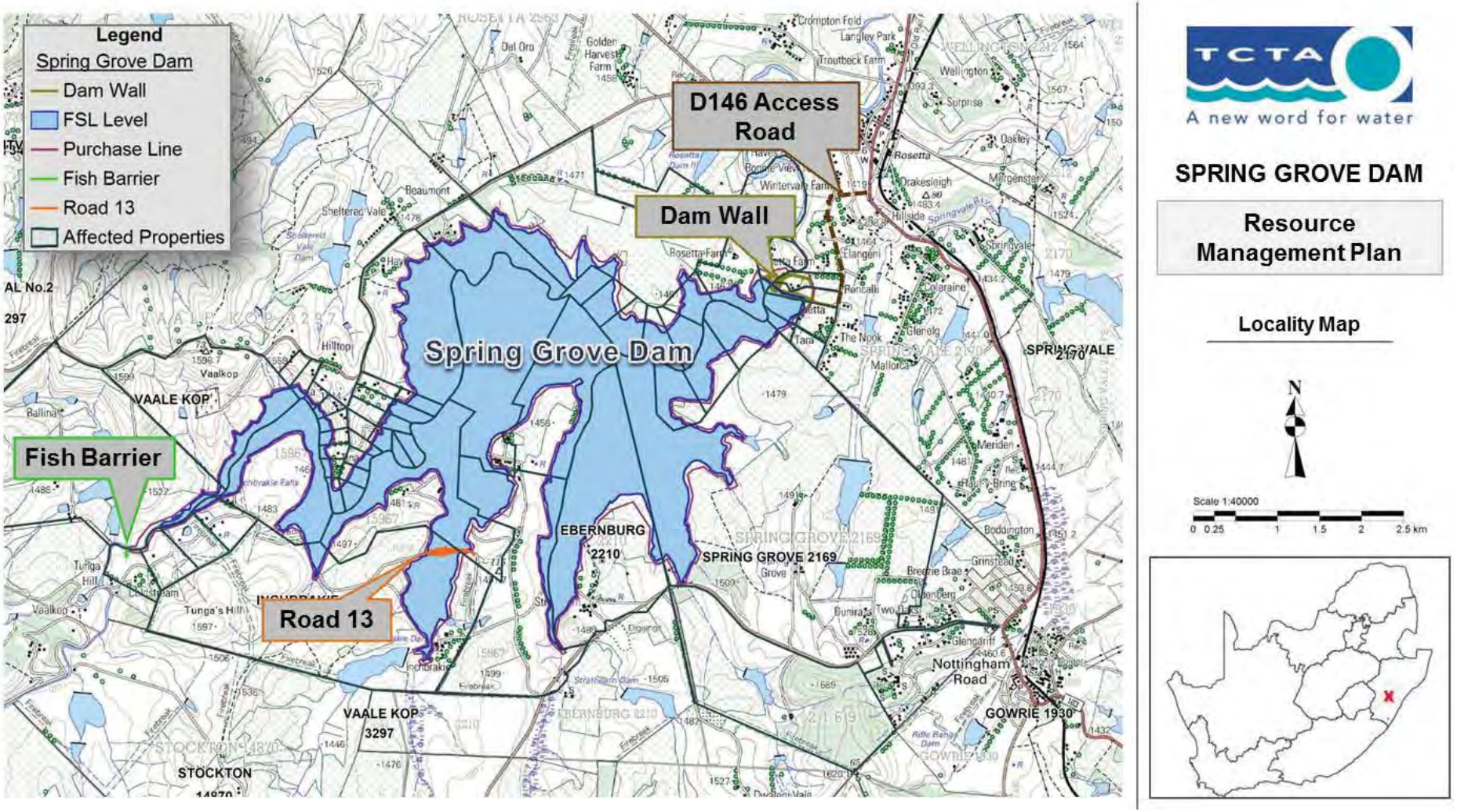

Figure 3: Locality Map

As shown in **Figure 4**, Spring Grove Dam is surrounded by private property and the main land uses include cattle (and dairy) farming, tourism and crop cultivation

Figure 4: Spring Grove Dam – Google Earth image

2.3 Details of the Dam

Details of Spring Grove Dam are shown in **Table 1**.

Table 1: Spring Grove Dam Characteristics

Dam Type	Composite RCC and Embankment	**Total Length of Dam Wall**	607 m
Dam Height	37 m	**Spillway Height**	32 m
GPS Coordinates (Dam Wall)	29° 19'12" S 29° 58'12" E	**Spillway Length**	70 m
Category	Category III	**Spillway Crest**	Ogee Crest
Gross Storage Volume	139,5 million m^3	**Firm Yield**	60 million m^3/a
Full Supply Level	RL 1 433,5 m	**Catchment Area**	344 km^2
Water Surface Area at Full Supply Level	1 022 ha	**Outlet Works**	Twin System with Multi-level Intakes
Embankment Type & Height	Earthfill; 11,5 m	**Outlet Capacity**	29,5 m^3/s

2.4 Operation of the Dam

The following operational requirements for Spring Grove Dam need to be met (in order of priority):

1. Supplement Ecological Water Releases (EWR) of WR site 10. The minimum river release (EWR) has been set at 0,3 m^3/s.
2. Release for downstream users (assumed to be part of EWR).
3. Transfer Water to Mgeni System. Water can be transferred at a maximum of 4,5 m^3/s.

The proposed control system for MMTS-2 is based on managing certain components of the water transfer scheme and the gathering of information required for the operation of this scheme. Information pertaining to releases, spillages and flows is obtained from the Mearns Weir and the various gauging weirs.

The following gauging weirs form part of the operation system of Spring Grove Dam:

- Spring Grove;
- Mpofana ;
- Little Mooi ;
- V2H005 – upstream of fish barrier;
- V2H006 – upstream of Mearns Weir on the Little Mooi River;
- V2H007 – Hlatikulu ; and
- Mearns.

Further information pertaining to the operation of Spring Grove Dam is contained in the **Operation and Maintenance Manual**.

2.5 Legal Framework

The RMP forms the overarching framework for the management of Spring Grove Dam. It is informed by the relevant policy, legislation and planning documents administered by other Government Departments. Similarly, these Government Departments are required to duly consider the RMP as part of their strategic planning and decision-making.

A RMP is founded in the following key sections of the National Water Act (NWA) (Act No. 36 of 1998):

- Section 2 – Purpose of the Act;
- Section 3(1)-(3) – Public trusteeship of nation's water resources;
- Section 21(k) – Using water for recreational purposes;
- Section 26(1), (2) and (4) – Draft Regulations; and
- Section 113 – Access to and use of government waterworks for recreational purposes.

The key pieces of environmental and development-related legislation governing the use and management of Spring Grove Dam and the surrounding state-owned land are presented in the table to follow. **Note:** this list does not attempt to provide an exhaustive explanation, but rather an identification of the most appropriate sections from pertinent pieces of legislation.

Table 2: Environmental Statutory Framework

Legislation	Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	• Chapter 2 – Bill of Rights. • Section 24 – Environmental rights.
National Environmental Management Act (No. 107 of 1998)	• Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). • Section 28 – Duty of care and remediation of environmental damage. • Environmental management principles. • Authorities – Department of Environmental Affairs (DEA) (national) and KZN Department of Agriculture and Environmental Affairs (DAEA) (provincial).
GN No. R. 543 of 18 June 2010	• Process for undertaking environmental assessment of activities listed in Listing Notices 1, 2 and 3.
GN No. R. 544 of 18 June 2010	• Listing Notice 1 – activities that require authorisation through a Basic Assessment process. • Examples of potential activities in Listing Notice 1 that could be triggered include –
	11. The construction of: *(i) canals;* *(ii) channels;* *(iii) bridges;* *(iv) dams;* *(v) weirs;* *(vi) bulk storm water outlet structures;* *(vii) marinas;* *(viii) jetties exceeding 50 square metres in size;* *(ix) slipways exceeding 50 square metres in size;* *(x) buildings exceeding 50 square metres in size; or* *(xi) infrastructure or structures covering 50 square metres or more* *where such construction occurs within a watercourse or within 32 metres of a watercourse, measured*

Legislation	Relevance
	from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
	18. The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from *(i) a watercourse;* *(ii) the sea;* *(iii) the seashore;* *(iv) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater-* *but excluding where such infilling, depositing, dredging, excavation, removal or moving* *(i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or* *(ii) occurs behind the development setback line.*
	22. The construction of a road, outside urban areas, *(i) with a reserve wider than 13,5 meters or,* *(ii) where no reserve exists where the road is wider than 8 metres, or* *(iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.*
	47. The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre - *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres* *– excluding widening or lengthening occurring inside urban areas.*
GN No. R. 545 of 18 June 2010	• Listing Notice 2 – activities that require authorisation through a Scoping and Environmental Impact Assessment (EIA) process.
GN No. R. 546 of 18 June 2010	• Listing Notice 3 – activities based on sensitive geographic areas that require authorisation through a Basic Assessment process. • Examples of potential activities in Listing Notice 1 that could be triggered include –
	13. The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list. (2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No 544 of 2010.
	16. The construction of: (i) jetties exceeding 10 square metres in size; (ii) slipways exceeding 10 square metres in size; (iii) buildings with a footprint exceeding 10 square metres in size; or (iv) infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
	24. The expansion of (a) jetties where the jetty will be expanded by 10 square metres in size or more; (b) slipways where the slipway will be expanded by 10 square metres or more; (c) buildings where the buildings will be expanded by 10 square metres or more in size; or (d) infrastructure where the infrastructure will be expanded by 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
National Water Act (Act No. 36 of 1998)	• Section 2 – Purpose of the Act. • Chapter 3 – Protection of water resources. • Section 19 – Prevention and remedying effects of pollution. • Section 20 – Control of emergency incidents. • Chapter 4 – Water use. • Section 21(k) – Recreational water use. • Section 26 – Regulations.

Legislation	Relevance
	• Section 113 – use of water and access and use of government waterworks for recreational purposes. • Authority – DWA.
National Environmental Management Air Quality Act (Act No. 39 of 2004)	• Air quality management. • Section 32 – dust control. • Section 34 – noise control. • Authority – DEA.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	• Management and conservation of the country's biodiversity. • Protection of species and ecosystems. • Authority – DEA.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	• Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.
National Environmental Management: Waste Act (Act No. 59 of 2008)	• Chapter 5 – licensing requirements for listed waste activities (Schedule 1)
National Forests Act (No. 84 of 1998)	• Section 15 – authorisation required for impacts to protected trees. • Authority – Department of Agriculture, Forestry and Fisheries (DAFF)
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	• Permit required for borrow pits. • Authority – Department of Mineral Resources (DMR).
Occupational Health & Safety Act (Act No. 85 of 1993)	• Provisions for Occupational Health & Safety. • Authority – Department of Labour.
National Heritage Resources Act (Act No. 25 of 1999)	• Section 34 – protection of structure older than 60 years. • Section 35 – protection of heritage resources. • Section 36 – protection of graves and burial grounds. • Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m^2 in extent. • Authority – Amafa aKwaZulu-Natali.
KZN Heritage Act (Act No. 04 of 2008)	• Conservation, protection and administration of both the physical and the living or tangible heritage resources of KZN. • Authority – Amafa aKwaZulu-Natali.
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	• Conservation of natural agricultural resources. • Control measures for erosion. • Control measures for alien and invasive plant species. • Authority – Department of Agriculture.
Kwazulu-Natal Planning and Development Act (Act No. 06 of 2008)	• Directs and regulates planning and development in KZN. • An application may be required before land may be used or developed for a particular purpose. • All developments need to be in accordance with the municipality's planning scheme. • Authority - Municipality
KwaZulu-Natal Nature Conservation Management Act (Act No. 09 of 1997).	• Institutional bodies for nature conservation in KZN. • Establish control and monitoring bodies and mechanisms. • Authority - Ezemvelo KZN Wildlife.
National Road Traffic Act (Act No. 93 of 1996)	• Authority – Department of Transport.
Tourism Act of 1993	• Authority – South African Tourism Board.

In addition, the following pieces of legislation are relevant to an RMP:

- Broad-based Black Economic Empowerment Act (Act No. 53 of 2003);
- Occupational Health and Safety Act (Act No. 85 of 1993);
- Municipal Systems Act (Act 32 of 2000);
- The Development Facilitation Act (Act 67 of 1995);
- Communal Land Right (Act 11 of 2004);
- Restitution of Land Rights Act (Act 22 of 1994);
- Intergovernmental Relations Framework Act (Act 13 of 2005);
- Disaster Management Act (Act 57 of 2002);
- Water Services Act (Act 108 of 1997);
- State Land Disposal Act (Act 48 of 1961);
- Land Administration Act (Act 2 of 1995);
- Merchant Shipping Act (Act 57 of 1951), as amended;
- Merchant Shipping (National Small Vessel Safety) Regulations 2007 GN. No. R704;
- South African Maritime Safety Authority Act (Act 5 of 1998);
- Public Finance Management Act (Act No. 1 of 1999);
- National Treasury Regulations in respect of procurement and Public Private Partnerships (15 March 2005); and
- National Environmental Management: Biodiversity Act (Act 10 of 2004) Alien and Invasive Species Regulations 2014 GN No. R598.

2.6 Existing Plans

Amongst others, the following institutional initiatives (including policies, strategies, plans and programmes), which have bearing on the governance and proposed management of the study area, were taken into consideration to ascertain the objectives and desired state of Spring Grove Dam:

- KZN Systematic Conservation Plan;
- uMgungundlovu District Municipality (DM) Biodiversity Sector Plan;
- uMgungundlovu DM Integrated Development Plan (IDP) and Draft Spatial Development Framework (SDF);

- uMgungundlovu DM Strategic Environmental Assessment (SEA) and Strategic Environmental Management Plan (SEMP);
- Mpofana Local Municipality (LM) IDP and SDF;
- uMngeni LM IDP and SDF;
- uKhahlamba Drakensberg Park World Heritage Site Buffer Zone policy; and
- Cooperative Inland Waterways Safety Programme (CIWSP) - this project is a partnership between multiple government entities and between the government and the community. The aim is to enhance the development of a best practice model to ensure a safe and structured inland maritime environment and culture, whilst protecting the country's precious water resources. The RMP integrates information from the CIWSP into the management objectives for the Dam.
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2.7 Biophysical Environment

The information to follow was extracted from the Research Report (RMP Volume 4).

2.7.1 Climate

In general, the area has an agreeable climate with summer rainfall characterised by afternoon thunder showers. Mild to warm temperatures are experienced during the summer months (December to February), whilst winter months (June to August) are cold with frost occurring regularly.

Rainfall occurs predominantly during summer. The winter months are dry with cold nights and warm days. Whilst the weather is generally predictable, it is possible to experience all four seasons in a day at any one time of the year.

2.7.2 Terrain

The Spring Grove Dam basin is relatively flat and the impoundment is thus relatively shallow and covers a large surface area. The terrain morphology surrounding the dam is classified as undulating hills and lowlands. Steeper areas are encountered along the

western portion of the dam. The slope is moderate in the northern part along the shoreline.

2.7.3 Hydrology

The Mooi River traverses the area in a north-easterly direction. This river system forms part of the Thukela Water Management Area (WMA), quaternary catchment V20D (**Figures 5 - 6**).

The predominant land use in the Mooi Catchment is commercial agriculture, with large-scale irrigation of pastures and summer cash crops. The other large water user of the Mooi River is transfers to the Mgeni WMA. The only major dam in the Mooi River is Craigieburn Dam, however, there is an abundance of farm dams in the greater area.

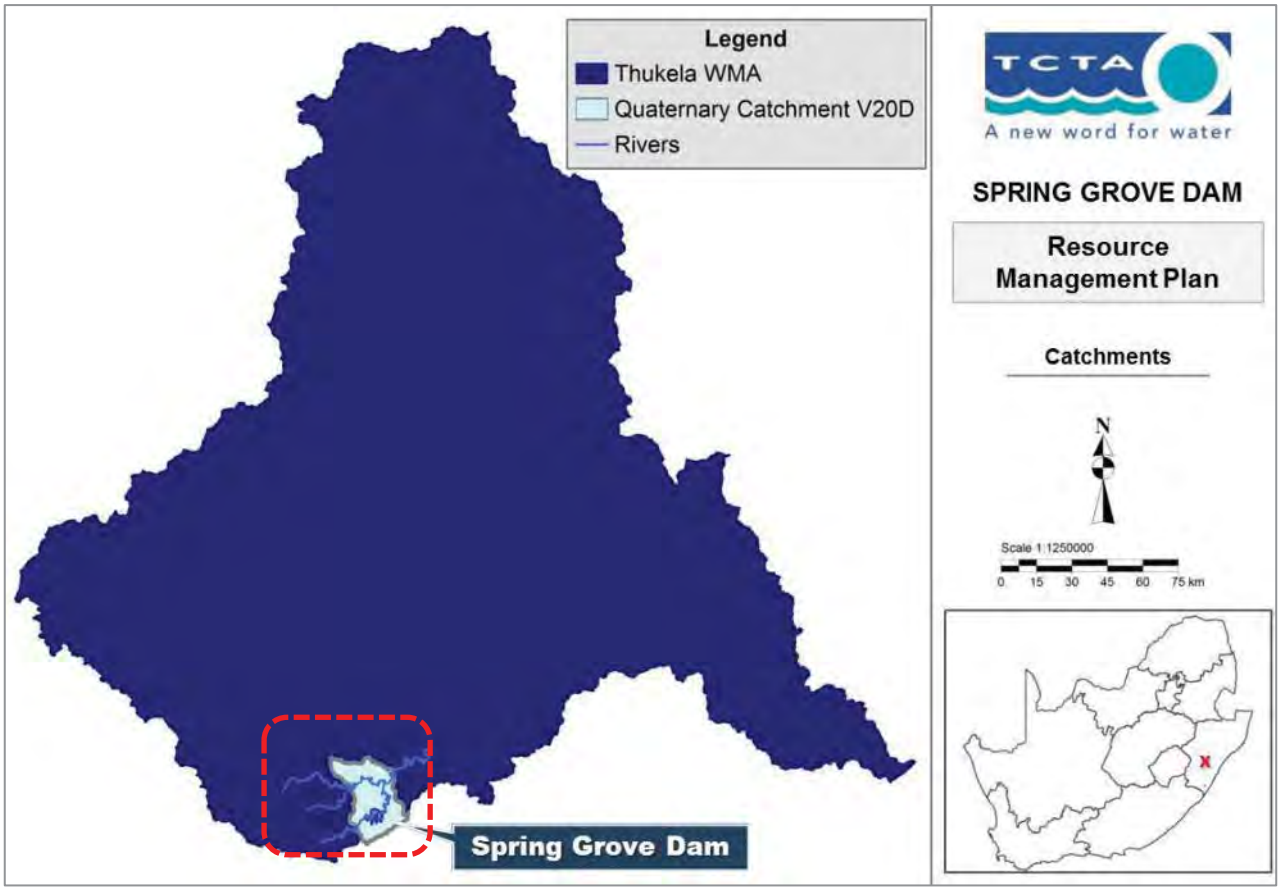

Figure 5: Catchments

Figure 6: Major Rivers

2.7.4 Water Quality

Water quality is a key determinant for recreational use of the impoundment. During the construction phase the Contractor conducted periodic water quality monitoring and water samples were collected at strategic locations up- and down-stream of the construction domain. Water quality monitoring will also be undertaken by Umgeni Water during the operational phase of the dam.

Some key findings from water quality monitoring that was undertaken along the river prior to project implementation, as sourced from the MMTS-2 EIA Report (BKS, 2009), follows:

- **Microbiological** –
  - There is faecal contamination of the water in the catchment but the levels are low.
  - The recorded median value is above 130 counts/100 ml which is the DWA *E. Coli* target water quality guideline for full contact recreation, such as swimming and bathing. It exceeds the drinking water guideline of 0 counts/100ml.
  - The bacteriological quality of the river water is predicted to improve significantly on impoundment, which is associated with bacteriological removal due to sedimentation, predation and natural mortality and ultra-violet light disinfection.
- **Suspended Solids** –

- The median for suspended solids was 8 mg/l. The 95 % percentile was 39 mg/l. This upper limit is reached in the wet summer months when silt laden rainfall runoff discharges to the river. The upper reaches of the Mooi Catchment are extensively used for agriculture and grazing induced erosion is a major source for suspended materials.

- **Phosphorus** –
  - The summer soluble reactive phosphorus concentration was 6.5 µg/l and can be classified as mesotrophic with high levels of biodiversity and low to moderate algal growth.
- **Nitrogen** –
  - Average summer inorganic nitrogen (sum of nitrate, nitrite and ammonia) concentrations were calculated 0.28 mg/l, indicating oligotrophic conditions.

2.7.5 Trophic Status

Studies undertaken during the EIA showed that the trophic status of Spring Grove Dam would be mesotrophic (i.e. moderately enriched with nutrients and occasional blooms of nuisance algal species).

The algal genera likely to dominate during periods of low nutrient loading (most of the time) are the less problematic green algae and diatoms (such as *Chlorella*, *Melosira* and *Cryptomonas*). However, during the higher rainfall period, problem blue-green genera, such as *Microcystis* and *Anabaena*, may occur.

2.7.6 Dam Stratification

Stratification is likely to result in anoxic water at a depth of 12 – 16 m from the surface during the hottest summer months (December - March). Impoundment turnover is predicted to occur in late March - early April, dependent on air temperatures and impoundment drawdown. Between May and October, the water column will generally be isothermal and oxygenated throughout. Restratification is likely to commence in October and by the end of December, the anoxic zone should be 12 - 16 m below the surface.

Due to the relatively broad basin, the dam will be between 29 and 34 m deep with a large surface area, and will thus be prone to wind mixing and high loss through evaporation. The surrounding hills are undulating and not likely to shelter the impoundment. This system is likely to be similar to the Midmar impoundment that is a warm summer monomictic system in which the stratification pattern may be disrupted by wind mixing.

2.7.7 Flora

According to Mucina & Rutherford (2006) most of the dam basin falls within the Mooi River Highland Grassland but a small eastern portion of the dam basin is located in the Drakensberg Foothill Moist Grassland.

The sections of grassland between the FSL and purchase line that are in a healthier state are shown in **Figure 7**. In terms of management and monitoring, it is recommended that these sections of grassland be minimally disturbed. It was also indicated that a population of *Merwilla plumbea* (shown in **Figure 7**), which is sought after for its medicinal properties, should be protected from illegal harvesting.

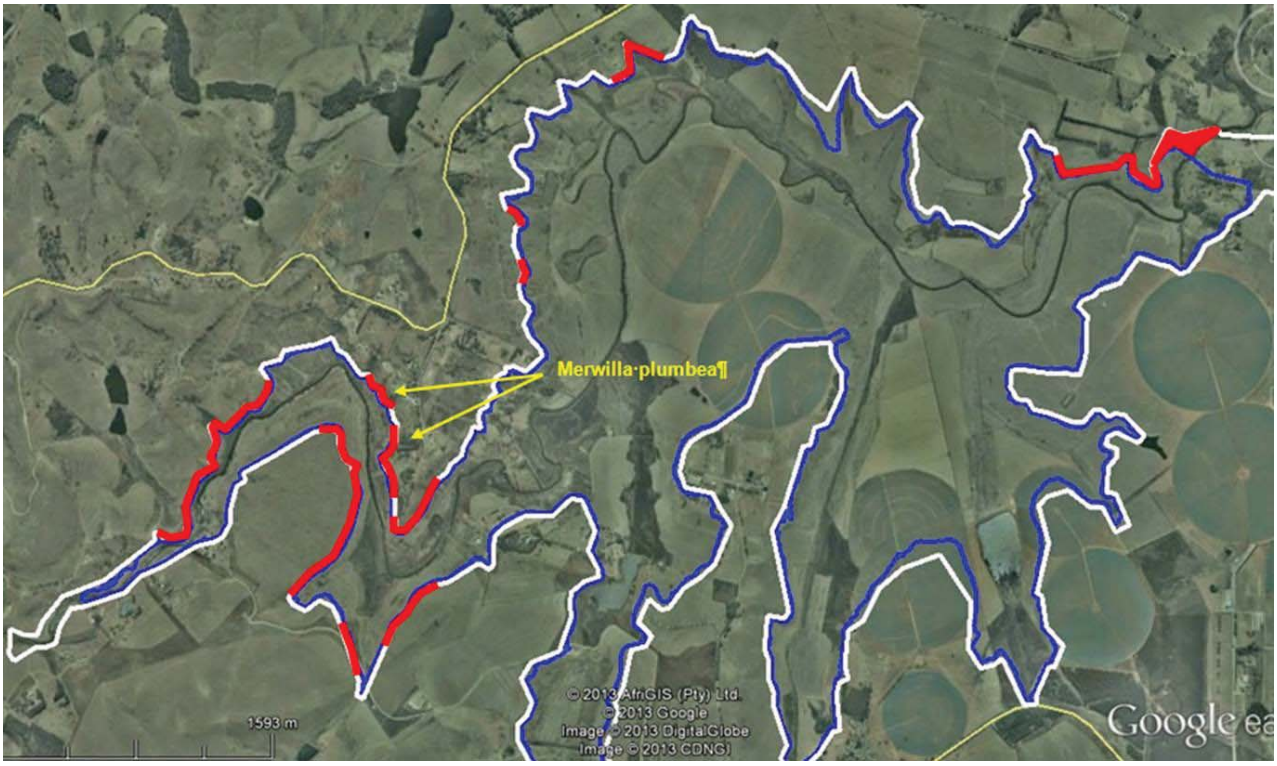

Figure 7: Sections of healthier grassland and population of *Merwilla plumbea*

In terms of aquatic vegetation, oxygen weed (*Lagarosiphon* spp.) has been identified in the basin. Water lilies occur on other dams in the area.

2.7.8 Fauna

2.7.8.1 Mammals

Important mammal species that have been recorded from the quarter degree square in which the basin falls include amongst others the White-tailed Rat (endangered), Spotted-necked Otter (Near Threatened) and Serval (Near Threatened).

2.7.8.2 Avifauna

According to INR (2013), most water-loving species - 69 in all - will benefit from the dam and all of these species are abundant and widespread.

2.7.8.3 Amphibians

According to BKS (2009), one KZN endemic Amphibian species *Afrixalus spinifrons intermedius* (Natal Leaf Folding Frog) occurs in the dam basin. However, the rest of the species are widespread in their distribution. According to the species database of Ezemvelo KZN Wildlife the Long-toed Tree Frog (*Leptopelis xenodactylus*), an endangered species, is also predicted to occur in the area.

2.7.8.4 Reptiles

The distribution of the Natal Midlands Dwarf Chameleon (*Brachypodion thamnobates*), one of the reptiles that may have occurred in the dam basin, is restricted.

2.7.8.5 Ichthyofauna

Three indigenous fish species occur naturally in the Mooi River above and below the Inchbrakie Falls (to become inundated). *Anguilla mossambica (Longfin Eel), Barbus viviparus (Bowstripe Barb)* and *Barbus anoplus (Chubbyhead barb*). Alien

fish species include *Ctenopharyngodonidella* (Grass Carp) *Micropterus dolomieu* (Smallmouth Bass) *Micropterus punctulatus* (Spotted Bass) *Micropterus salmoides* (Largemouth Bass) *Oncorhynchus mykiss* (Rainbow Trout) and *Salmo trutta* (Brown Trout).

The bass only occur below Inchbrakie Falls, which acts as a barrier and prevents invasion upstream where trout species occur. As Inchbrakie Falls will become inundated by Spring Grove Dam (impoundment currently underway), a Fish Barrier was built to prevent the smallmouth bass (downstream) from mixing with the trout population (upstream), as the former will out-compete the other species and impact on the existing trout-fishing industry.

2.7.8.6 Invertebrates

The invertebrates occupying the basin (pre-impoundment) are divided into those that are aquatic and those that are terrestrial in their habitats.

Five species of mayflies (superfamily *Ephermeroidea*) were documented from the Mooi River area. Currently all but one of the originally recorded burrowing mayfly species appears to have disappeared. Invertebrate records for the area are those of butterflies, millipedes, earthworms and velvet worms. Some of the species are KZN endemics, but none are Red Data listed (BKS, 2009).

2.7.9 Conservation Status

The western and most of the southern and south-eastern portions of Spring Grove Dam fall within the uKhahlamba Drakensberg Park World Heritage Site Buffer Zone. The zone serves to influence land use adjacent to the protected area to manage external pressures and threats that may jeopardise its values and objectives.

The Mooi River has been identified as a River Freshwater Ecosystem Priority Areas (FEPA) and a fish sanctuary (INR, 2013). In addition, according to the Ezemvelo KZN Wildlife MINSET coverage a large proportion of the Spring Grove Dam basin (pre-

impoundment) was classified as a Critical Conservation Area 1. However, the sensitivity map of the dam basin and shoreline area that was prepared during the EIA (provided in **Figure 8**) shows that the majority of the land around the dam has low sensitivity due to past disturbances (primarily agriculture). Areas of medium sensitivity occur to the north and south of sections of the impoundment.

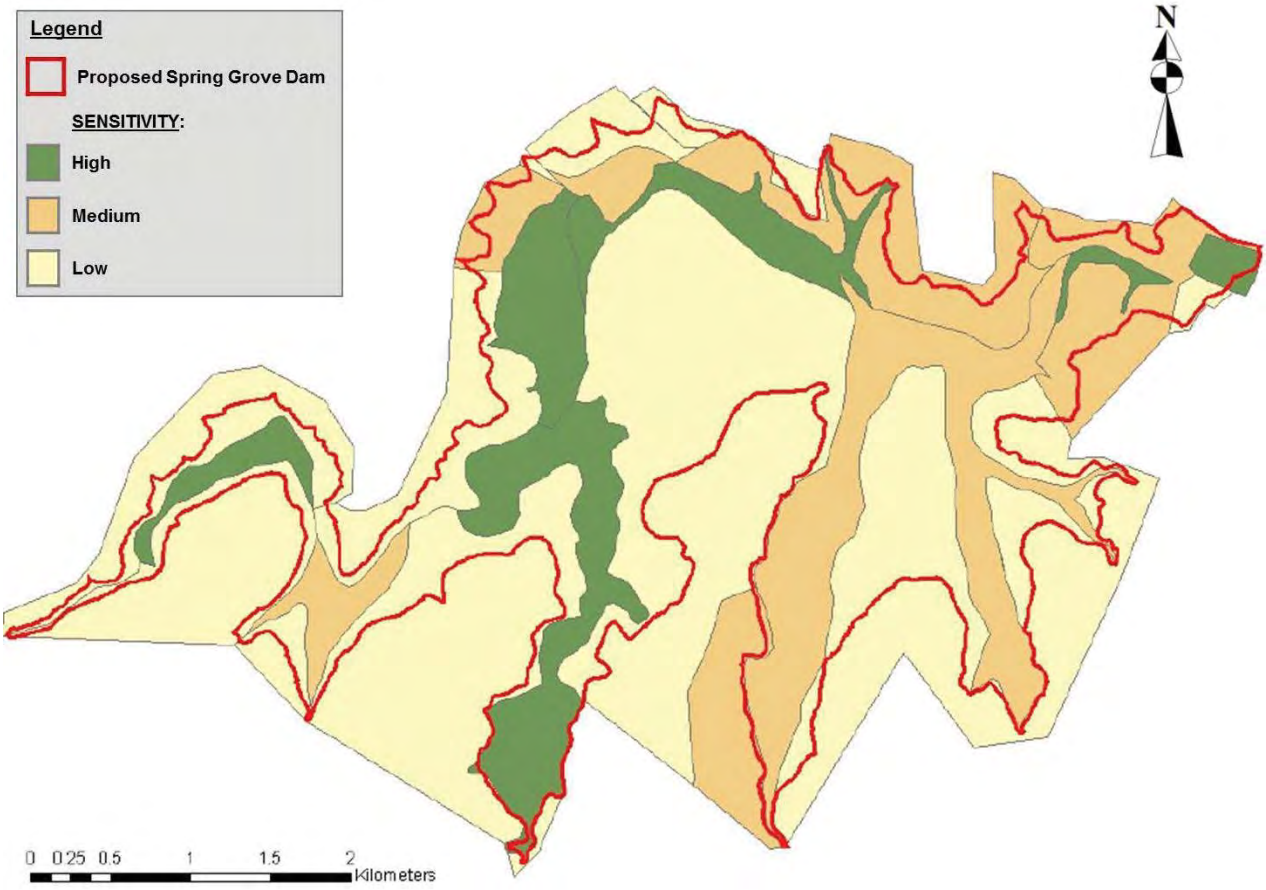

Figure 8: **Sensitivity map of the dam basin (Swanepoel et al, 2009)**

As part of the fauna and flora search, rescue and relocations efforts that took place during the construction phase of the dam, four habitat areas were created which are shown in **Figure 9**. These areas would need to be protected and maintained as part of the future management of the dam and state-owned land.

The northern section of Spring Grove Dam falls within the Mhlangeni Conservancy and the southern part of the dam falls within the Nottingham Road / Rosetta Conservancy.

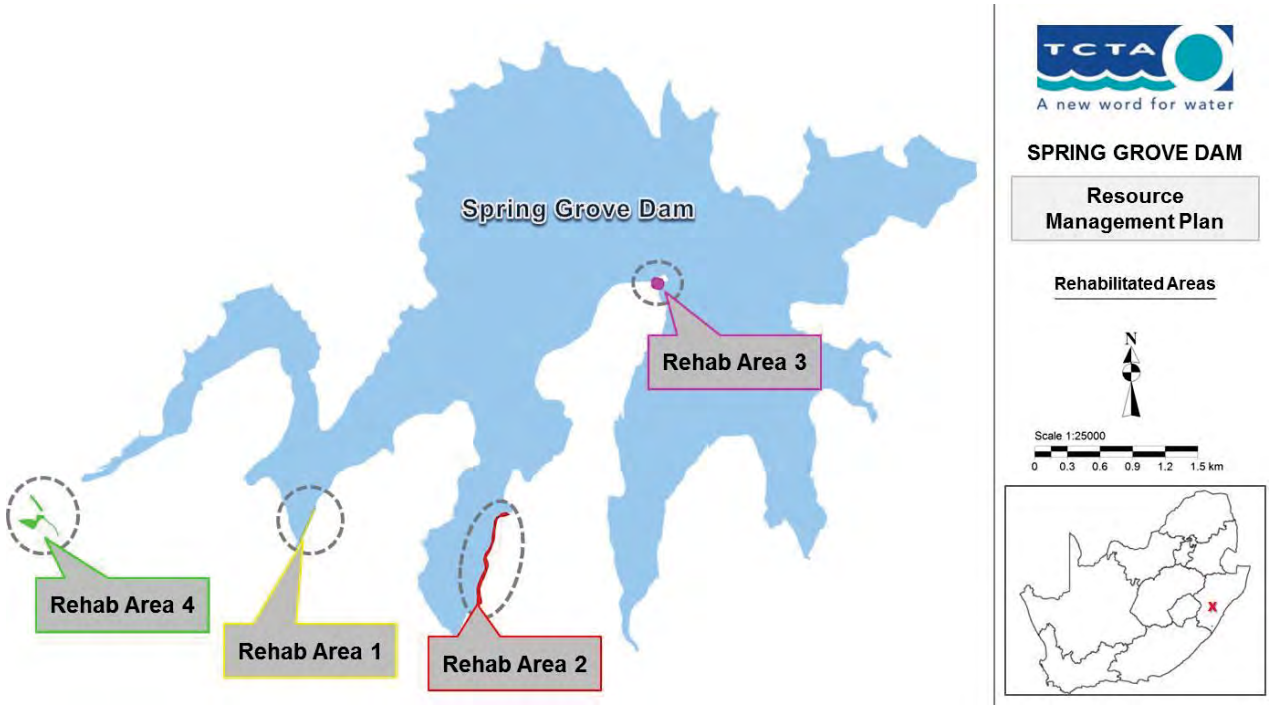

Figure 9: Rehabilitated areas

2.8 Socio-economic Environment

2.8.1 Land Use

The greater area is characterised by extensive mixed farming (predominantly dairy pastures) with beef, cash crops and timber farming also being significant enterprises. There are numerous smallholdings in the sub-region, some of which are used for weekend and holiday accommodation, while others are permanently occupied.

Agriculture is the dominant land use around the dam. It is expected that the land use may shift in some areas around the dam to tourism, in order to exploit the visual and potential recreational qualities of the dam.

2.8.2 Socio-Economic Baseline

An overview of the socio-economic baseline for the Mpofana Local Municipality and uMngeni Local Municipality is contained in the Research Report (RMP Volume 4) and is not repeated here.

2.8.3 Tourism

The area forms part of the KwaZulu-Natal Midlands Meander, which is an important tourist node and one of the most successful tourist circuits in the country. The circular route out of Nottingham Road through the Kamberg and back into Rosetta is rated as one of the country's most scenic motoring outings and is increasingly popular as a weekend drive. Both Rosetta and Nottingham Road have become increasingly popular as weekend destinations with various accommodation venues.

The rivers and dams of the area have been stocked with trout for many years, which forms the basis of a robust recreational fishing industry and an important element of the local economy (DWAF, 2002).

Spring Grove Dam is located within easy reach of the Drakensberg, which lies to the west. The camps at Kamberg, Loteni, Highmoor and Giants Castle are all within an easy drive of approximately one hour.

Besides the wealth of the surrounding natural attractions and the tourism facilities, there is also a wide variety of cultural and historical features. Fort Nottingham is immediately south of the dam and within a very short drive. The South African Crane Foundation is north-west of the site.

2.8.4 Community Composition

2.8.4.1 Local communities

Local communities within a ± 20 km radius of the dam, are shown in **Figure 10**.

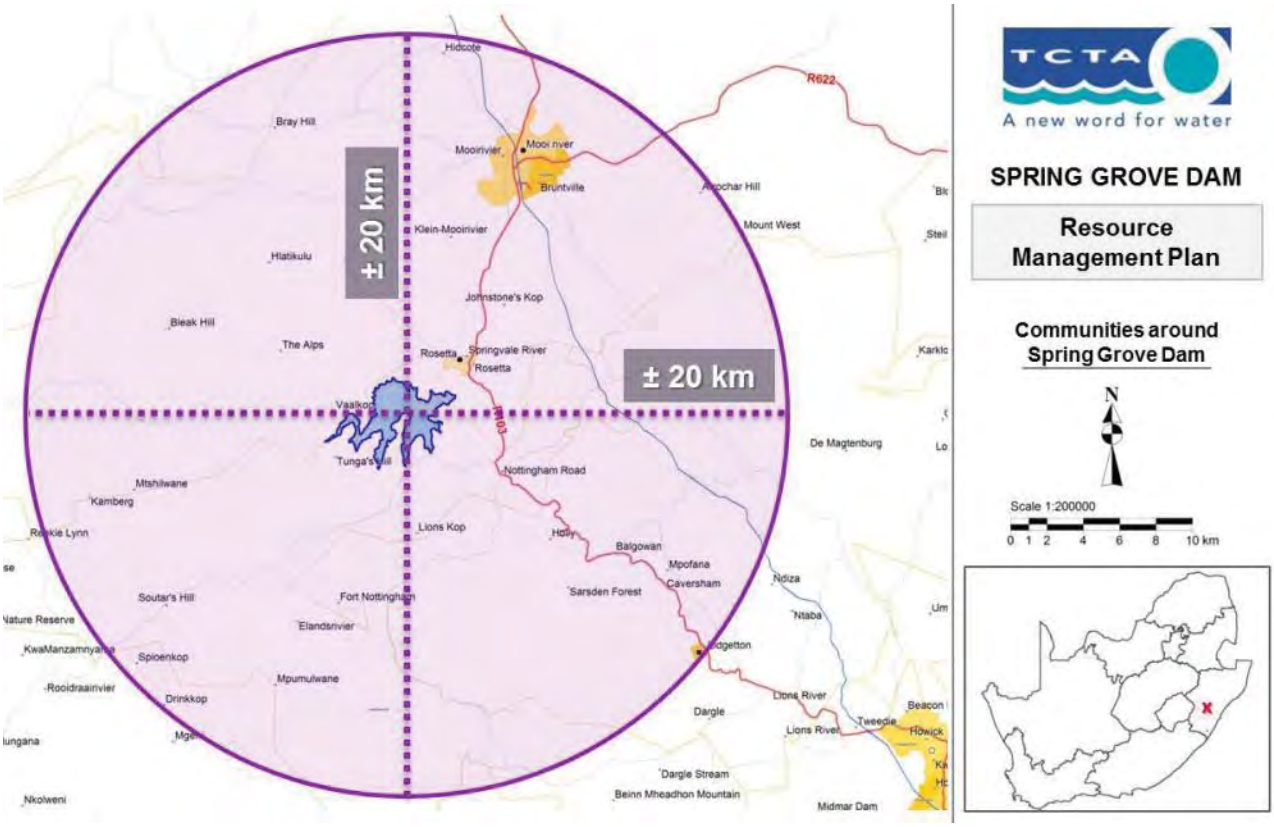

Figure 10: Communities around Spring Grove Dam

The nearest urban centres to Spring Grove Dam which serve the sub-regional economy include Mooi River (approx. 15 km to the north-east) and Howick (approx. 35 km to the south-east).

Secondary nodes near Spring Grove Dam include Rosetta, Lidgetton and Nottingham Road, which are all linked by the R103. These areas play an important role as service centres to farmers, providing housing and a small range of commercial and social services.

2.8.4.2 Affected Communities

The members of the community who will be mostly affected by the use of Spring Grove Dam include the shoreline landowners and residents along the D146 (depending on future access arrangements). In addition, the community along the Kamberg Road may also potentially be affected if access is sought from this road to the dam.

2.8.4.3 Host Communities

As this is a new impoundment, with no existing arrangements for recreational use, no members of the community have established any direct commercial value from Spring Grove Dam. It should be noted that shoreline landowners may pursue ventures to gain from the dam in the future.

During public participation for the RMP (refer to the Objectives Identification Report) some Interested and Affected Parties expressed an interest in undertaking ecotourism activities at the dam.

2.8.5 Land Ownership

Spring Grove Dam is surrounded by privately owned land. The expropriation of land and the relocation of services for the dam was planned and implemented according to the 1:100 year backwater profiles as well as the point of no influence of the proposed dam. The purchase line was determined in terms with standing DWA policy to determine the buffer line, which was calculated as the greater of 1,5m vertically above the 1:100 year flood level or 15m horizontally. This resulted in a very narrow strip of state-owned land around the dam (see **Figure 11**).

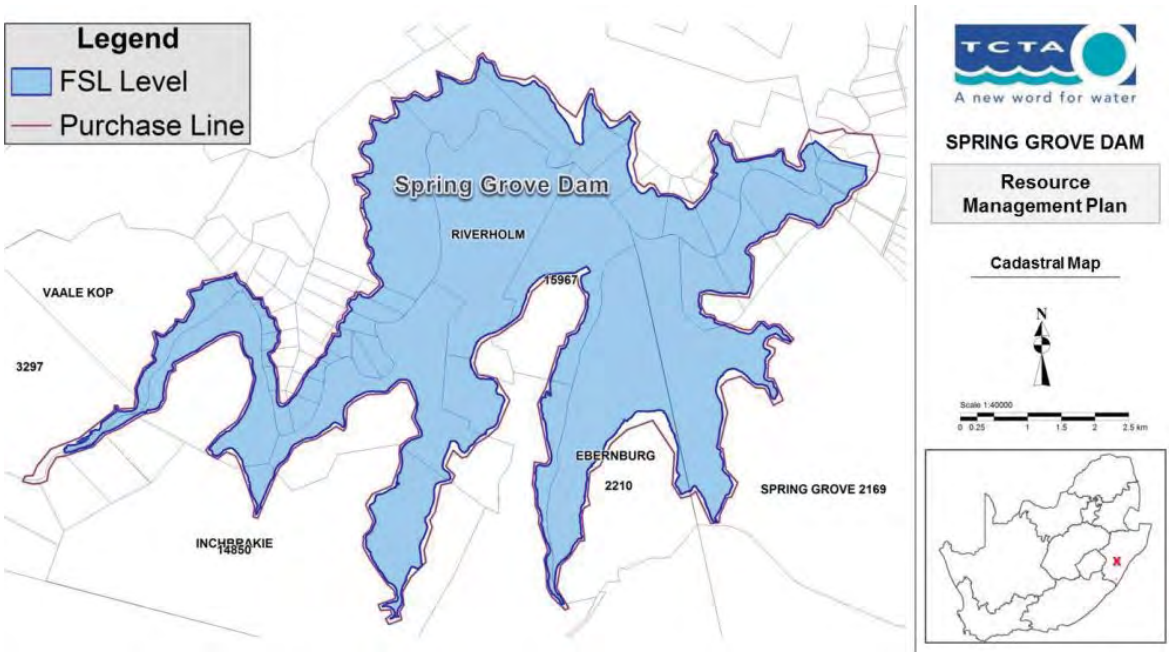

Figure 11: Cadastral map

2.8.6 Safety of Navigation

In addition to its common law responsibility, DWA is, in terms of the requirements described in the NWA, amongst others, responsible for the safety of Government's waterways and watercourses, including its dams. DWA, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or floating Aids to Navigation (AtoN) for general navigation. A marine Aid to Navigation (AtoN) is defined by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) as "*A device or system external to vessels that is designed and operated to enhance the safe and efficient navigation of vessels and/or vessel traffic*".

In addition to the DWA, Local Accountable AtoN Parties (LAAP) and other Bodies providing access to Government waterways and watercourses have a responsibility to ensure that the required fixed and/or floating AtoN are provided after obtaining the necessary support from DWA and thereafter the permission by SAMSA.

In order to demarcate specific zones/areas, standardised demarcation markers are to be used in conjunction with the relevant AtoN. There are currently no adequate, standardised and harmonised fixed and floating AtoN and Demarcation Markers in place.

2.9 Built Environment

2.9.1 Permanent Infrastructure for Dam Operation

The permanent infrastructure which is required for the operation of the dam includes –

- Pumping station and switch yard;
- Operator's office;
- Stores and boat house;
- Staff accommodation;
- Water Treatment Works; and
- Sub-station.

2.9.2 Transportation Network

As shown in **Figure 12**, The Nottingham Road to Lower Loteni provincial road (P27- 30) runs to the south of the dam whilst the Kamberg Road (Rosetta to Giants Castle) (P164) runs along the north-western boundary.

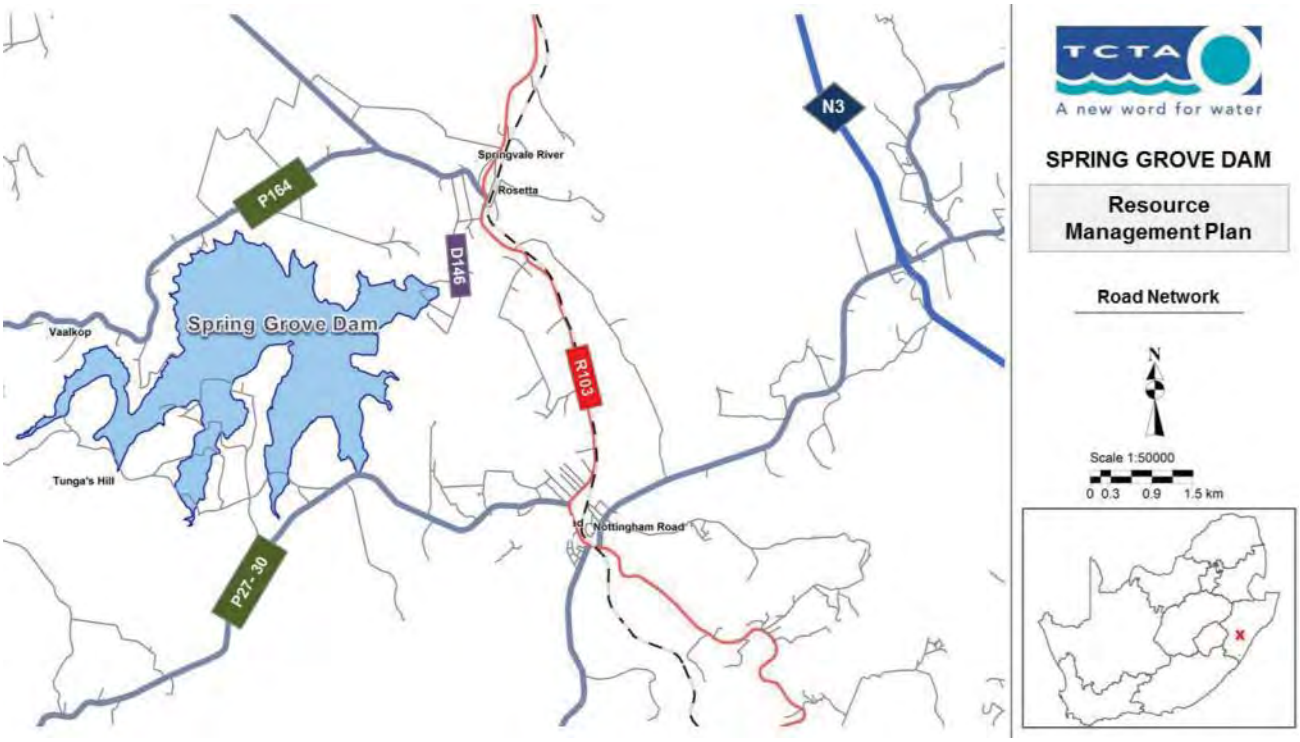

Figure 12: Road network

The dam is surrounded by private land with no direct access for the public.

2.9.3 Fencing

The dam basin was fenced off with a six-strand fence (five strands in certain areas where provision was made for the movement of Oribi) along the purchase line, in accordance with DWA' standards. The size and type of gates, the number and positions required and the type of locks or padlocks still need to be decided upon in collaboration with DWA and the adjoining landowners. Gates were installed during the construction phase to accommodate landowners for stock watering purposes.

2.9.4 Road 13 Embankment

A road embankment (referred to as Road 13) was built over the dam to replace an existing private road (Inchbrakie-Vaalekop South Access Road) that was inundated by the dam. This is to allow private landowners to access their properties

2.9.5 Fish Barrier

A Fish Barrier (see **Figure 13**) was built to prevent smallmouth bass (downstream) from mixing with the trout population (upstream), as the basin will eventually inundate Inchbrakie Falls. It is noted that the impoundment created by the Fish Barrier did not form part of the scope for the Spring Grove Dam RMP. The landowners around the Fish Barrier impoundment retain use of the land as only a servitude of submergence was acquired, There is thus no state-owned land around this impoundment.

Figure 13: Fish Barrier

2.9.6 Spring Grove Gauging Weir

A gauging weir was built downstream of Spring Grove Dam (see **Figure 14**) which provides flow data that feeds into the dam's control system.

Figure 14: Spring Grove Dam Weir (downstream of dam wall)

2.9.7 Submersible Pumps

Water abstraction points and associated infrastructure, which include submersible pumps on pontoons, are located within the dam. These pontoons are connected via steel cables to two concrete blocks, to allow for movement due to the fluctuating dam levels.

2.10 Encumbrances

As part of the RMP deliverables, an Encumbrance Survey (RMP Volume 2) was conducted to establish whether there are any hindrances to the RMP process or limitations associated with the utilisation of the dam and its shoreline area for recreational purposes.

The encumbrances and key management considerations related to recreational opportunities at Spring Grove Dam are summarised below.

- **Access** -
  - There is no direct access for the public to the dam;

- The access road from the D146 to the dam will be used to access the permanent infrastructure which is required for the operation of the dam (see **Section 2.9.1**), as well as the water treatment works and substation. For the sake of public safety and to prevent any risks to the operation of the dam, no public access will be allowed from this road; and
- All other access roads around the dam traverse of are located on private property and therefore not accessible.

- **Space** -
  - The state-owned land around the basin is a very narrow strip of land and was based on the buffer zone for the safe operation of the dam in terms of standing DWA policy;
  - Very limited space is available for recreational use;
  - Currently, no provision is made for public parking;
  - At certain areas the topography creates steep slopes along the shoreline which discourages recreational uses; and
  - If additional land is to be acquired to provide access then the mechanism through which this can be achieved will need to be investigated further. TCTA's mandate from the Minister only allows for the expropriation for a Government Water Works.
- **Infrastructure – dam related** -
  - Management guidelines will need to be implemented to prevent negligent stocking of the watercourse upstream of the Fish Barrier with bass;
  - No activities / development may jeopardise the intention of the fish barrier;
  - The Fish Barrier creates an instream obstacle to recreational use;
  - The road embankment creates an instream obstacle to recreational use; and
  - A slipway has been built, but will be for the exclusive use of the dam operator. If required, the slipway could be utilised for emergency purposes or for the maintenance of the submersible pumps. No public use of the slipway will be allowed. No provision has been made for any other boat ramps or launches;
- **Infrastructure – private / other** -
  - Water abstraction points and associated infrastructure, which include submersible pumps on pontoons, are located within the dam;
  - Agricultural land use restricts the potential recreational access areas;

- In some areas farm pivots are located in close proximity to the fence line. Expensive and necessary farming equipment adjacent to the state-owned land needs to be safeguarded from any activities undertaken along the shoreline; and
- Certain stock watering points were lost with the expropriation of land, however alternative solutions were provided.

- **Biophysical** -
  - Sensitive habitat may be regarded as no-go for recreational purposes in order to protect the ecological features;
  - The dam basin and surrounding area is regarded as having high biodiversity and the associated ecosystems should be suitably protected. This will influence the areas where recreational access will be allowed;
  - As mentioned, measures need to be implemented to prevent the stocking of smallmouth bass upstream of the Fish Barrier;
  - Pollution of the dam via run-off that is contaminated by agricultural practices and other possible pollution sources in the catchment may impact on the dam's suitability for recreational use;
  - The trophic status of the dam needs to be considered for recreational use of the impoundment; and
  - The water is likely to be cold, even in summer, which will promote seasonal water based recreation. It is therefore likely that the dam will have a high tourist season (late spring, summer and autumn) and a low season (winter and early spring).
- **Dam Operations** -
  - Fluctuations in the dam level due to transfers may adversely impact on the recreational use of the dam.
- **Amenities** -
  - The narrow strip of the shoreline area on the state land, as well as its relatedness to the buffer zone for the safe operation of the dam, hampers the provision of amenities (e.g. ablution facilities, drinking water, benches) to public users; and
  - Amenities and associated activities along shoreline state-owned land may be highly conspicuous to private landowners.
- **Safety and Security** -

- The private land will be easily accessible from the adjoining state-owned land, as the boundary consists of a six-strand fence (five strands in certain areas to make provision for the movement of Oribi); and
- Likewise, access can also easily be gained to the dam's surface from state-owned land, with the potential to lead to uncontrolled use.

- **Fire Management** -
  - Due to the proximity of cultivated land, homestead and other structures to the state-owned land in certain areas, this private property may be at risk from fires that start on such land, if fire breaks are not maintained.
- **Institutional Arrangements** -
  - Institutional arrangements are crucial to the successful management of the dam and state-owned land.
- **Community Expectations** -
  - There may have been some expectation created during the EIA amongst the community members that the dam and state-owned land could be accessed for recreational use;
  - Shoreline landowners may have an expectation that they will be granted access to the dam's surface and state-owned land; and
  - Certain of the shoreline landowners had existing entitlements with regards to the Mooi River prior to impoundment.

2.11 Current Institutional Arrangements

Spring Grove Dam is a DWA-owned Government Waterwork and it will be managed in accordance with the NWA. DWA will enter into an agreement with Umgeni Water to operate the dam on behalf of this Department. Umgeni Water will manage the water surface and the infrastructure. It is anticipated that Msinsi Holdings (Pty) Ltd, which is a subsidiary of Umgeni Water, will be responsible for the management of the state-owned land surrounding the dam, which will include access, recreational facilities for the public and water resource/biodiversity protection. Umgeni Water pays an annual management fee to Msinsi Holdings (Pty) Ltd to undertake all activities which relate to the aforementioned tasks.

As it is a new dam, no further arrangements are currently in place. Public access to the waterbody is not permitted at present.

Other important Government Departments that will have an official management role include *inter alia* the Department of Transport in relation to boats on the dam, SAMSA, the Department of Public Works and the Department of Sports and Recreation.