RESOURCE QUALITY
INFORMATION SERVICES

STATE OF RIVERS REPORT

River Ecostatus Monitoring Programme

2017 - 2018

WATER IS LIFE - SANITATION IS DIGNITY

www.dws.gov.za

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

DOCUMENT STATUS:

WORKING TITLE: River Ecostatus Monitoring Programme State of Rivers Report 2017-2018

EDITORS: Christa Thirion and Nolusindiso Jafta

REPORT STATUS: First version

RQS REPORT NUMBER: N/0000/00/REMP/2019

DATE: September 2019

State of Rivers Report

Editors: Christa Thirion and Nolusindiso Jafta

Contributing Organisations:

Department of Water and Sanitation:

Resource Quality Information Services: Resource Quality Monitoring

Integrated Water Resources Management Support

Regional Offices: Eastern Cape, Free State, Gauteng, Kwa-Zulu-Natal, Limpopo, Mpumulanga, Northern Cape, North West, Western Cape.

Catchment Management Agencies:

Breede-Gouritz Catchment Management Agency

Inkomati-Ususthu Catchment Management Agency

Other Organisations:

Gauteng Department of Agriculture and Rural Development

Mpumalanga Tourism and Parks Agency

Northern Cape Department of Environment and Nature Conservation

South African National Parks

State of Rivers Report 2017-2018

Contents

ACRONYMS

BGCMA	Breede Gouritz Catchment Management Agency
CMA	Catchment Management Agencies
EC	Ecological Category
FROC	Frequency of Occurrence
FBIS	Freshwater Biodiversity Information System
GDARD	Gauteng Department of Agriculture and Rural Development
IUCMA	Inkomati-Usuthu Catchment Management Agency
MIRAI v2	Macroinvertebrate Response Assessment Index Version 2
MTPA	Mpumalanga Tourism and Parks Agency
NAEHMP	National Aquatic Ecosystem Health Monitoring Programme
NCDENC	Northern Cape Department of Environment and Nature Concervation
PES	Present Ecological State
REMP	River Ecostatus Monitoring Programme
RHP	River Health Programme
SASS5	South African Scoring System Version 5
SANBI	South African National Biodiversity Institute
SANPARKS	South African National Parks
SQR	Sub Quaternary Reach
WMA	Water Management Area

EXECUTIVE SUMMARY

The South African National Water Act (Act 36 of 1998) requires regulators to establish a sustainable equitable balance between the use and protection of water resources. This includes a range of resource monitoring and protection measures that must be implemented for the rivers in South Africa. The River Ecostatus Monitoring Programme (REMP) enables the monitoring of the ecological condition of river ecosystems in South Africa and provides information to support the management of rivers. River Ecostatus monitoring assists in identifying problems at an early stage so that prevention measures can be initiated timeously. In areas that are poor or unsustainable, intervention actions can be initiated in order to remedy problems and rehabilitate these vital water resources.

The objective of this report is to determine the ecological condition of South Africa's rivers based on the rapid assessment of aquatic macroinvertebrates. This state of the rivers report presents the findings of the river ecostatus monitoring that was undertaken during the 2017/2018 hydrological year.

The results presented here only reflect the condition of the macroinvertebrates, using the Macroinvertebrate Response Assessment Index (MIRAI). MIRAI is a tool developed by Resource Quality Information Services (RQIS) for Ecological Reserve Determinations, monitoring for water use licence conditions, monitoring of Resource Quality Objectives (RQOs) and for the REMP (Thirion 2007, 2016). The macroinvertebrates were sampled on a quarterly basis using the South African Scoring System version 5 (SASS5) protocol (Dickens and Graham 2002). Examples of invertebrates with different sensitivities are presented in Plate 1. The MIRAI v2 model for each site was populated with the SASS5 results for the 2017/2018 Hydrological year. These results were then used to run the model per site and the condition of the river expressed as an ecological category reflecting a percentage change from reference.

Results are presented for 363 sites spread throughout South Africa. The data for sites falling within the Kruger National Park was provided by SANPARKS, those in the Breede-Gouritz Water Management Area (WMA) by the Breede Gouritz Catchment Management Agency (BGCMA) and those in the Inkomati Usuthu WMA by the Inkomati Usuthu CMA (IUCMA). Approximately 50% of the sites were in a moderately modified (C category) condition (Figure 1). There are few sites (only 16%) that are in AB, B or BC categories, mostly located in the upper reaches of the catchments. Only the Vaal River WMA had no sites in a good (better than C category) condition. Approximately 5% of the sites are in an unsustainable (DE to E) condition. These highly impaired sites are generally in the urban areas and are subjected to modified flows and habitat alteration in addition to pollution. They were located in the Crocodile West section of the Limpopo, Vaal, Olifants, Berg, Mzimvubu-Tsitsikamma and Pongola -Mtamvuna WMAs. See Plate 2 for examples of impacts on rivers.

The results show that upper reaches of rivers tend to be in a better condition, with the state of the rivers deteriorating downstream. Exceptions are the upper reaches of rivers in the Crocodile West, Bronkhorstspruit and Vaal catchments, where the rivers originate in industrial or mining areas.

Parts of the country have experienced low flow conditions, with some rivers ceasing to flow during the reporting period, meaning that they could not be sampled. The drought conditions in a number of areas are exacerbated by intensive water use. As more phenomena like these are experienced due to climate change the country needs to develop and execute strategies to lessen the impacts, better manage land use and protection of water resources. Interventions for the latter would include monitoring and enforcing

adherence to the Reserve and Resource Quality Objectives, with rehabilitatation were water resources have deteriorated to unsustainable conditions.

Rivers in densely populated areas were in poor condition due to the lack of proper management and maintenance of waste water treatment works and insufficient capacities of these works for the population served. Furthermore, many rural areas still lack proper sanitation. Proper and well-managed sanitation solutions should thus be given priority in the country. Waste discharge poses major risks for aquatic and human health and is one of the largest contributors to the deterioration of water resources.

Many sites are currently not sampled. A major portion of these sites are inactive due to access problems or unsuitable flow conditions; Plate 3 gives an illustration of these challeges. Sites could not be accessed because of problems obtaining permission from private land-owners or due to blocked or damaged roads. The majority of sites that were not sampled due to unsuitable flow conditions will be re-activated once the river flows have normalised. Certain sites, particularly some of the sites in the Vaal and Orange catchments are too ephemeral in nature and will have to be discontinued altogether for the in-stream assessments. These sites will only be used for riparian assessments in future. The habitat at some sites was altered to such an extent that it has become impossible to do macroinvertebrate assessments. There were health and safety concerns at 12 sites. Two sites have been discontinued due to the consistent high level of raw sewage, which constitutes a major health risk to staff. The majority of inactive sites with safety concerns are located in nature reserves of game farms where wild animals pose a potential risk to the samplers. The safety concerns may be addressed to a certain extent by providing wildlife awareness courses to the sampling teams or providing them with a trained, experienced and armed game guard. These interventions will however come at a cost.

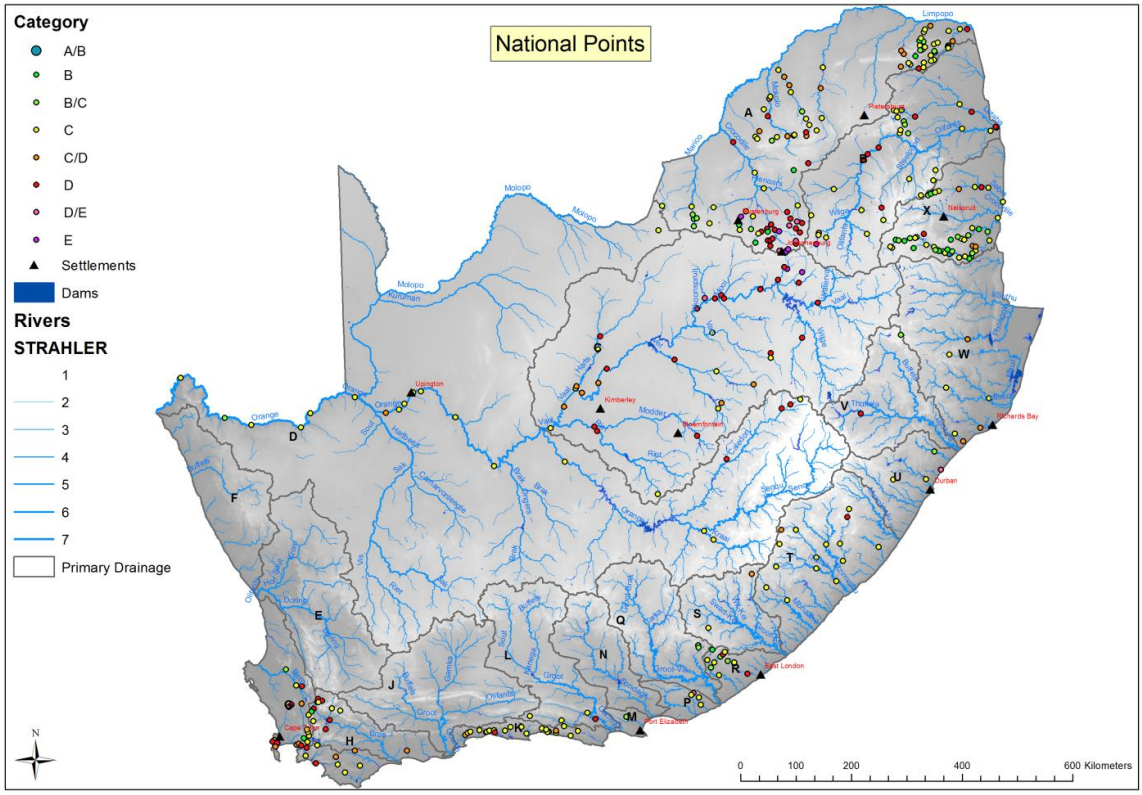

Figure 1. Summary Ecological Categories reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

A lack of capacity remains a major challenge with implementing the REMP. At this stage only the macroinvertebrates are monitored regularly in all the WMAs. Another difficulty is the need for training of regional staff in running the EcoStatus models. A systematic training process is under way, but it has time and cost implications. Financial constraints are a major challenge in the implementation of the REMP. The recent cost-cutting measures implemented in the department necessitated the reduction in the number of sites monitored. Further financial implications are related to the procurement of essential sampling equipment and Personal Protective Equipment (PPE), without which sampling cannot take place.

Riparian zones and instream habitats, which are beneficial to the environment and humans, have deteriorated because of land use activities. In addition to supporting diverse fauna and flora, intact habitats provide goods and services to surrounding communities. An intact riparian zone can buffer the effects of temperature increases on instream habitats, and helps in reducing erosion. Everyone needs to contribute to sustainable solutions in this space. Municipalities need better and greener town planning and improved service delivery to densely populated areas. Mining companies need to be held accountable where there has been improper management of mining activities. Compliance and enforcement measures need to be tightened, for example on illegal sand and diamond mining prevalent in Eastern Cape and Northern Cape.

Sustainable agricultural practices are encouraged, where preserving of biodiversity and protection of the environment are practised with reduced use of fertilisers and water. Other environmentally-friendly farming methods include drip irrigation, low tillage to reduce erosion and water use, and crop and livestock rotation to improve water quality and increase carbon sequestration.

To solve implementation challenges, the River Ecostatus Monitoring Programme needs to be well resourced. The provinces with limited resources will need support until they are able to implement the programme independently. Integrated Water Resource Management is a necessity for the successful management of any type of water resource. Strong government, private and public inter-relations are needed for promoting the values of the National Water Act: protection, management, and equitable and sustainable use.

Plate 1: Examples of macroinvertebrate taxa with different levels of sensitivity.

Plate 2: Photographs depicting activities impacting on the ecological condition of rivers (Clockwise: Mining on river banks in Northern Cape; Diamond mining within the river in Lower Vaal; Informal settlements and dumping on Kaalspruit in Gauteng; Sand mining of the Tyumen River in Eastern Cape; Runoff from agricultural land in the Upper Vaal catchment; and Bank erosion along Hex River due to the bridge and trampling).

Plate 3: Photographs relating to flow, safety and access issues (Clockwise: Samplers guarderd by armed ranger due to occurrence of dangerous wildlife in the Kruger National Park; Instream monitoring cannot be conducted on dry rivers, picture is from Swart River in Western Cape; Difficulty to access sites is prevalent where rivers flow through private property; and Flooding rivers are dangerous to sample due to possible drowning).

INTRODUCTION

The South African National Water Act (Act 36 of 1998) requires regulators to establish a sustainable equitable balance between the use and protection of water resources. This includes a range of resource monitoring and protection measures that must be implemented for the rivers of South Africa. The National Aquatic Ecosystem Health Monitoring Programme is an initiative established by the Department of Water and Sanitation to develop and implement a range of monitoring programmes for various water resources in South Africa. The South African River Health Programme (RHP) was initiated in 1994 in response to the need for more detailed information on the condition of South Africa's river ecosystems. The RHP was initiated prior to the promulgation of the Water Act and as such did not align completely with the Act, so it was later replaced by the River Ecostatus Monitoring Programme (REMP). The REMP enables the monitoring of the ecological condition of river ecosystems in South Africa. The REMP provides information regarding the ecological wellbeing of river ecosystems to support the management of rivers and was designed to meet the following objectives:

- Measure, assess and report the ecological state of river ecosystems;
- Detect and report spatial and temporal trends in the ecological state of river ecosystems;
- Identify and report emerging problems regarding river ecosystems;
- Ensure that all river ecosystem status reports provide scientifically relevant information for the management of these river ecosystems; and
- Create public capacity and environmental awareness.

River Ecostatus monitoring assists in identifying water-related problems at an early stage so that prevention measures can be initiated before the problem becomes severe. In areas where the status is poor or unsustainable, remedial actions can be initiated in order to rehabilitate the water resources.

OBJECTIVES OF THIS REPORT

The objective of this report is to show the ecological condition of South Africa's rivers based on the rapid assessment of aquatic macroinvertebrates.

This state of the rivers report presents the findings of river ecostatus monitoring that was undertaken during the 2017/2018 hydrological year.

METHODS

The results presented here only reflect the condition of the macroinvertebrates, using the Macroinvertebrate Response Assessment Index (MIRAI). MIRAI is a tool developed by RQIS for Ecological Reserve Determinations, monitoring for water use licence conditions, monitoring of Resource Quality Objectives (RQOs) and for the River Ecostatus Monitoring Programme (Thirion 2007, 2016). The macroinvertebrates were sampled on a quarterly basis using the SASS5 protocol (Dickens and Graham 2002). The MIRAI v2 model for each site was populated with the SASS5 results for the 2017-2018 Hydrological year. These results were then used to run the model per site and the condition of the river expressed as an ecological category (Table 1) reflecting a percentage change from reference.

The REMP makes use of a suite of ecological indicators that have specifically been selected for their ability to integrate the impact of multiple disturbances on the state of rivers. The integration of the ecological indicators then provides information on the overall condition or health of the river, known as the ecological status (EcoStatus). This totality of the features and characteristics of the river and its riparian areas

manifests in its ability to support a natural array of species. This ability directly relates to the capacity of the system to provide a variety of ecosystem services (Kleynhans and Louw 2008).

The Ecoclassification approach makes use of a range of ecological categories to describe the condition of the component under consideration ranging from natural (A) to critically modified (F) (Table 1). The following components are considered in an ecoclassification assessment:

- System drivers, non-living or abiotic components (physico-chemical, habitat, hydrology) which provide a particular habitat template, and
- Biological responses (fish, riparian vegetation and aquatic invertebrates) that provide information related to the effect (or response) of the ecosystem to the state of driver variables.

Table 1: Generic Ecological Categories (EC) for Ecological Integrity Categories (modified from Kleynhans 1996 & Kleynhans 1999).

ECOLOGICAL CATEGORY	GENERIC DESCRIPTION OF ECOLOGICAL CONDITIONS	ARBITRARY GUIDELINE SCORE (% OF MAXIMUM THEORETICAL TOTAL)
A	**Unmodified/natural.** Close to natural or close to predevelopment conditions within the natural variability of the system drivers: hydrology, physico-chemical and geomorphology. The habitat template and biological components can be considered close to natural or to pre-development conditions. The resilience of the system has not been compromised.	>92 - 100
A/B	The system and its components are in a close to natural condition most of the time. Conditions may rarely and temporarily decrease below the upper boundary of a B category.	>88 - ≤92
B	**Largely natural with few modifications**. A small change in the attributes of natural habitats and biota may have taken place in terms of frequencies of occurrence and abundance. Ecosystem functions and resilience are essentially unchanged.	>82 - ≤88
B/C	Close to largely natural most of the time. Conditions may rarely and temporarily decrease below the upper boundary of a C category.	>78 - ≤82
C	**Moderately modified.** Loss and change of natural habitat and biota have occurred in terms of frequencies of occurrence and abundance. Basic ecosystem functions are still predominantly unchanged. The resilience of the system to recover from human impacts has not been lost and it is ability to recover to a moderately modified condition following disturbance has been maintained.	>62 - ≤78
C/D	**The system is in a close to moderately modified condition most of the time.** Conditions may rarely and temporarily decrease below the upper boundary of a D category.	>58 - ≤62
D	**Largely modified.** A large change or loss of natural habitat, biota and basic ecosystem functions have occurred. The resilience of the system to sustain this category has not been compromised and the ability to deliver Ecosystem Services has been maintained.	>42 -≤58
D/E	**The system is in a close to largely modified condition most of the time.** Conditions may rarely and temporarily decrease below the upper boundary of an E category. The resilience of the system is often under severe stress and may be lost permanently if adverse impacts continue.	>38 - ≤42
E	**Seriously modified.** The change in the natural habitat template, biota and basic ecosystem functions are extensive. Only resilient biota may survive and it is highly likely that invasive and problem (pest) species may dominate. The resilience of the system is severely compromised as is the capacity to provide Ecosystem Services. However, geomorphological conditions are largely intact but extensive restoration may be required to improve the system's hydrology and physico-chemical conditions.	20 - ≤38
F	**Critically / Extremely modified.** Modifications have reached a critical level and the system has been modified completely with an almost complete change of the natural habitat template, biota and basic ecosystem functions. Ecosystem Services have largely been lost This is likely to include severe catchment changes as well as hydrological, physico-chemical and geomorphological changes. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible. Restoration of the system to a synthetic but sustainable condition acceptable for human purposes and to limit downstream impacts is the only option.	<20

The results of applying the biological and habitat indices during a river survey provide the context for determining the degree of ecological modification at the monitoring site. The degree of modification observed at a particular site therefore translates into the Present Ecological State (PES).

Due to capacity constraints in the regions, this report is based only on the macroinvertebrate assemblage.

Macroinvertebrate communities are good, short-term, biotic indicators of integrated stressors on river resources (Dickens and Graham 2002). Macroinvertebrate community composition and abundance can be affected by flow alterations, habitat disturbance and water quality perturbations, or any combination of these stressors (Thirion 2007). Macroinvertebrates possess various sensitivities to these three system drivers thereby giving an indication of the overall disturbance to the ecological integrity of a freshwater resource (Thirion 2007, 2016).

Sampling was conducted according to the South African Scoring System Version 5 (SASS5) method, which is a rapid biomonitoring tool that was developed for lotic (flowing water) systems only. The method assesses macroinvertebrate assemblages occupying different habitats and uses pre-determined sensitivity weightings assigned per taxon. Macroinvertebrates are identified mostly to family level. This method gives an indication of water quality impairment and overall river integrity/health. Detail on the method can be obtained in Dickens and Graham (2002).

The MIRAI v2 (Macroinvertebrate Response Assessment Index version 2) was used to analyse the SASS5 data collected. Present-day and relevant historic data for sites was sourced. The MIRAI was developed to provide a habitat-based cause-and-effect foundation for interpreting the deviation of the macroinvertebrate assemblage from reference condition (Thirion 2007, 2016).

The MIRAI generates an Ecological Category (EC) for macroinvertebrates by integrating the ecological requirements of an assemblage and relating this to modified flow, habitat and water quality conditions. Reference conditions for this project were set by using historic data as well as the reference taxa generator functionality of MIRAI v2 and specialist judgement. Frequencies of Occurrence (FROCs) were set using the SASS5 data (Thirion 2007, 2016).

DATA ARCHIVING

Prior to 2014 the fish and Macroinvertebrate data collected through the REMP was archived in the Rivers Database. This database which was specifically developed for the River Health Programme (precursor to the REMP) became non-functional in 2014. The Rivers Database was developed under Windows XP and funds were not available for upgrading it. Since then the Freshwater Research Centre in Cape Town received donor funding to develop a freshwater biodiversity information system (FBIS), initially for the Cape Floristic Kingdom, but later expanded to the whole of South Africa. The data captured on the Rivers Database has since been imported into the FBIS. Version 2 of FBIS became available in July 2019 (FBIS 2019). At this stage the FBIS can only store invertebrate and fish information. RQIS will be assisting regional offices with capturing historical information while the regional staff will be responsible for entering new information once they have received training. The FBIS is hosted on a web server and data can only be captured online, requiring a stable internet connection.

ECOLOGICAL CONDITION OF SOUTH AFRICAN RIVERS

NATIONAL PERSPECTIVE

Results are presented for 364 sites spread throughout the country. Another 108 sites were sampled but not enough data was available to run the MIRAI models. The data for sites falling within the Kruger National Park was provided by SANPARKS, those in the Breede-Gouritz WMA by the Breede Gouritz Water Management Agency (BGCMA) and those in the Inkomati Usuthu WMA by the Inkomati Usuthu CMA (IUCMA). The results obtained from the MIRAI models are presented graphically in Figures 1 to 23. Approximately 50% of the sites were in a moderately modified (C category) condition (Figure 2). Few sites (16%) are in AB, B or BC categories. These sites are mostly located in the upper reaches of the catchments. Only the Vaal River WMA had no sites in a good (better than C category) condition. Approximately 5% of the sites are in an unsustainable (DE to E) condition, generally located in urban areas and subjected to modified flows and habitat alteration in addition to pollution. These highly impaired sites were located in the Crocodile West section of the Limpopo (9 sites), the Vaal (4 sites) and one site in each of the Olifants, Berg, Mzimvubu-Tsitsikamma and Pongola-Mtamvuna WMAs. See Plate 2 for examples of impacts on rivers.

Many sites are currently not sampled. A major portion of these sites are inactive due to access problems or unsuitable flow conditions; Plate 3 gives an illustration of these challeges. Sites could not be accessed because of problems obtaining permission from private land-owners or due to blocked or damaged roads. The majority of sites that were not sampled due to unsuitable flow conditions will be re-activated once the river flows have normalised. Certain sites, particularly some of the sites in the Vaal and Orange catchments are too ephemeral in nature and will have to be discontinued altogether for the in-stream assessments. These sites will only be used for riparian assessments in future. The habitat at some sites was altered to such an extent that it has become impossible to do macroinvertebrate assessments. There were health and safety concerns at 12 sites. Two sites have been discontinued due to the consistent high level of raw sewage, which constitutes a major health risk to staff. The majority of inactive sites with safety concerns are located in nature reserves of game farms where wild animals pose a potential risk to the samplers. The safety concerns may be addressed to a certain extent by providing wildlife awareness courses to the sampling teams or providing them with a trained, experienced and armed game guard. These interventions will however come at a cost.

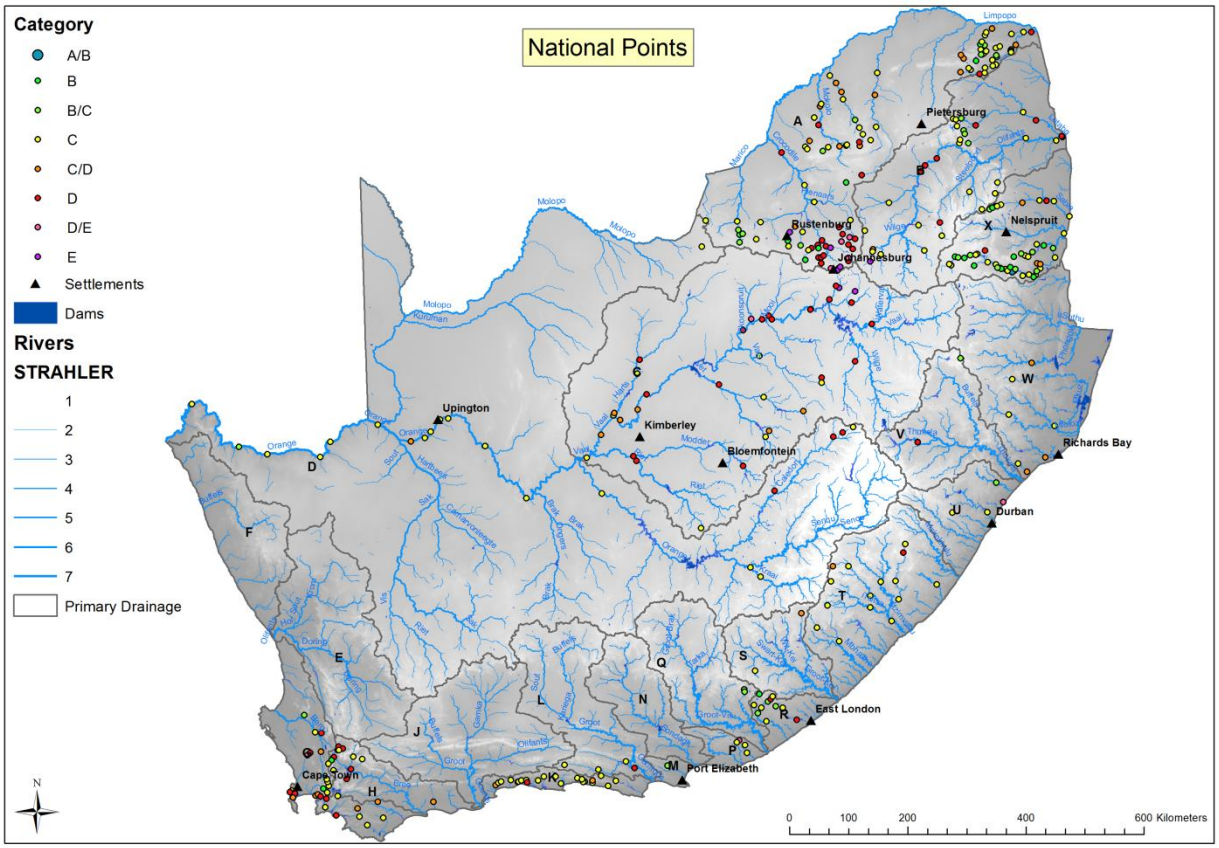

Figure 2. Summary Ecological Categories reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with blue and green representing relatively good conditions while the red and purple reflect relatively poor conditions

Plate 2: Photographs depicting activities impacting on the ecological condition of rivers (Clockwise: Mining on river banks in Northern Cape; Diamond mining within the river in Lower Vaal; Informal settlements and dumping on Kaalspruit in Gauteng; Sand mining of the Tyumen River in Eastern Cape; Runoff from agricultural land in the Upper Vaal catchment; and Bank erosion along Hex River due to the bridge and trampling).

Plate 3: Photographs relating to flow, safety and access issues (Clockwise: Samplers guarderd by armed ranger due to occurrence of dangerous wildlife in the Kruger National Park; Instream monitoring cannot be conducted on dry rivers, picture is from Swart River in Western Cape; Difficulty to access sites is prevalent where rivers flow through private property; and Flooding rivers are dangerous to sample due to possible drowning).

REGIONAL PERSPECTIVE

DRAINAGE REGION A (LIMPOPO WATER MANAGEMENT AREA)

The A primary drainage region falls completely within the Limpopo Water Management Area. Secondary drainage regions within the A drainage region are sampled quarterly by the North West (A1-A3) and the Limpopo (A4-A9) regional offices. The section of the Luvuvhu catchment that falls within the Kruger National Park is sampled annually by Mr Hendrik Sithole of SANPARKS. There are nine secondary drainage regions:

- A1: Ngotwane
- A2: Crocodile West
- A3: Groot Marico
- A4: Mokolo/ Matlabas
- A5: Lephalale
- A6: Mogalakwena
- A7: Sand (not sampled as it is a seasonal system)
- A8:Nzhelele/ Nwanedi
- A9: Luvuvhu

The condition of the rivers in primary drainage region A is provided in Figure 3. There are 134 REMP monitoring sites in this drainage region. At 128 of them, scheduled monitoring is difficult; see Annexure A for the reasons.

A1: Ngotwane

There is only one site (A1NGOT-DINOK) on the Ngotwane that is currently sampled. This site is located approximately 1 km from the source of the Ngotwane at Dinokana Springs. It is currently in a moderately modified (C) condition due mostly to alterations in flow. Dinokana Springs is used to supply domestic water to the nearby villages.

A2: Crocodile West

There are 40 sites in this secondary drainage region. The main rivers sampled include the Crocodile, Jukskei, Magalies, Apies, Pienaars, Hennops and Elands including a number of tributaries. Four sites in the Crocodile West, Elands and Koster rivers could not be sampled in this hydrological year due to unsuitable flow conditions. The majority of the sites (13) were in a largely modified (D) condition. Four sites were in a D/E category and another 5 were in an unsustainable seriously modified E category. Only four sites were in a largely natural (B) category and 8 were in a moderately modified (C) condition. The five sites that were in B or B/C categories were all located in the upper reaches of the rivers (Magalies, Plat, Skeerpoort, Watervals and Sterkstroom), whereas the sites that were in poor condition (D to E) tended to be around the urban areas. The main impacts in the Crocodile West catchment were related to mining, industry and agricultural practices.

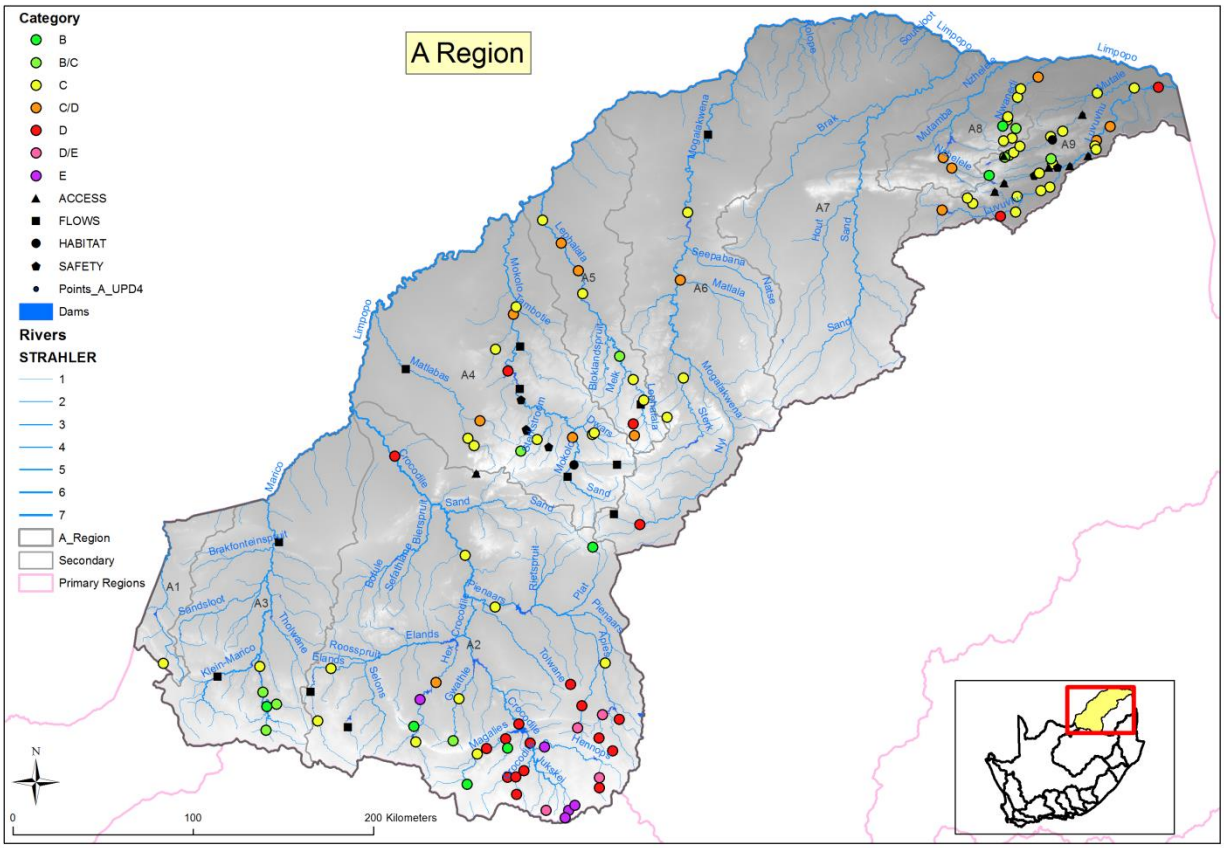

Figure 3. Summary Ecological Categories in primary drainage region A reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

A3: Groot Marico

Only five of the seven sites in the Groot Marico catchment were sampled. The Klein Marico downstream of the Klein Maricopoort Dam and the Groot Marico downstream of the Molatedi Dam did not have suitable flows. This catchment is in a reasonably good condition ranging from a B/C category upstream of GrootMarico Town to a moderately modified (C) condition downstream of the Marico Bosveld Dam. The main impacts were due to agricultural activities. The site downstream of the Marico Bosveld Dam is affected by an altered flow regime as no releases into the river are made from the dam. The site at the N4 was impacted by construction work done to repair the bridge. The Kaaloog se loop tributary is also impacted by sedimentation due to the slate mining in the vicinity but is still in a B/C category.

A4: Mokolo/Matlabas

The Mokolo andMatlabas rivers are not always perennial and due to the drought experienced during this hydrological year four sites on the Mokolo and one on the Matlabas could not be sampled due to no or extremely low flow conditions. The sites in the Welgevonden Nature Reserve could not be sampled due to safety concerns relating to wild animals. The upper Matlabas in the Marakele National Park could also not be sampled as no arrangements could be made to obtain access to the national park. The mainstem Matlabas River was in a moderately modified (C) condition while its Mamba tributary was in a slightly worse (C/D) condition. The condition in the Mokolo River ranged from moderately modified (C) to largely modified (D) condition while its tributaries were mostly also in a moderately modified (C) condition

although the upper section of the Sterkstroom was in a slightly better B/C condition. These catchments are mostly impacted by reduced flow and agricultural activities.

A5: Lephalale

The Lephalale catchment has limited water resources but high water demand dominated by irrigation. The upper reaches of the Lephalale River catchment form part of the Waterberg Biosphere Reserve, while there are a number of rural villages in the lower section that are still using water directly from the river for domestic purposes. There are eight monitoring sites on the main Lephalale River and one on the Rietbokvleispruit. One of the sites on the Lephalale could not be sampled due to unsuitable flow conditions. The site just downstream of the Lapalala Wilderness reserve (A5LEPH-MOERD) is in a B/C category while the rest of the sites are mostly in a moderately modified (C) condition. The Rietbokvlei tributary and two of the sites on the Lephalale are in a moderately to largely modified (C/D) condition. The main impacts in this catchment are related to habitat changes due largely to erosion.

A6: Mogalakwena

The Mogalakwena catchment has limited surface water resouces. Only six sites were sampled in this catchment. The condition of the Mogalakwena and its tributaries ranged from moderately modified (C) to largely modified (D) condition. The two dams in the catchment supply water for domestic use and irrigation. The main impacts are related to flow regulation as well as poorly functioning waste water treatment works.

A7: Nzhelele/ Nwanedi

Three sites on the main Nzhelele River were sampled. The tributaries could not be sampled due to accessibility issues. The upper reaches of the Nzhelele was in a largely natural (B) condition, but the section downstream of the Mutshedzi tributary deteriorated to a moderately to largely modified (C/D) condition. The upper part of the catchment is dominated by plantations while the lower section is utilised for irrigation, so the main impacts on the river are flow modification and habitat alteration.

The upper sections of the Nwanedi catchment are perennial whereas the lower sections are more seasonal and often dry up completely during drought conditions. The upper part of the catchment falls within a more natural area but there are numerous informal settlements and agricultural activities in the lower section. Nine sites were sampled in this catchment. Seven sites were sampled on the Nwanedi itself and two sites on the Luphephe tributary. The Luphephe is in a moderately modified (B/C to C) condition, while the Nwanedi River upstream of the Nwanedi Dam is in a largely natural condition. Both dams (Nwanedi and Luphephe) alter the downstream flow to such a degree that the sites downstream of the dams are in a moderately modified (C) and moderately to largely modified (C/D) condition.

A8: Luvuvhu

The Luvhuvhu catchment falls mostly within an agricultural and rural area with the lower section forming part of the Kruger National Park. Only 24 of the 34 sites in this secondary catchment were sampled. Seven of the sites could not be sampled due to access issues, while two sites in the Mutshundudi were not safe to sample and the habitat at one site on the Mutale changed to a wetland and was thus unsuitable for applying river protocols. The catchment is mostly in a moderately modified (C) condition with only 2 sites

the Mukhase and the lower site on the Mutale in a largely natural to moderately modified (B/C) condition and two sites on the Luvhuvhu were in a largely modified (D) condition. The main impacts in this catchment are related to altered flow regimes and changes in habitat due mostly to erosion and sedimentation.

DRAINAGE REGION B (OLIFANTS WATER MANAGEMENT AREA)

The condition of the rivers in primary drainage region B is provided in Figure 4. There are 47 REMP monitoring sites in this drainage region with 14 of them usually experiencing challenges to conduct scheduled monitoring; see Annexure B for the various reasons. Primary drainage B is subdived into the Olifants River (B1 to B7) and Letaba River (B8) sub-catchments.

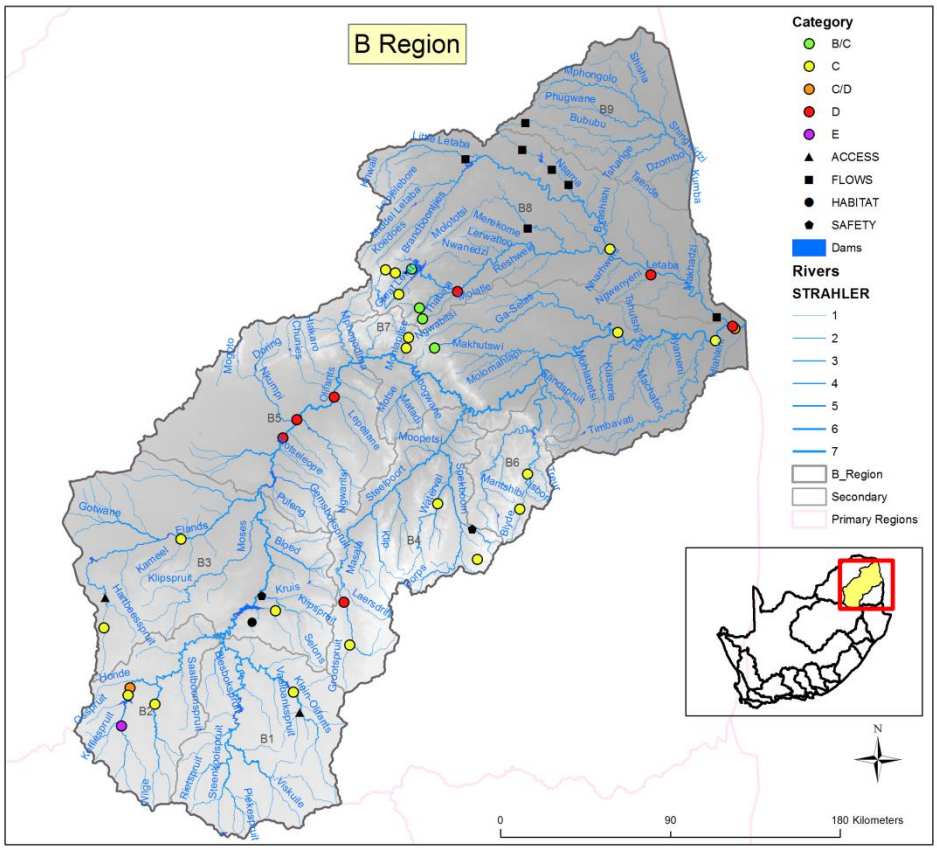

Figure 4. Summary Ecological Categories in primary drainage region B reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

Olifants River

The Olifants River originates at Trichardt to the east of Johannesburg and initially flows northwards before gently curving in a generally eastward direction through the Kruger National Park and into Mozambique, where it joins the Limpopo River before discharging into the Indian Ocean. The Olifants River catchment falls within three provinces; it originates in the west part of Gauteng, after which the majority of it drains Mpumalanga. The last portion is in the Limpopo Province. The main tributaries are the Wilge, Elands and Ga-Selati rivers on the left bank and the Klein Olifants, Steelpoort, Blyde, Klaserie and Timbavati rivers on

the right bank (DWS 2016, DWS 2019a). The Olifants River catchment covers an area of approximately 54 570 km^2 and is subdivided into seven secondary catchments (B1 to B7; DWS 2019a). They are:

- B1: Olifants and Klein Olifants
- B2: Wilge/ Bronkhorstspruit
- B3: Elands/ Olifants
- B4: Steelpoort
- B5: Olifants
- B6: Blyde
- B7: Olifants

B1: Olifants and Klein Olifants

Only one site could be monitored in this secondary catchment, the B1KOLI-MIDDE site on the Klein Olifants River. This part of the Olifants is mostly subjected to extensive coal mining and cultivation. As a result, the condition of the site was found to be in a C category (moderately modified condition).

B2: Wilge/Bronkhortspruit

Secondary catchment B2 is highly developed, with the towns of Delmas and Bronkhorstspruit, extensive agriculture (cultivation and livestock) and coal mining. The largest deterioration is observed on the Bronkhorstspruit, downstream of Delmas (site B2BRON-WAAIK); the site was largely modified, D category, with solid waste within the stream, filamentous algae and an unpleasant sewage odour. The other sites on the Bronkhorstspruit were mostly in a C category (moderately modified condition), as well as the Wilge River site.

B3: Elands and Olifants

Four sites in this secondary catchment could not be monitored mostly due to difficulties with accessing the sites and presence of dangerous wildlife; hence there are also no monitored sites on the main Olifants River. Agriculture is the major land use in this catchment, where the major tributaries are Elands, Kranspoort, and Selons rivers. A moderately modified condition (C category) was the dominant status in the catchment. Major impacts are acid mine drainage and sewage effluent (Dabrowski *et al*. 2013). Although there are no REMP results for the main Olifants River in this secondary catchment, there have been records of microalgal blooms on the Loskop Dam (DWS 2011a) and invasive aquatic plants (water hyacinth).

B4: Steelpoort

Salinity, eutrophication, toxicity and sedimentation have been cited as major problems in the Steelpoort catchment. These are due to irrigation return flows, mining impacts and sewage treatment plant discharges (DWS 2011a). The sites in this secondary catchment were mostly in a C category (moderately modified condition), except for the Steelpoort at Stoffberg town, which was largely modified (D category).

B5: Olifants

The sites in the B5 catchment lie on the main Olifants River. There is a lack of varied habitat types to support high diversity of biota due to the sandy nature of the river in this part of the Olifants River catchment. Intensive citrus agriculture, game farming, informal settlements and high erosion were also observed (DWS 2011a). As a result, all the monitored sites were largely modified (D category), with most of the sensitive invertebrate taxa absent.

B6: Blyde

The Blyde River catchment is characterised by commercial forestry, extensive orchards, croplands, and nature reserves. Monitoring conducted on two sites within this secondary catchment indicate a river that is in a moderately modified (C) condition. Flow reduction due to the plantations and irrigation is suspected to be a major contributor.

B7: Olifants

The majority of this secondary catchment is in the Kruger National Park or other nature reserves. Six sites were monitored in the Lower Olifants and four of them were in a moderately modified (C) condition. The site on the Olifants River just upstream of its confluence with the Letaba River was in a C/D category (moderately to largely modified condition). The Ga-Selati River is mostly within the Lekgalameetse Nature Reserve; as result, the B7GASE-MIDDL site was in a close to largely natural (B/C) category.

B8: Letaba River

The Groot Letaba, Politsi, Debengeni, Thabina and Letsitele rivers rise in the Northern Drakensberg Mountains and cascade down the steep slopes in a north easterly direction. The Little Letaba joins the Groot Letaba in the Kruger National Park to form the Letaba River, which flows eastwards across Park until it joins the Olifants River a short distance upstream of the Mozambique border. The Letaba catchment falls entirely within the B8 secondary catchment and within the Limpopo Province. The REMP focused on 18 monitoring sites where flow hindered monitoring of six sites and one site was inaccessible.

As the Groot Letaba sub-catchment originates in the Drakensberg Mountains, there are commercial plantations, sand mining, and erosion evident. The sites were in a moderately modified condition (C category) at the upstream reaches of the Groot Letaba, Broederstroom, and Debengeni Rivers. The Politsi, Letsitele, and Thabina River sites were close to largely natural (B/C category) as they occur in areas with limited land use impacts and are upstream of villages or towns like Tzaneen and Magoboya. Largely modified conditions were mostly found on the main Letaba River and one site on the Letsitele River, downstream of the highly developed areas of Mariveni and irrigated agriculture.

DRAINAGE REGION C (VAAL AND ORANGE WATER MANAGEMENT AREAS)

The C primary drainage region falls mostly within the Vaal WMA but the Modder-Riet catchment (C5) forms part of the Orange River WMA. This drainage region is sampled quarterly by the Gauteng (Upper Vaal), Free State (Middle Vaal and Modder-Riet) and the Northern Cape (Lower Vaal) regions. The section of the Riet River that falls within the Mokala National Park is sampled annually by Mr Hendrik Sithole of SANPARKS. The Gauteng regional office is assisted by staff of the Gauteng Department of Agriculture and Rural Development (GDARD). The condition of the rivers in primary drainage region C is provided in Figure

5. There are 43 REMP monitoring sites in this drainage region with six of them experiencing challenges to conduct scheduled monitoring; see Annexure C for the various reasons. There are nine secondary drainage regions:

- C1: Vaal
- C2: Vaal
- C3: Harts
- C4: Sand/ Vet
- C5: Modder/Riet
- C6: Vals
- C7: Renoster (could not gain access)
- C8:Wilge
- C9: Vaal

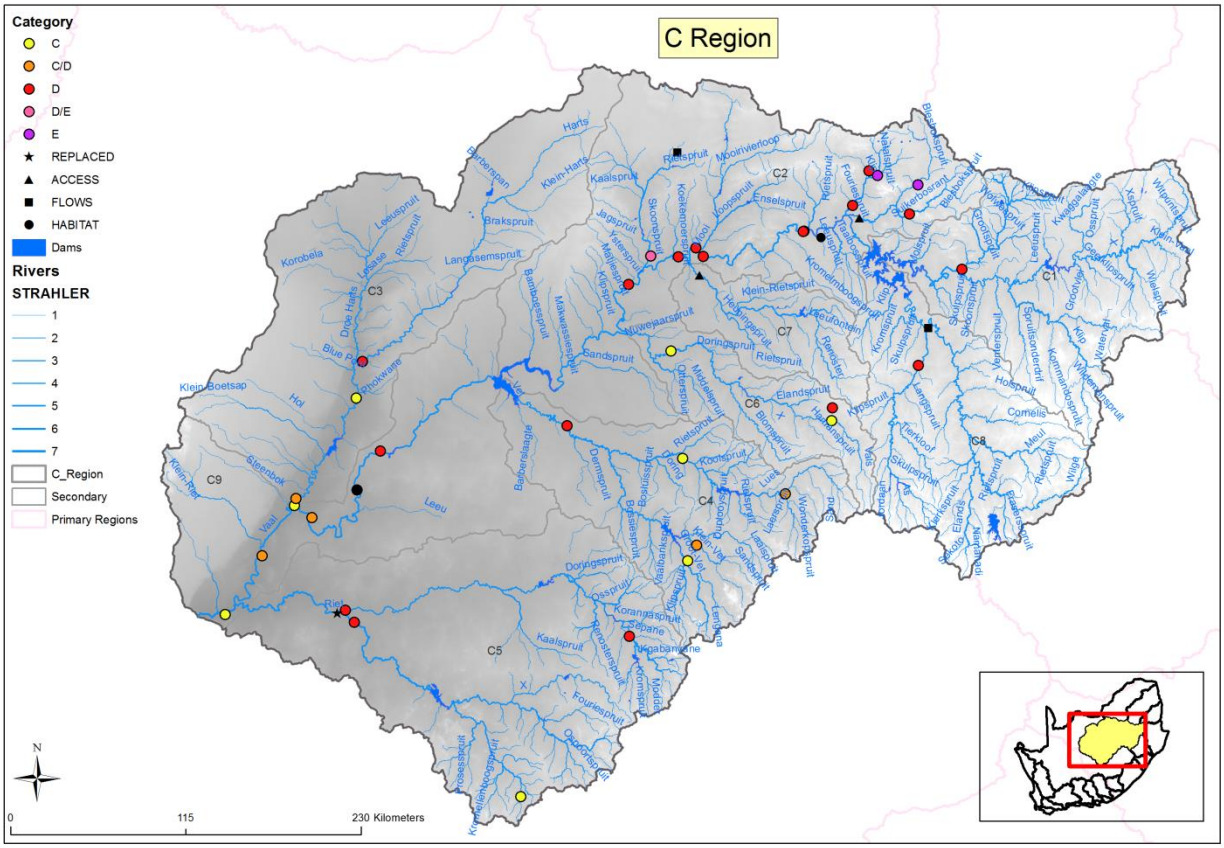

Figure 5. Summary Ecological Categories in drainage region C reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

C1: Vaal River

This secondary catchment comprises the Vaal River and its tributaries upstream of Vaal Dam. The only site in this secondary catchment is on the Watervals River. The Vaal River and its other tributaries have not yet been sampled due to cost-cutting measures and associated travel restrictions. The Watervals River was in a largely modified (D) condition.

C2: Vaal River

This secondary catchment comprises the Vaal River and its tributaries (Suikerbosrant, Blesbokspruit, Klip River, Leeuspruit, Taaibosspruit, Natalspruit, Skoonspruit and Mooi River) from the Vaal Dam to the Bloemhof Dam. This part of the Vaal catchment is heavily utilised as is evident from the generally poor condition. This area is mostly in a largely modified (D) condition with the Natalspruit and Blesbokspruit in a seriously modified (E) condition. The main impacts are related to mining, industry as well as poor or non-functioning waste water treatment works.

C3: Harts River

The Harts River is the main river in this catchment which is characterised by highly intermittent runoff that is regulated by dams built on the river. The lower section of the Harts River forms part of the Vaal-Harts water scheme. The Harts River is generally in a poor condition ranging from a moderately (C) to largely (D) modified condition. The main impacts in the catchment are from towns and settlements such as Schweizer Reneke, Taung, Pampierstad as well as irrigation from the Vaal-Harts Scheme in the lower part of the catchment.

C4: Sand/ Vet

This secondary catchment is characterised by agricultural activities, mostly in the southern part of the catchment, and gold mining in the Welkom/ Virginia area. The rivers in this area are mostly seasonal with only the Sand and Vet rivers perennial. The five sites sampled in this catchment ranged from a moderately modified (C) to largely modified (D) condition.

C5: Modder/Riet

Although the Riet River is a tributary of the Vaal River, this secondary catchment forms part of the Orange River WMA. The Modder River starts in the Eastern Free State near the Lesotho border and enters the Riet River at the town of Ritchie upstream of the Mokala National Park. This catchment is mostly in a poor (D) condition, with only the van Zylspruit tributary in a moderately modified (C) condition. This area is mostly impacted by agriculture although the Modder River is also affected by the towns of Botshabelo and Bloemfontein. The Riet River is also affected by mining activities in the vicinity of Koffiefontein. The catchment flow regime is modified by the Orange-Riet Interbasin Transfer Scheme.

C6: Vals

The Vals river tributary of the Vaal River originates in the Eastern Free State near the town of Bethlehem and flows through a mostly agricultural area before joining the Vaal River near Bothaville. It is mostly impacted by agricultural activities but also by urban runoff from towns as well as more industrial impacts at Kroonstad. It is a major water source for Sedibeng Water in Bothaville. Both sites in the Vals River were in a moderately modified (C) condition.

C7: Renoster

The Renoster River flows mostly through agricultural areas before entering the Vaal River upstream of Orkney. There is only one site in the Renoster River which could not be sampled due to unfavourable flows. This site is also located on private property and could not be accessed.

C8: Wilge

The Wilge and Liebenbergsvlei rivers are the main rivers in this catchment. Both rivers are affected by interbasin transfers from the Lesotho Highlands Water Scheme. There are two sites in this catchment, one on each of the rivers. The Liebenbergsvlei was in a largely modified (D) condition while the Wilge River could not be sampled due to high flows.

C9: Vaal

There are eight sites in this secondary catchment, seven of which were sampled. The Vaal River at Windsorton is seriously affected by alluvial diamond mining. The mining company regularly diverts the river channel in order to mine the alluvial diamonds, so it was decided to discontinue sampling at this site. This lower section of the Vaal River is generally in moderately to largely modified (C/D) condition with the site at Warrenvale in a largely modified condition and the most downstream site downstream of the Douglas Weir at St Clair in a moderately modified (C) condition. Most of the sites in this area are affected by alluvial diamond mining.

DRAINAGE REGION D (ORANGE AND LIMPOPO WATER MANAGEMENT AREAS)

The D primary drainage region falls mostly within the Orange River WMA, but the Molopo catchment (D4) forms part of the Limpopo WMA. This drainage region is sampled quarterly by the North West (Molopo), Free State (Upper Orange) and the Northern Cape (Lower Orange) regions. The lowest site on the Orange River that falls within the Richtersveld National Park is sampled annually by Mr Hendrik Sithole of SANPARKS. The condition of the rivers in primary drainage region D is provided in Figure 6. There are 24 REMP monitoring sites in this drainage region with two of them experiencing challenges to conduct scheduled monitoring; see Annexure D for the various reasons. There are eight secondary drainage regions:

- D1: Orange
- D2: Caledon
- D3: Orange
- D4: Molopo
- D5: Hartbees (Ephemeral not sampled)
- D6: Brak (Ephemeral not sampled).
- D7: Orange
- D8: Orange

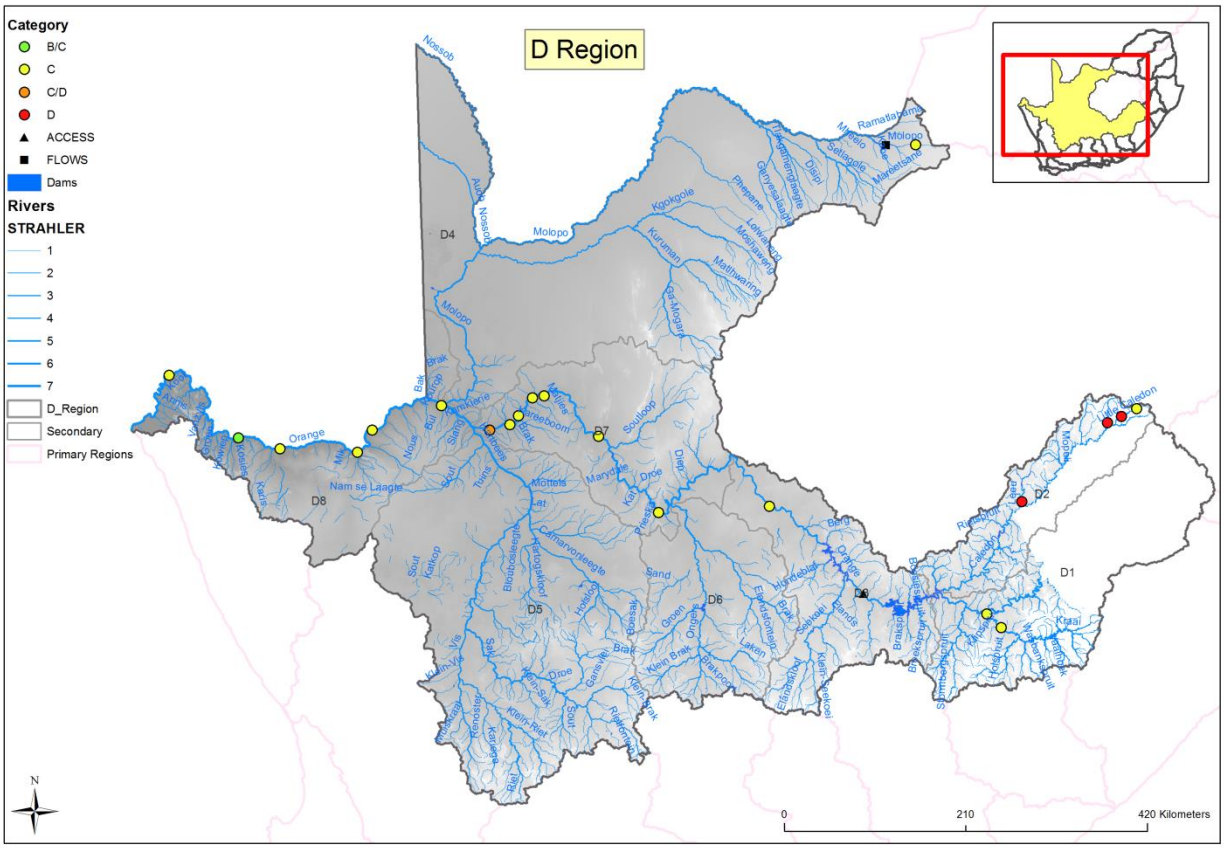

Figure 6. Summary Ecological Categories in drainage region D reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Eco-logical Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

D1: Orange

The majority of this secondary catchment falls within Lesotho and is not included in this assessment. Assessments done in 2015 as part of the second ORASECOM Joint Basin Survey (Orasecom 2015) indicated that the Senqu (Orange) River was in a moderately modified (C) condition just upstream of the South African Border. The two sites in the Kraai River are both in a moderately modified (C) condition.

D2: Caledon

The Caledon River forms the border between South Africa and Lesotho. The main stem Caledon river is not included as part of REMP due to its naturally sandy habitat together with safety issues. Two sites on the Little Caledon as well as the Leeu and Groot (Brandwater) River tributaries of the Caledon were sampled. The upper site on the Little Caledon was in a moderately modified (C) condition and the other sites were all in a largely modified (D) condition. The main impacts in this area are related to agricultural activities.

D3: Orange

This secondary comprises the Orange River from the confluence with the Caledon (at Gariep Dam) to the confluence with the Vaal River downstream of Douglas. The uppermost site between Gariep and Vanderkloof dams could not be accessed. The other two sites in this area were both in a moderately modified (C) condition. This section of the Orange River is largely impacted by hydroelectricity generation at Gariep and Vanderkloof dams. The nature of this electricity generation results in regular and extreme

fluctuations in flows close to the dams, which moderate further downstream. Other impacts in this region are related to agricultural activities.

D4: Molopo

The Molopo system is mostly ephemeral and forms part of the Limpopo North West WMA. The only monitoring sites in the Molopo are near the source in the North West Province. Even so, these sites are often dry and can only be sampled irregularly, when they are flowing. Only one site approximately 30 km from the eye was sampled as the more downstream site was completely dry. The upper site was in a moderately modified (C) condition. Farming activities affect the upper section of the Molopo while urban and rural activities modify it closer to Mahikeng. Several dams add to the irregular flows in the Molopo.

D7: Orange

This secondary catchment stretches from the Vaal River confluence near Douglas to the confluence with the Hartbees River at Kakamas. All eight sites in this secondary catchment were monitored and they were mostly in the moderately modified (C) category. Only the site at Kakamas was in a moderately to largely modified (C/D) condition. The main impacts in this section of the Orange River are related to agriculture, mostly irrigated vineyards along the river. The site at Kakamas is situated downstream of the Neusberg Weir and is therefore also exposed to the effects of the Neusberg Hydro Electrical Scheme explaining the slight deterioration compared to the upstream sites.

D8: Orange

This is the lowest section of the Orange River stretching from the confluence of the Hartbees River at Kakamas to the Orange River Estuary at Alexander Bay. This section of the Orange River is also in a moderately modified (C) condition. There is a slight recovery of the river once it enters the Richtersveld National Park with the Richtersveld site in a largely natural to moderately modified (B/C) condition. This site is more than 100km from the river mouth at Alexander Bay but there are no suitable sites downstream of the Richtersveld.

DRAINAGE REGION E (BERG-OLIFANTS WATER MANAGEMENT AREA)

The E primary drainage region comprises the Olifants-Doorn River catchment and other smaller and highly intermittent rivers. The south-western portion of the catchment falls within the Western Cape Province and the arid north-eastern portion is in the Northern Cape Province (Basson and Rossouw 2003). The main river is the Olifants, with the Doring River being a major tributary. The other tributary is the Sout River (Basson and Rossouw 2003).

The Olifants-Doorn catchment has 31 REMP sites (Figure 7. Primary drainage region E showing the existing monitoring sites.). However, due to capacity issues, the catchment was not targeted for monitoring in the reporting period. There are 4 secondary catchments in this primary drainage Region:

- E1: Olifants
- E2: Doring
- E3: Olifants
- E4: Koebee

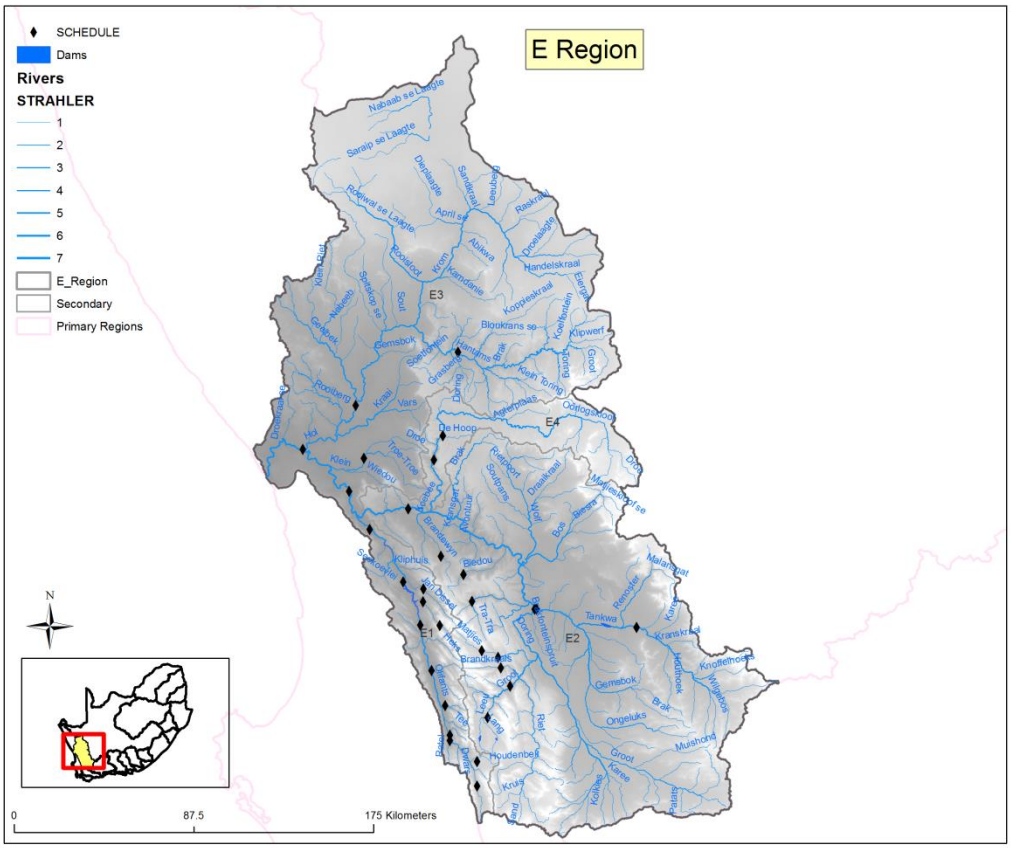

Figure 7. Primary drainage region E showing the existing monitoring sites.

DRAINAGE REGION G (BERG-OLIFANTS AND BREEDE-GOURITZ WATER MANAGEMENT AREAS)

The G primary drainage region mostly consists of the old Berg River WMA (G1 and G2), a small portion of the Olifants-Doorn WMA (G3), and the south western parts of the old Breede WMA (G4 and G5). There are 69 REMP sites but the majority of them either did not have enough data for an ecological condition analysis or were not scheduled for monitoring during the reporting period due to capacity constraints. Annexure G has more detailed tables of the sites and Figure 8 provides a spatial view of the ecological conditions.

- G1: Berg
- G2: Eerste River, etc.
- G3: Verlorenvlei to Jakkalsvlei
- G4: Palmiet to Uilkraal
- G5: Nuwejaars to Sout

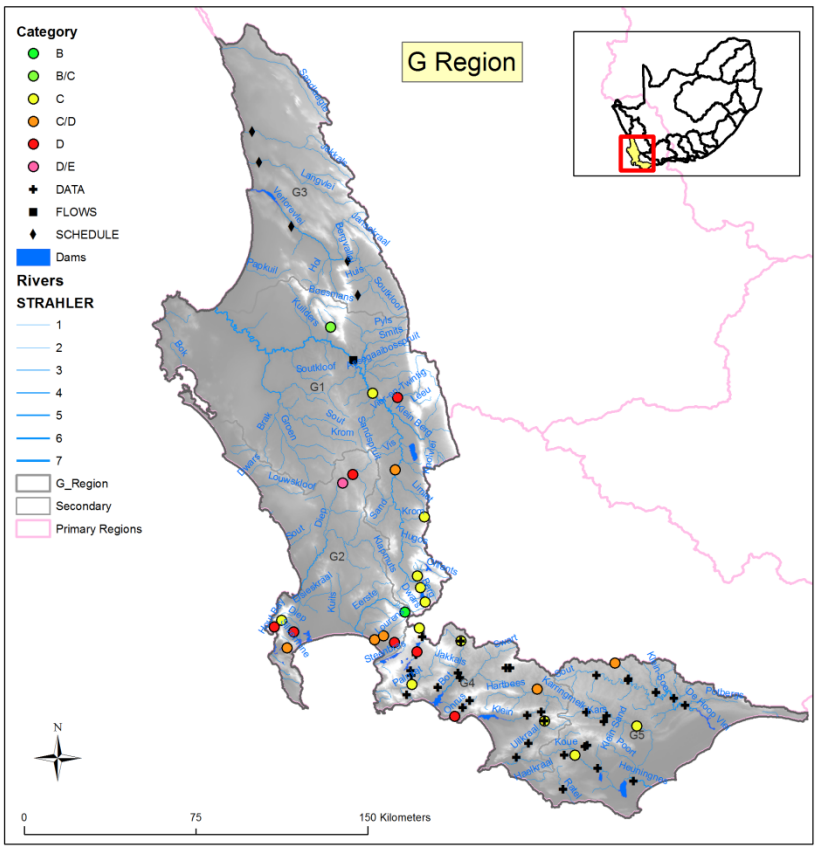

Figure 8. Summary Ecological Categories in primary drainage region G reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

G1: Berg

Secondary catchment G1 has nine monitoring sites on the main Berg River and some of its tributaries, Wemmershoek, Vier-en-twintig, Krom and Platkloof. About 65% of the Berg River is under agriculture, mostly grapes and deciduous fruit, with some dryland grain farming and sheep farming north of Wellington (RHP, 2004a). Aerial images indicate that cultivation intrudes onto the river banks in some areas. Immediately below its source, it flows through Franschoek and proceeds northwestwards through Paarl, Wellington and Velddrif at the coast before entering the Atlantic Ocean through the Berg River Estuary. Due to the highly developed nature of the catchment, most of the Berg River sites were in a moderately modified (C) condition, even those in the upper reaches. The tributaries, Wemmershoek and Krom, were also moderately modified except the Platkloof, which has less human interventions due to the mountainous nature of it upper reaches.

G2: Eerste River etc.

The G2 secondary catchment is mostly within the Cape Town Metro with 10 REMP sites (see Figure 7). It is a combination of numerous small catchments like the Steenbras, Sir Lowry's Pass, Lourens, Eerste/ Kuils, Silvermine, Hout Bay, Salt, Diep, Sout, Modder and Dwars. These rivers rise in the mountain ranges of the Hottentots Holland Mountains in the east and Table Mountain and Cape Peninsula mountains in the south west (RHP 2005). The majority of river sites in this secondary catchment are either close to, or largely modified (C/D and D categories). The Diep River, downstream of of Malmesbury is close to reaching the unsustainable seriously modified condition. This can be attributed to the high development of the City of

Cape Town, where significant stretches of most rivers have been canalised, have poor water quality, modified flows, sewage treatment releases, and abundant invasive alien plants (RHP 2005). Only a few of the upper reaches of the rivers in the Cape Town area are still in a natural or good ecological state, hence the upper reaches of the Eerste River had a B category (largely natural condition).

G3: Verlorenvlei to Jakkalsvlei

This secondary catchment falls within the old Olifants-Doring Water Management Area boundaries. It comprises the seasonal Verlorevlei, Langvlei and Jakkals Rivers, which flow westwards to the Atlantic Ocean (RHP 2006). The catchment is mostly rural, with extensive agriculture in the form of irrigated potato cultivation. The coastal areas support fishing and tourism development. There are five REMP sites, as indicated in Figure 7, but none of them were sampled during the reporting period as they were not scheduled for monitoring.

G4: Palmiet to Uilkraal

The G4 secondary catchment forms the western part of the old Breede WMA. It is mainly drained by short, coastal, fast flowing rivers like the Palmiet, Bot, Onrus, Klein, and Uilkraals. The main land use is irrigated agriculture in the form of orchards and vineyards, afforestation, and livestock farming (RHP 2011). Out of the 26 REMP sites in this area, 20 did not have enough data to be analysed as they were sampled only once, four were in a moderately modified (C) condition, and two were largely modified (D category). The moderately modified conditions were either in the upper reaches or undeveloped mountainous reaches of the Bot, Palmiet Klein and Uilkraals. The D category (largely modified condition) sites on the Palmiet and Onrus are within the developed towns of Grabouw and Onrus, respectively.

G5: Nuwejaars to Sout

This secondary catchment consists of slower flowing, more turbid and saline rivers that are associated with a number of inland water bodies and wetlands (RHP 2011). Sites on the Kars (G5KARS-SOUTK), Nuwejaars (G5NUWE-UNSPE) and Sout (G5SOUT-KLIPD) had sufficient data for classification. These sites were in a moderately modified (C) condition mainly due to river habitat loss as a result of agricultural activities on the riparian zones.

DRAINAGE REGION H (BREEDE-GOURITZ WATER MANAGEMENT AREA)

The H drainage region falls entirely within the current Breede-Gouritz WMA demarcation. A large portion of the H catchment (H1 to H7) forms part of the previous Breede WMA, while H8 and H9 are the Duiwenhoks and Goukou parts of the Gourits WMA. There are 53 REMP sites in this drainage region (Figure 9). Annexure H has more detailed tables of the sites.

- H1: Breede
- H2: Hex
- H3: Kogmanskloof
- H4: Breede
- H5: Breede
- H6: Riviersonderend

- H7: Breede
- H8: Duiwenhoks
- H9 Goukou

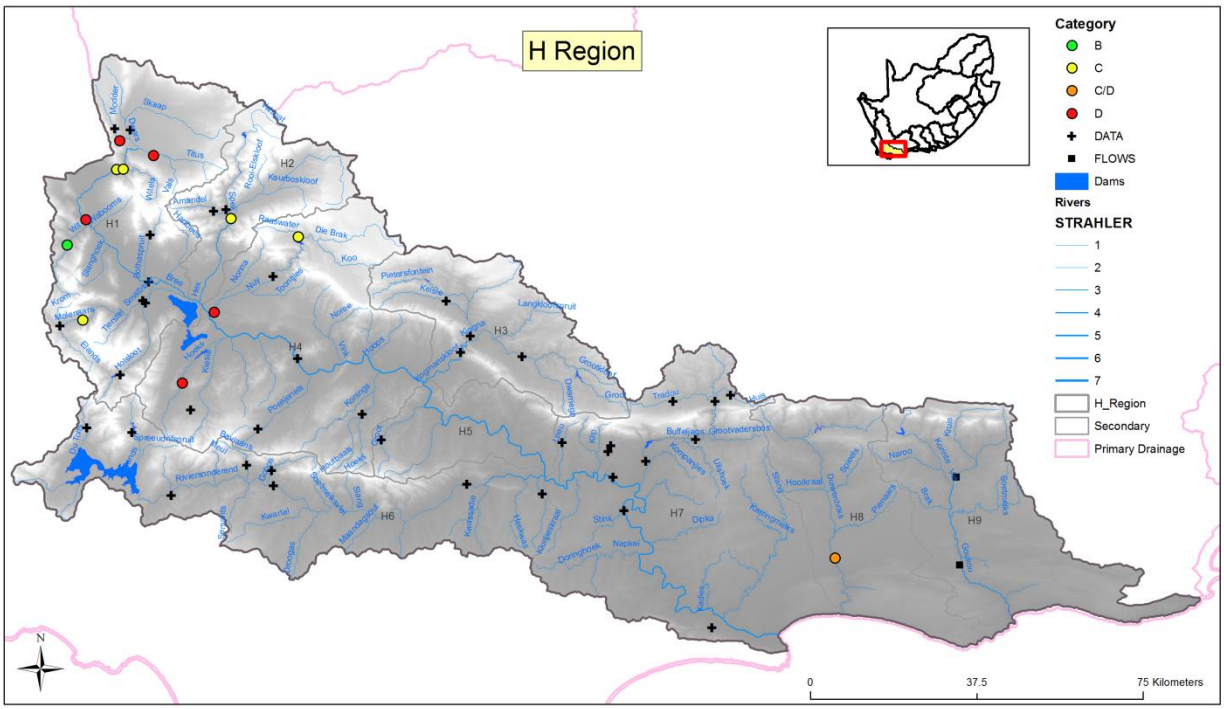

Figure 9. Summary Ecological Categories in primary drainage region H reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indi-cates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

H1: Breede

The Breede River originates in the H1 secondary drainage region, near Ceres, through the merging of Koekedou, Dwars, and Titus Rivers. The other tributaries are Witels, Wabooms, Bothaspruit, and Hartbees on the left and Wit, Slanghoek, and Smalblaar on the right hand side of the Breede River. Irrigated crops and pastures and some dryland crops are the prevalent land uses on this part of the catchment (RHP 2011). Major towns are Ceres, Wolseley, and Rawsonville. As the upper reaches of this river system originate within urban development, have riparian areas that have been cleared for agricultural actives, have other extensive habitat alterations, it is expected that the sites would be mostly in moderately (C) to largely (D) modified conditions as the results indicate. The site that was found to be largely natural (B category) is on the undeveloped upper reaches of the Wit River.

H2: Hex

The Hex River, the major river in this secondary catchment, rises from several mountain streams draining the southern slopes of the Bonteberg Mountains in the north eastern portion of the Upper Breede area and joins the Breede River north of the Brandvlei Dam (RHP 2011). One site (H2HEXR-AMAND) had enough data to indicate a moderately modified (C) condition. This can be attributed to orchards and vineyards

extending into the riparian zone and the site being downstream of De Doorns, a town that is the centre of the grape cultivation region.

H3: Kogmanskloof

The main river in this secondary catchment is the Kogmanskloof, which joins the Breede River in the middle reaches. There were no sites with enough data for ecological analysis on this secondary catchment.

H4: Breede

This secondary catchment forms part of the Central Breede River region. It stretches from the confluence with the Hex River at Brandvlei Dam to the confluence with the Kogmanskloof River. The main tributaries in this area are the Keisers, Doring and Hoeks rivers. The ecological condition of the assessed sites in this area indicate a moderately modified (C) condition in the upper reaches of the Nuy and deteriorate to a largely modified (D) condition towards the lower reaches, after draining large areas of cultivated land. The Hoeks River site is also largely modified by extensive agriculture upstream.

H5: Breede

The B5 secondary catchment also forms part of the central Breede River area and stretches from the confluence with the Kogmanskloof near Ashton to the confluence of the Breede River with the Riviersonderend River upstream of Ashton. The small tributaries, Poesjenels, Groot and Boesmans rivers, have become seasonal due to abstraction for the intensive agriculture in the area (RHP 2011). The two sites in this region did not have enough data to determine the ecological condition.

H6: Riviersonderend

The H6 secondary catchment comprises the Riversonderend sub-catchment. The Riviersonderend has its source in the Groot Drakenstein and Franschhoek Mountains and flows eastwards to its confluence with the Breede River west of Swellendam. The 2011 State of Rivers report (RHP 2011) established that Theewaterskloof Dam has seriously modified the natural flow regime of the downstream reaches of the Riviersonderend while agricultural practices in the catchment led to moderate modifications to the river channels and contributed to further flow modifications. During the current reporting period none of the sites in this area had sufficient data to determine an ecological condition.

H7: Breede

In this secondary catchment, the data was not sufficient to conduct an ecological analysis. This area includes the lower reaches of the Breede River after its confluence with the Riviersonderend. The Buffeljags River is a major tributary of the Breede River along its lower reaches (in terms of flow contribution) and the main towns are Swellendam, Barrydale, Suurbrak, Malgas, and Witsand.

H8: Duiwenhoks

The Duiwenhoks River drains the Langeberg Mountains and flows south to the coast, and enters the sea adjacent to the Duiwenhoksriviermond Private Nature Reserve, through the Duiwenhoks Estuary. The monitored site was in a moderate to largely modified (C/D) condition, as it is found in the vicinity of agricultural activities. Dryland and irrigated agriculture (vineyards, lucerne and pasture) is a major land use in this secondary catchment (RHP 2007).

H9: Goukou

The main land use in the Goukou secondary catchment is dryland and irrigated agriculture (vineyards, fruit, vegetables, lucerne and pasture), livestock, and commercial forestry. The middle reaches were found to be heavily invaded with black wattle, while reduced flow conditions were prevalent in the lower reaches (RHP 2007), which could be the reason behind the lack of sufficient flow to conduct monitoring in this catchment. As a result there was no data for the Goukou REMP sites.

DRAINAGE REGION J (BREEDE-GOURITZ WATER MANAGEMENT AREA)

The J primary drainage region consists of the Gouritz River system. The main river, Gouritz, flows from the confluence of the Gamka and Olifants rivers and is joined by the Groot River, before flowing through the Langeberg Mountains and coastal plain and eventually draining into the Indian Ocean near Gouritzmond (RHP 2007). Dryland and irrigated agriculture (lucerne and pasture), and livestock (cattle and sheep) are the major land uses in the secondary catchment. Various challenges were encountered in this catchment; hence none of the ten sites had sufficient data to determine an ecological condition (Figure 10, Annexure J).

There are four secondary catchments in this primary drainage region:

- J1: Groot
- J2: Gamka
- J3: Olifants
- J4: Gouritz

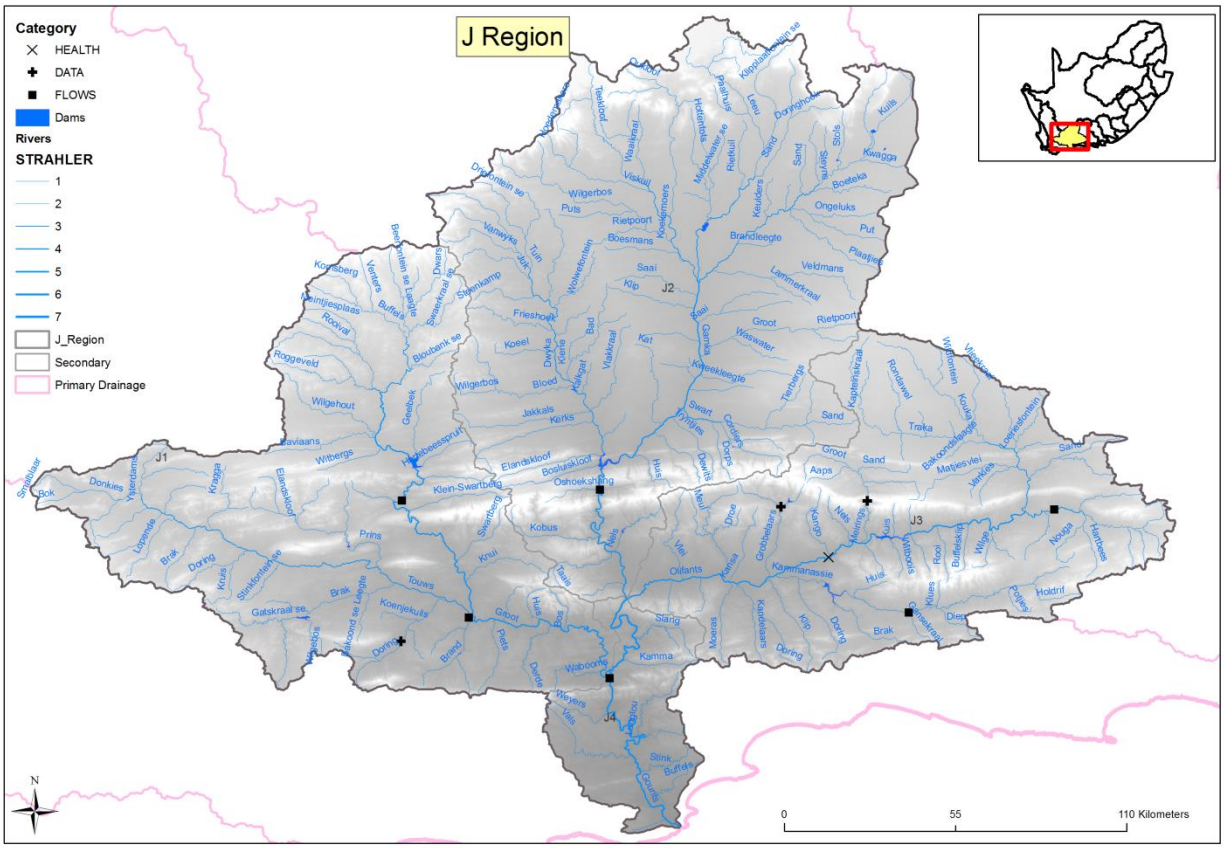

Figure 10. Primary drainage region J indicating the existing monitoring sites.

DRAINAGE REGION K (BREEDE-GOURTIZ AND MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREAS)

The K primary drainage region falls within the Breede-Gouritz and Mzimvubu-Tsitsikamma WMAs. The Breede-Gouritz Rivers are sampled quarterly by the BGCMA, and the rivers in the Mzimvubu-Tsitsikamma WMA are sampled by the Eastern Cape Regional staff in Port Elizabeth. There are 30 REMP monitoring sites in this drainage region with eight of them experiencing difficulties in conducting scheduled monitoring (see Annexure K for the various reasons). There are nine secondary drainage regions:

- K1: Klein Brak
- K2: Groot Brak
- K3: Kaaimans
- K4: Sedgefield
- K5: Knysna
- K6: Keurbooms.
- K7: Bloukrans
- K8: Tsitsikamma
- K9: Kromme/ Seekoei

The condition of the rivers in primary drainage region K is provided in Figure 11.

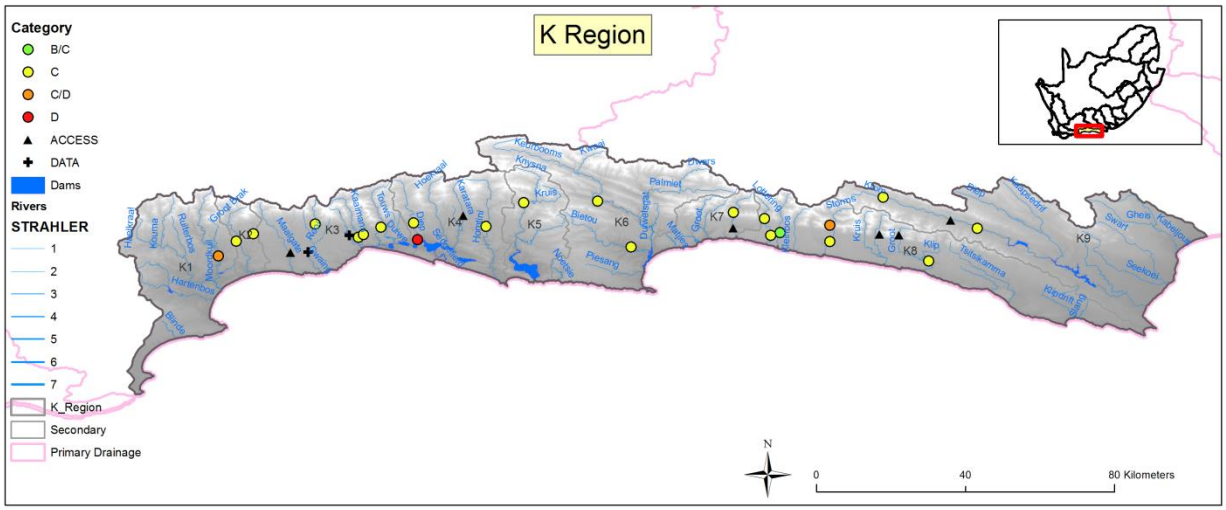

Figure 11. Summary Ecological Categories in primary drainage region K reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

K1: Klein Brak

Only one site on the Moordkuil River was sampled in this secondary catchment. It was in a moderately to largely modified (C/D) condition. The major impacts in the Moordkuil River are related to a damaged Riparian zone (alien species, erosion etc.), which affect the instream habitat as well (DWS 2014a).

K2: Groot Brak

Two sites were monitored in this secondary catchment, one on the Groot Brak River and one on the Varing River tributary. Both sites were in a moderately modified (C) condition. The main impacts in this area are related to agriculture and forestry, while the lower reaches of the Groot Brak River also experience alteration in flow from the Wolwedans Dam (DWS 2014b).

K3: Kaaimans etc

There are a number of smaller rivers (Gwaing, Kaaimans, Maalgate, Silver, Swart, and Touws) in this secondary catchment. There are seven monitoring sites in this catchment. The Maalgate River could not be accessed and not enough data was available for the Gwaing and Swart rivers to determine the ecological condition. The other rivers were in moderately modified (C) condition. The main impacts in this region are related to forestry and agriculture with the lower reaches of some rivers also being impacted by the coastal towns such as George and Wilderness (DWS 2014c).

K4: Sedgefield etc.

There are a number of smaller rivers (Diep, Homtini, Sedgefield and tributaries) in this secondary catchment. There are four sites in this drainage region of which three were sampled. There was no access to the site on the Karatara River. The Diep and Homtini rivers were in a moderately modified (C) condition

while the Wolwe River upstream of Swartvlei was in a largely modified (D) condition. The main impacts in this area are related to forestry activities while the lower section of the Sedgefield River is also impacted by the town of Sedgefield (DWS 2014d).

K5: Knysna

The Knysna River catchment is characterised by forestry in the upper reaches and tourism and light industry in the lower reaches. The single site on the Knysna River was in a moderately modified (C) condition.

K6: Keurbooms

The Keurbooms and Bietou rivers were sampled in this catchment. The upper parts of the catchment are reasonably unimpacted but further downstream the main impacts are as a result of forestry and agriculture. The lower section of the Piesang River flows through and is impacted by Plettenberg Bay. Both sites were in a moderately modified (C) condition.

K7: Bloukrans

Of the two main rivers (Groot and Bloukrans) in this secondary catchment only the Bloukrans was sampled. The lower site on the Bloukrans River could not be accessed but the upper section of the Bloukrans was in a moderately modified (C) condition. This is a mostly natural area with some forestry in the upper reaches and mostly tourism in the lower reaches. The modification at the upper site may have been exacerbated by drought conditions.

K8: Tsitsikamma etc.

There are a number of smaller rivers (Elands, Elandsbos, Kleinbos, Lotterings, Storms, Groot, Klasies, Tsitsikamma and Klipdrift) in this secondary catchment. There are eight sites in five rivers (Elands, Elandsbos, Lotterings, Storms and Groot) in this catchment. The Elands and Groot Rivers could not be accessed. The majority of sites were in a moderately modified (C) condition with only the Elandsbos river in a largely natural to moderately modified (B/C) condition and the upper Storms River in a moderately to largely modified condition (C/D). The upper reaches of these rivers are mostly in reasonably pristine mountainous regions with the middle reaches going through forested areas with agriculture lower down (DWS 2014e).

K9: Kromme/ Seekoei

Only the Kromme River was sampled in this secondary catchment. The middle site on the Kromme River could not be accessed as the road washed away. The Kromme River was in a moderately modified (C) condition. The Kromme River flows through the Langkloof almost parallel to the R62 and is impacted mostly by the agricultural activities in the Langkloof, flow regulation from Churchill and Mpofu Dams as well as impacts from the town of Kareedouw (DWS 2014f, DWS 2019b).

DRAINAGE REGION L (MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA)

The L primary drainage region falls within the Mzimvubu-Tsitsikamma WMA. This drainage region was sampled by the Eastern Cape Regional staff in Port Elizabeth. This primary catchment is generally dry with limited rainfall (DWS 2018a). There are eight REMP monitoring sites in this drainage region with four of them experiencing difficutlies with scheduled monitoring; see Annexure L for the various reasons. There are nine secondary drainage regions but only three (L7-L9) were sampled. The secondary catchments that were not sampled are mostly ephemeral in nature and thus not suitable for the SASS protocol.

- L1: Sout (ephemeral)
- L2: Kariega (ephemeral)
- L3: Groot (ephemeral)
- L4: Plessis (ephemeral)
- L5: Groot (ephemeral)
- L6: Heuningklip (ephemeral)
- L7: Groot
- L8: Kouga
- L9: Gamtoos

The condition of the rivers in primary drainage region L is provided in Figure 12.

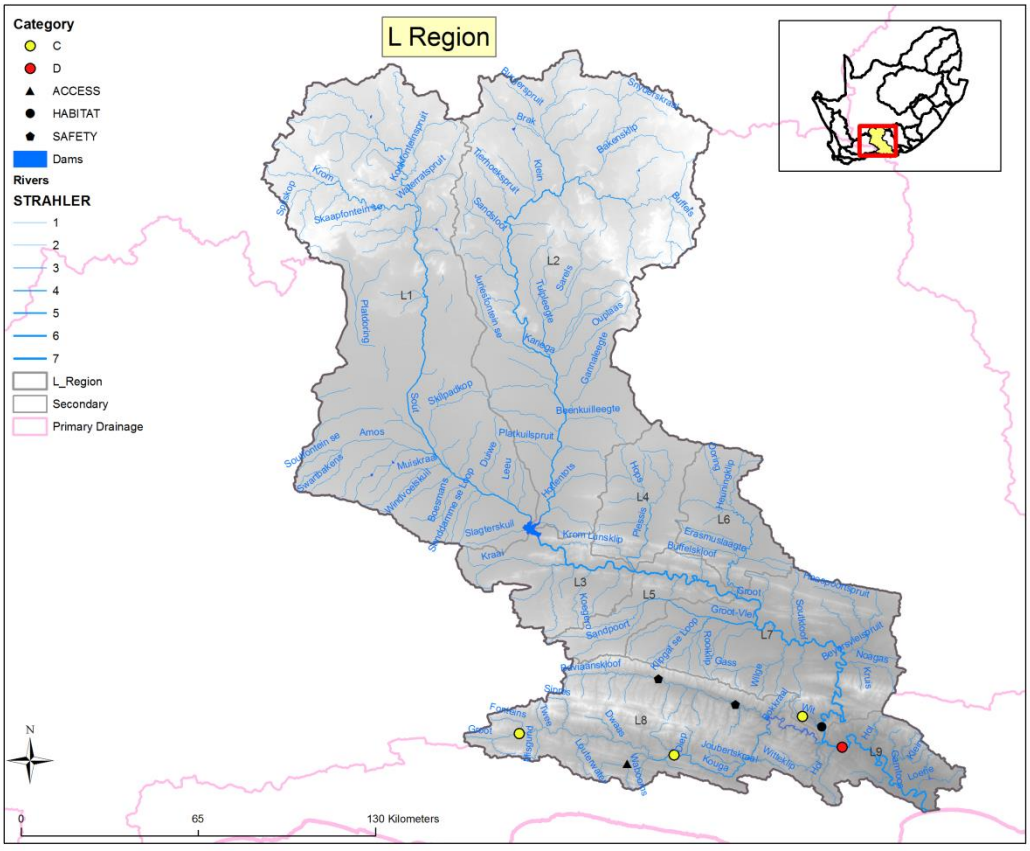

Figure 12. Summary Ecological Categories in primary drainage region L reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indi-cates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

L7: Groot

There are only two sites in this secondary; the Wit River as well as the Groot River downstream of the confluence with the Wit River. The Groot River was not sampled as the river bed is mined and could not be sampled. The site on the Wit River, located in the Baviaanskloof Mega Reserve, was in a moderately modified (C) condition. The modification evident in the macroinvertebrate assemblage is most likely a response to reduced flows resulting from the drought conditions.

L8: Kouga

There are five sites in this secondary catchment but only the two sites on the Kouga River were sampled. The Kouga River was in a moderately modified (C) condition. The main impacts on the Kouga River are related to agricultural activities (DWS 2018a).

L9: Gamtoos

The Gamtoos River at Patensie was in a largely modified (D) condition. This site is located in an area of irrigated agriculture (citrus and vegetables) downstream of the Kouga River dam. Flow at the site is modified by the dam and return flows from agriculture (DWS 2018a).

DRAINAGE REGION M (MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA)

The M primary drainage region falls within the Mzimvubu-Tsitsikamma WMA. This drainage region was sampled by the Eastern Cape Regional staff in Port Elizabeth. There are three REMP monitoring sites in this drainage region with two of them experiencing difficulties in conducting scheduled monitoring; see Annexure M for the various reasons. There are three secondary drainage regions but only the Swartkops (M1) was sampled.

- M1: Swartkops
- M2: van Stadens etc. (not sampled)
- M3: Coega (not sampled)

The condition of the rivers in primary drainage region M is provided in Figure 13.

The KwaZungu (Swartkops) River downstream of the Groendal Dam was the only section of the Swartkops River that was sampled. The sites lower down in the Swartkops River are so polluted by sewerage that sampling is a health risk. Sand mining is taking place in the Brak River. The KwaZungu River was in a B/C (largely Natural to moderately modified) condition. Flow is modified by the Groenkloof Dam (DWS 2019c).

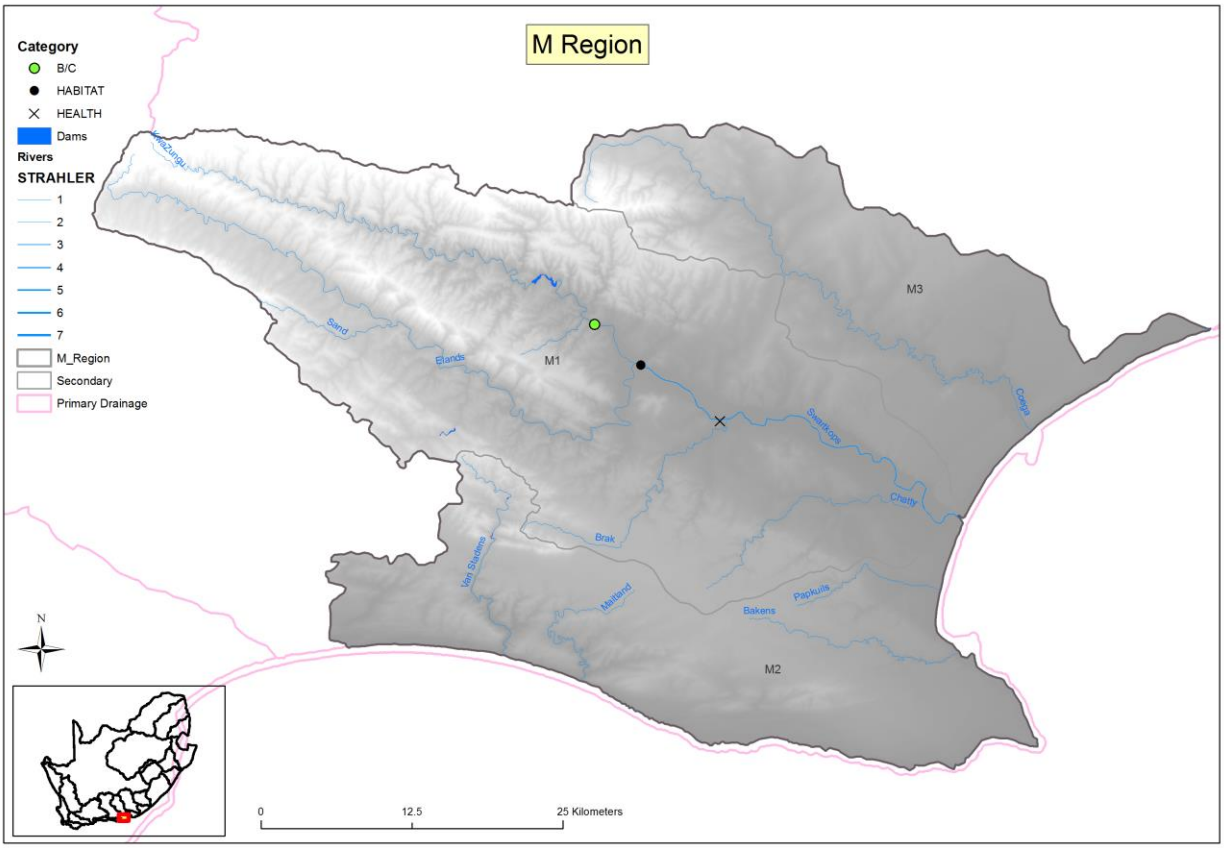

Figure 13. Summary Ecological Categories in primary drainage region M reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indi-cates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

DRAINAGE REGION P (MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA)

The P primary drainage region falls within the Mzimvubu-Tsitsikamma WMA. This drainage region was sampled by the Eastern Cape Regional staff in Port Elizabeth. There are six REMP monitoring sites in this drainage region with two of them experiencing challenges to conduct scheduled monitoring; see Annexure P for the various reasons. There are four secondary drainage regions but only the Kowie (P4) was sampled.

- P1: Boesmans
- P2: Boknes etc.
- P3: Kariega
- P4: Kowie

The condition of the rivers in primary drainage region P is provided in Figure 14.

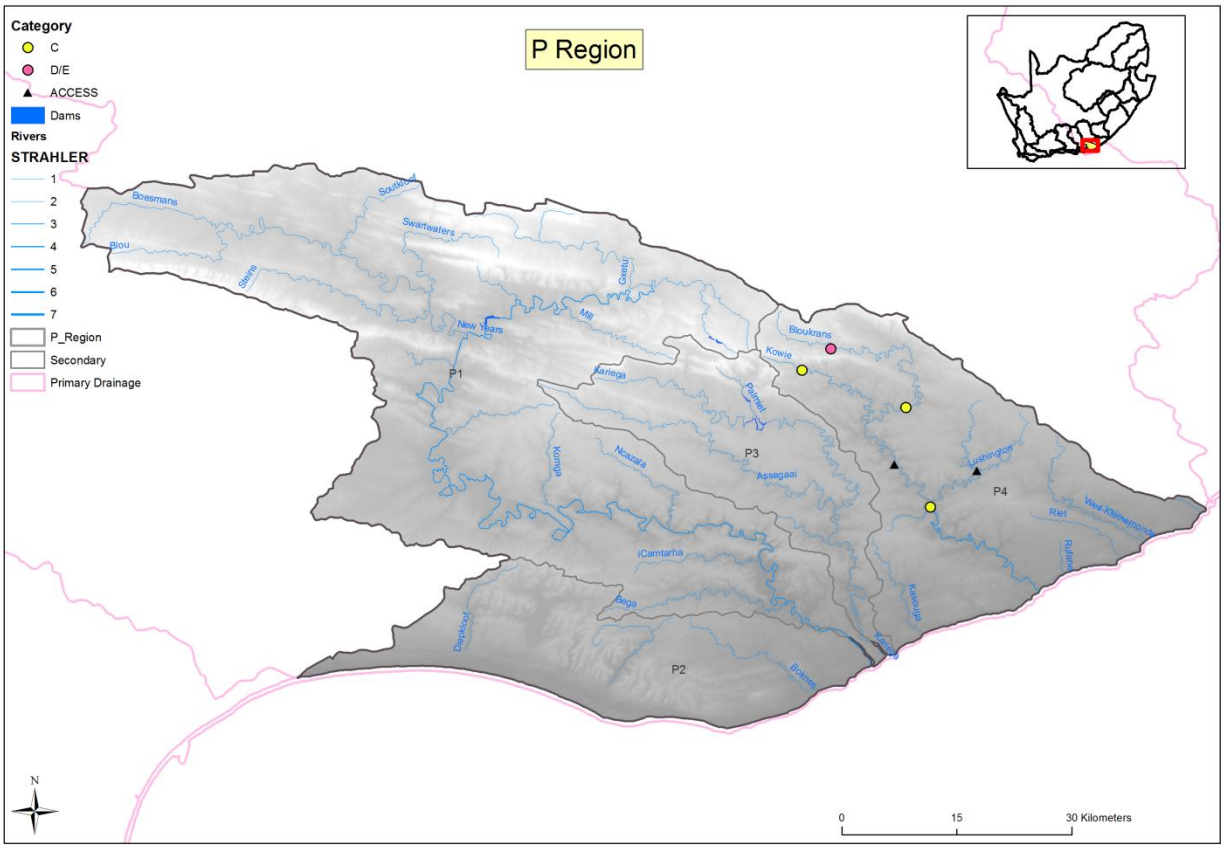

Figure 14. Summary Ecological Categories in primary drainage region P reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indi-cates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

The Bloukrans River and upper Kowie River sites were in a moderately modified (C) condition whereas the Kowie River downstream of the Lushington Confluence was in a largely natural (B) condition. The upper Kowie River is affected by agriculture and urban impacts from Grahamstown (DWS 2018b). The lower site on the Kowie near Bathurst is downstream of the Waters Meeting Nature Reserve and the confluence of the Lushington. It is likely that the improvement in the Kowie is a combination of flowing through the Nature Reserve and the influence of the Lushington River.

DRAINAGE REGION Q (MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA)

The Q primary drainage region (Great Fish River) falls within the Mzimvubu-Tsitsikamma WMA. This drainage region was sampled quarterly by the Eastern Cape Regional staff in East London. There are three REMP monitoring sites in this drainage region but only two had enough data to determine the conditions. There are nine secondary drainage regions but only the only one (Q9) was sampled. A list of the monitoring sites including reasons for not sampling is provided in Annexure Q

- Q1: Great Fish
- Q2: Great Fish.
- Q3: Great Fish
- Q4: Tarka
- Q5: Great Fish

- Q6: Baviaans.
- Q7: Great Fish
- Q8: Little Fish
- Q9: Great Fish

The condition of the rivers in primary drainage region Q is provided in Figure 15.

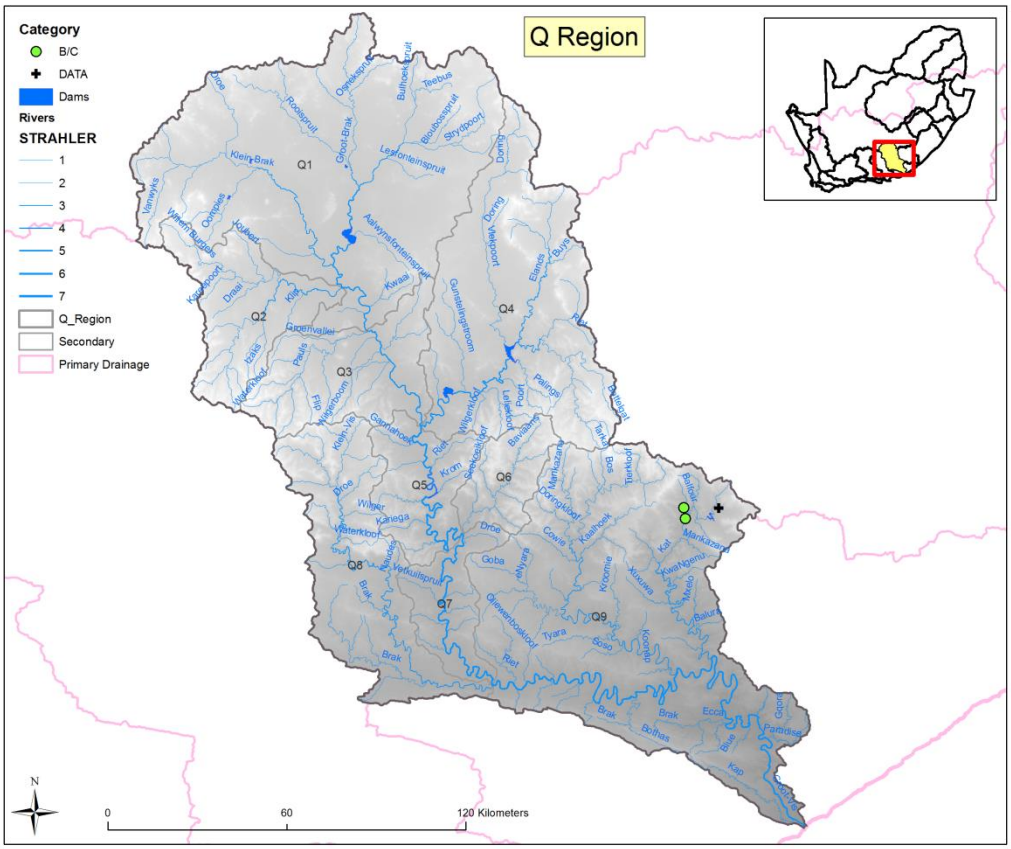

Figure 15. Summary Ecological Categories in primary drainage region Q reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions.

The Great Fish River is naturally quite dry, but currently experiences high flow due to the Orange-Fish Interbasin Transfer (IBT) Scheme. Water is diverted from the Orange River to the Great Fish River via the Orange- Fish Tunnel and the Teebusspruit. A portion of this water is also diverted to the Sundays River Catchment via the Little Fish River and the Skoenmakers Canal. This transfer scheme has resulted in higher flows in a large part of the catchment making sampling not practical. As such it was decided to focus only on the Kat River part of the Q9 secondary catchment as it is not affected by the IBT scheme. The Kat River as well as the Balfour tributary of the Kat was in a largely natural to moderately modified (B/C) condition.

DRAINAGE REGION R (MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA)

The R region is formed by the secondary catchments around the East London area; there are 23 monitoring sites in five secondary drainage regions (Figure 16). Annexure R has more detailed tables of the sites. Land use ranges from urban development and nature reserves closer to the coast to more rural and farming

inland. Various water transfer schemes augment the areas with high water demand, for example Keiskamma River to Birha River and Wriggleswade Dam to Buffalo and Nahoon Rivers (ISP 2004).

- R1: Keiskamma
- R2: Buffalo
- R3: Nahoon (not sampled)
- R4: Tyolomnqa (not sampled)
- R5: Mpekweni, Mtati, Mgwalana, Bhira (not sampled)

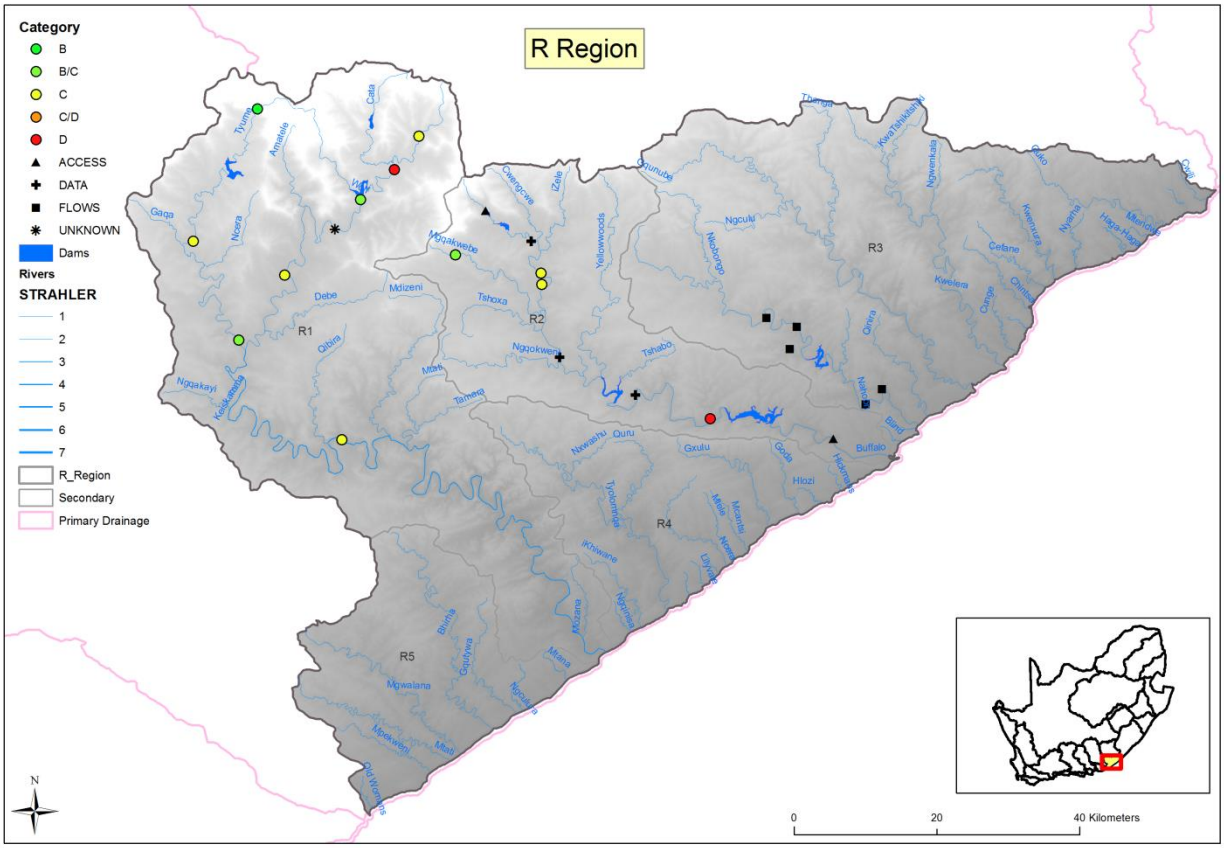

Figure 16. Summary Ecological Categories in primary drainage region R reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

R1: Keiskamma

The major river in this secondary catchment is the Keiskamma. The source of the river is at the Amatola escarpment and flows into the Indian Ocean through the Keiskamma Estuary, within the Hamburg Nature Reserve. There are numerous tributaries that drain into the Keiskamma, they are the Gqubushe, Wolf, Amatole, Debe, Nxalawe, Tyhume, Qibira, Zalara, Mtati, Mgwanggqa, Nquntsi, Mtombe, KwaDube, Tyityaba, Mkalane, Wawana, Wawa, Tuwa, Nyulutsi and Mozana streams. The catchment is relatively undeveloped with most land being communal and used predominantly for stock grazing or dry land cultivation. Commercial forestry (less than 1000ha) is located in the upper reaches of the Keiskamma and Tyume. The main formal towns are Alice, Middledrift and Keiskammahoek in the upper catchment and Hamburg at the mouth of the Keiskamma River (DWS 2018d).

The Tyume River begins in a largely natural (B) condition near its source in Hogsback. It however deteriorates to a moderately modified (C) condition in its middle reaches, which are downstream of the Tyume River Dam and peri-urban towns. It improved to a largely natural to moderately modified (B/C) condition before joining the Keiskamma. Sites on the main Keiskamma River indicate a river system that is mostly in a moderately modified (C) condition except for sites below Sandile Dam and in Keiskammahoek, which are in a B/C (largely natural to moderately modified) and D (largely modified) categories, respectively. It is expected that the Sandile Dam would have major impacts on the flow but the site below the dam has good habitat to support sensitive macro-invertebrate taxa, hence a B/C category (largely natural to moderately modified).

R2: Buffalo

The R2 secondary catchment is densely populated, putting strain on the Buffalo River, which is the main river system that drains this catchment. Four dams supply the main urban areas of King William's Town, Zwelitsha, Mdantsane and East London and these dams have no mechanism for releasing environmental flows to support ecosystem functions and health. The Mgqakwebe, Ngqokweni, Yellowwoods and KwaNxamkwane tributaries supplement the low flow in the Buffalo River. Other notable challenges are overloaded sewage treatment systems, industrial effluent, and impacts of cultivation, livestock farming and plantations (RHP 2004b).

A condition close to largely natural (B/C) was only recorded on the upper reaches of the Mgqkwebe River, at the foot of the Amatola Mountains. The other REMP sites indicate a river system that is moderately modified (C) in the middle reaches, becoming largely modified (D) towards the lower reaches in areas that drain the Mdantsane Township and Potsdam village (site R2NXAM-POSTD).

R3: Nahoon

Reduced flows have made it difficult to monitor the aquatic condition of the rivers in the R3 secondary catcment. The major river systems in this drainage region are the Nahoon, Gqunube, and Kwelera. Due to the unsuitable flows in the Nahoon River coupled with human and financial resources, sampling in this secondary catchment is temporarily suspended.

DRAINAGE REGION S (MZIMVUBU-TSITSIKAMMA WATER MANAGEMENT AREA)

The Great Kei River catchment, with 12 river monitoring sites, takes up the entire S primary drainage region (Figure 17). The main river forms from the confluence of the Black Kei and White Kei rivers, north east of a town called Cathcart. It meanders in a south easterly direction for 320 km till it flows to the Indian Ocean through the Great Kei Estuary (DWS, 2018). There are seven secondary catchments, namely:

- S1 – White Kei;
- S2 – Indwe;
- S3 – Black Kei;
- S4 – Great Kei;
- S5 – Tsomo;
- S6 – Kubusi; and
- S7 – Great Kei

A combination of capacity, financial constraints, and flow conditions led to insufficient collection of data for a number of sites in this catchment. Only conditions for the Klipplaat River at site S3KLIP-PLAAT and the upper parts of Tsomo River (S5TSOM-R56BR) could be analysed. The proximity of the Klipplaat River site to the Waterdown Dam, 10 kilometers upstream, and cultivation on the riparian zone contributed to the moderately modified condition (C category) of the site. The upper reaches of the Tsomo River, at the R65 Bridge, were moderately to largely modified by cultivation.

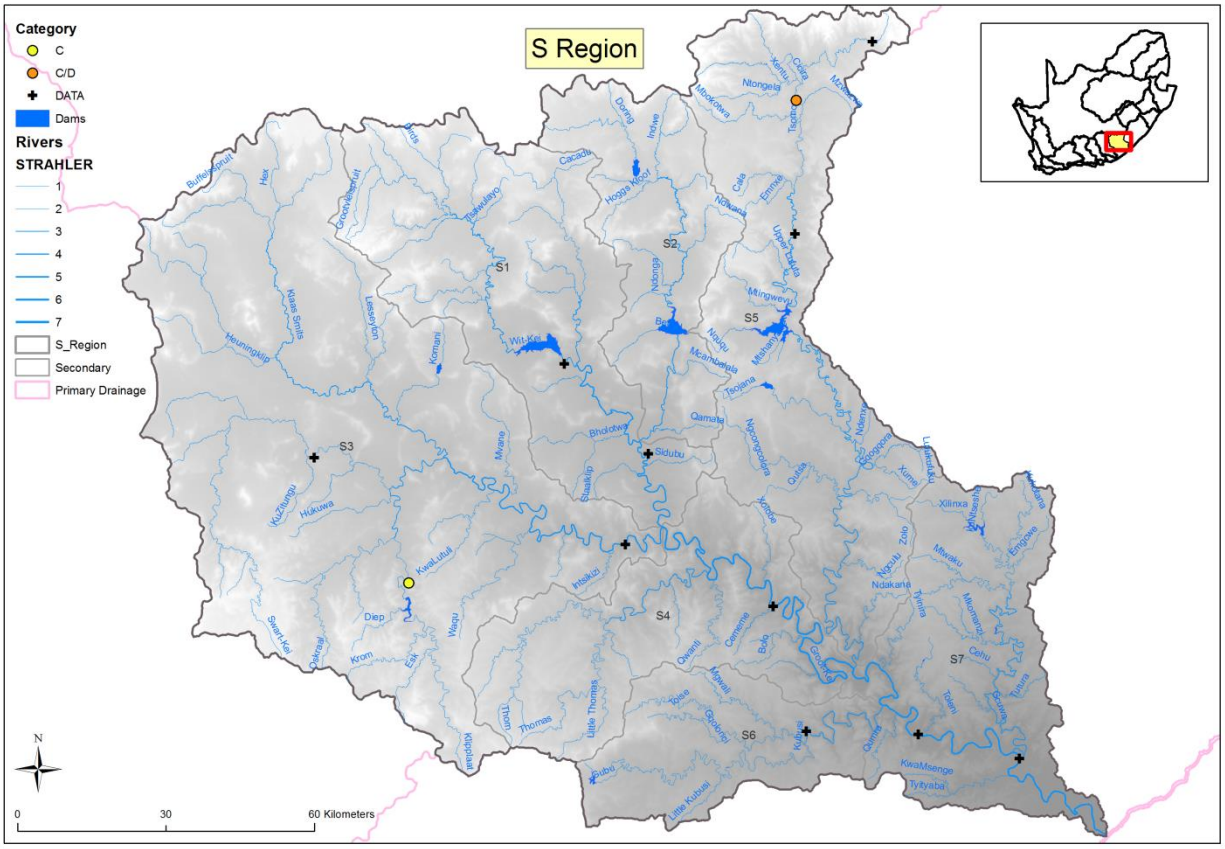

Figure 17. Summary Ecological Categories in primary drainage region S reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indi-cates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

DRAINAGE REGION T (MZIMVUBU-TSITSIKAMMA AND PONGOLA–MTAMVUNA WATER MANAGEMENT AREAS)

The largest part of this drainage region forms part of the Mzimvubu to Tsitsikamma WMA with only two (T4 and T5) secondary catchments forming part of the Pongola to Mtamvuna WMA (Figure 18). The East London office is responsible for sampling the sites in the Mzimvubu to Tsitstikamma WMA, while the KwaZulu-Natal regional office is responsible for monitoring the Mtamvuna (T4) and Mzimkhulu (T5) catchments. There are 51 sites within this primary catchment but 21 of these sites could not be sampled for a variety of reasons (see Annexure T) and another four sites did not have enough data to run the MIRAI model. There are no sites in the T8 secondary catchment. The nine secondary catchments in this drainage region are:

- T1: Mbhashe
- T2: Mthatha
- T3: Mzimvubu
- T4: Mtamvuna
- T5: Mzimkhulu
- T6: MNtafufu to Mzamba
- T7: Mdumbi to Mngazi
- T8: Xora to Coffee Bay (not sampled)
- T9: Qolora to Nqabarha

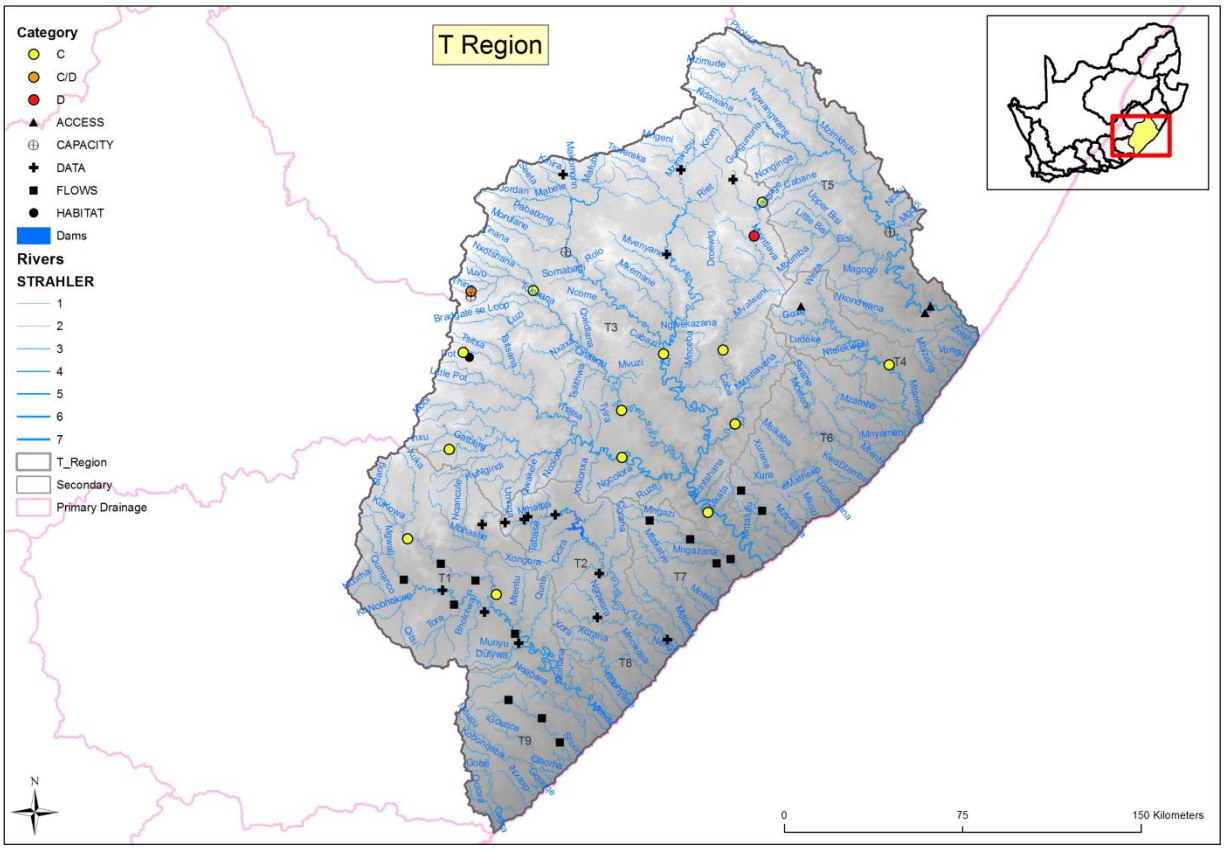

Figure 18. Summary Ecological Categories in primary drainage region T reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indi-cates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

T1: Mbhashe

The Mbhashe River system begins in the Drakensberg Mountain range and passes through Elliot, Engcobo and Idutywa towns, finally discharging into the Indian Ocean through the Mbhashe Estuary. The major tributaries of the system are Mnyolo, Mgwali and Xuka. Most of the catchment is degraded, mainly by overgrazing. The soils are naturally erodible and severe erosion has occurred. Due to the rural nature of the area, land use is mostly in the form of subsistence farming and cattle grazing. Commercial dryland agriculture has been recorded in the upper reaches of the catchment around Elliot, along with some small scale commercial forestry (DWA 2010).

The monitoring results indicate a river system that is in a moderately modified (C) condition at the sites that had sufficient data for an analysis, which are on the middle lower reaches of the catchment on the Xuka and Ntsuba rivers.

T2: Mthatha

The main river in this secondary catchment, Mthatha River, originates approximately 5 kilometres below the Drakensberg Mountains. It meanders towards the Indian Ocean with major tributaries being Cicira, Tabase, Mpafane, Ncambele, Corana, Cumngce and Ngqungqu rivers.

Land use activities include pine and blue gum tree plantations, subsistence agri-culture (animal husbandry and crop production, mainly livestock and maize respectively), commercial agriculture, especially along the areas along the Mthatha Dam (where extensive irrigation occurs), and settlements (mainly rural and some urban around Mthatha town) (DWS 2019).

Due to financial constraints, not enough data was collected from the Mthatha River catchment during the reporting period.

T3: Mzimvubu

The T3 secondary catchment is the largest in this primary drainage region. It comprises of the Mzimvubu River and its four major tributaries: Tsitsa, Tina, Kinira, and Mzintlava Rivers. The origins of the Mzimvubu catchment are at the Drakensberg escarpment, then flowing through deep and steep river valleys incised into the coastal belt, before discharging into the Indian Ocean at Port St Johns (DWS 2019d). Land uses are commercial agriculture with farm dams, irrigation schemes, crop production and animal husbandry as well as subsistence agriculture. There are pine and blue gum plantations as well as urban and rural settlements.

Moderately modified (C) conditions prevailed in most of the catchment. Poor management of the above listed land use activities was constantly observed in terms of habitat destruction by crossings, cattle trampling, overgrazing and sand mining, alien plant invasions adding to erosion and sedimentation, and water abstraction and farm dams leading to reduced or no flows in some parts of the catchment.

T4: Mtamvuna

The Mtamvuna River forms the border of the Eastern Cape and KwaZulu Natal with mostly rural low density settlements spanning the catchment. There is extensive forestry in the upper reaches, the middle reaches have a gorge that makes the river difficult to access, and cultivation occurs in the more accessible lower reaches (DWS 2013). The Mtamvuna River, on a site in the lower reaches, was found to be in a moderately modified (C) condition. This was in an area with cultivation along the river banks surrounded by rural communities.

T5: Mzimkhulu

Challenges of capacity in the KwaZulu-Natal office and access to some of the sites have led to difficulty with monitoring the Mzimkhulu River system. This river originates in a World Heritage Site, at Ukhahlamba Drakensberg Park, and winds down south easterly, joined by the Ngwangwane, Bisi, Mzimkhulwana and

other tributaries, before discharging to the Indian Ocean (DWS 2011b). Efforts to properly implement monitoring in this catchment are underway.

T6: Mntafufu to Mzamba to T9: Qolora to Nqabarha

Lack of capacity in the East London office of the Department has led to these secondary catchments being left out, in terms of biomonitoring, except for the Shixini River (T9), where monitoring was terminated due to prevailing low flow conditions. These catchments are in largely rural areas or nature reserves, which mean they would probably exhibit natural ecological conditions. The importance of monitoring these rivers is recognised and mentoring will be re-instated as soon as the capacity limitations have been resolved.

DRAINAGE REGION U (PONGOLA-MTAMVUNA WATER MANAGEMENT AREA)

The U primary drainage region falls within the Pongola-Mtamvuna WMA (Figure 19). The KwaZulu Natal regional office is responsible for monitoring this management area. Up to November 2017 an implementing agent was used to do the monitoring. Since termination of the services of the implementing agent, only a limited number of sites have been monitored. Staff from the Resource Quality Information Services Directorate (RQIS) assisted with the monitoring but due to the limitations on travel as well as a restricted budget only a few sites could be sampled. The condition of the rivers in primary drainage region U is provided in Figure 18. There are 26 REMP monitoring sites in this drainage region but only four had enough data to determine the conditions. There are eight secondary drainage regions. There are no sites in secondary regions U5 (Nonoti) and U8 (Mzumbe etc.). A list of the monitoring sites including reasons for not sampling is provided in Annexure U.

- U1: Mkomazi
- U2: Mngeni.
- U3: Mdloti, Tongati etc.
- U4: Mvoti
- U5: Nonoti (not done)
- U6: uMlazi etc.
- U7: Lovu
- U8: Mzumbe etc (not done)

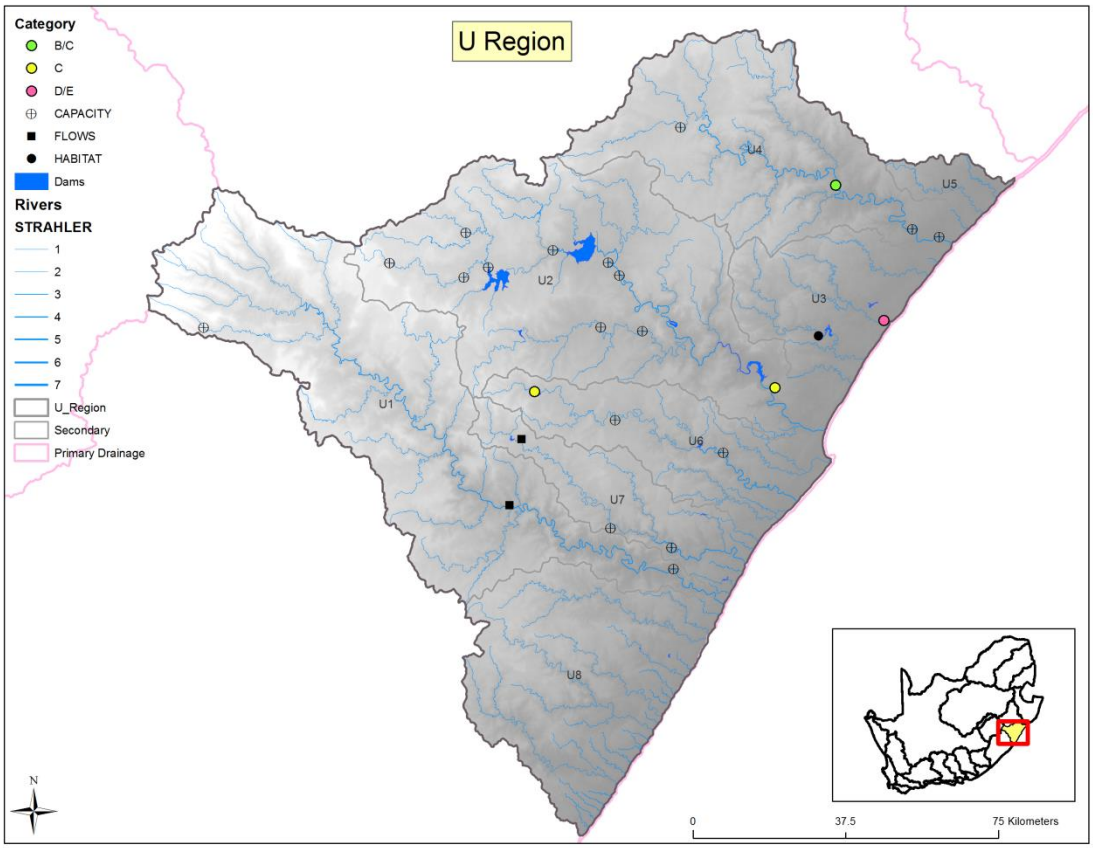

Figure 19. Summary Ecological Categories in primary drainage region U reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indi-cates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

U1: Mkomazi

There are only three sites in this secondary but none were sampled during the hydrological year (see Annexure U for reasons).

U2: Mngeni

There are 11 sites in this secondary catchment, nine on the Mngeni River and two on the Duzi River. The only site monitored in this catchment is the Mngeni downstream of Inanda Dam which was in a moderately modified (C) condition. There was no capacity to monitor the rest of the sites. The main impacts in the Mngeni catchment apart from flow regulation were related to poor water quality (DWS 2017). According to the 2017 State of the Rivers of KwaZulu-Natal, the Umngeni River had acceptable water quality but with periodic increases in microbial contamination as well as increased concentrations of salts and nutrients in the lower reaches.

U3: Mdloti, Tongati

There were only two sites in this secondary catchment, one each in the Mdloti and the Tongati rivers. The site on the Mdloti could not be sampled as it is in the backup of the Hazelmere Dam. The Tongati was in a largely to seriously modified (D/E) condition. According to the 2017 State of KZN Rivers report (DWS 2017),

this site may be affected by faecal pollution and fertilizers. This area is impacted by agricultural activities as well as run-off from industrial, urban and peri-urban areas (DWS 2017).

U4: Mvoti:
Only one of the four sites in the Mvoti catchment could be monitored due to capacity problems. This environmental flow requirements (EWR) site in the middle reaches of the Mvoti River was in largely natural to moderately modified (B/C) condition. The main impacts in this area are from low-density rural settlements and the accompanying overgrazing by livestock (DWS 2014g).

U6: uMlazi etc.
Sufficient resources were available for monitoring only the uppermost of the three sites in the Mlazi River. The site, upstream of the Baynesfield Farm Estate near Richmond, was in a moderately modified (C) condition. This site is mostly impacted by agriculture and there were indications of erosion and sedimentation as well as possible faecal pollution and nitrogen-based fertilisers (DWS 2017).

U7: Lovu
There are three sites within this secondary catchment but none of them were sampled during this sampling period (Annexure U). The upper site was visited but could not be sampled due to high flows at the time.

DRAINAGE REGION V (PONGOLA-MTAMVUNA WATER MANAGEMENT AREA)

The V (Tukhela) primary drainage region falls within the Pongola-Mtamvuna WMA. The KwaZulu Natal regional office is responsible for monitoring this management area. Up to November 2017 an implementing agent was used to do the monitoring. Since terminating the services of the implementing agent the only a limited number of sites have been monitored. Staff from the Resource Quality Information Services Directorate (RQIS) assisted with the monitoring but due to the challenges with travel as well as a limited budget only a few sites could be sampled. The condition of the rivers in primary drainage region V is provided in Figure 20. There are 14 REMP monitoring sites in this drainage region but only two had enough data to determine the conditions. There are seven secondary drainage regions. There are no sites in Sundays (V6) secondary region. A list of the monitoring sites including reasons for not sampling is provided in Annexure V.

- V1: Thukela
- V2: Mooi
- V3: Buffalo
- V4: Thukela
- V5: Thukela
- V6: Sundays (not done)
- V7: Bushmans

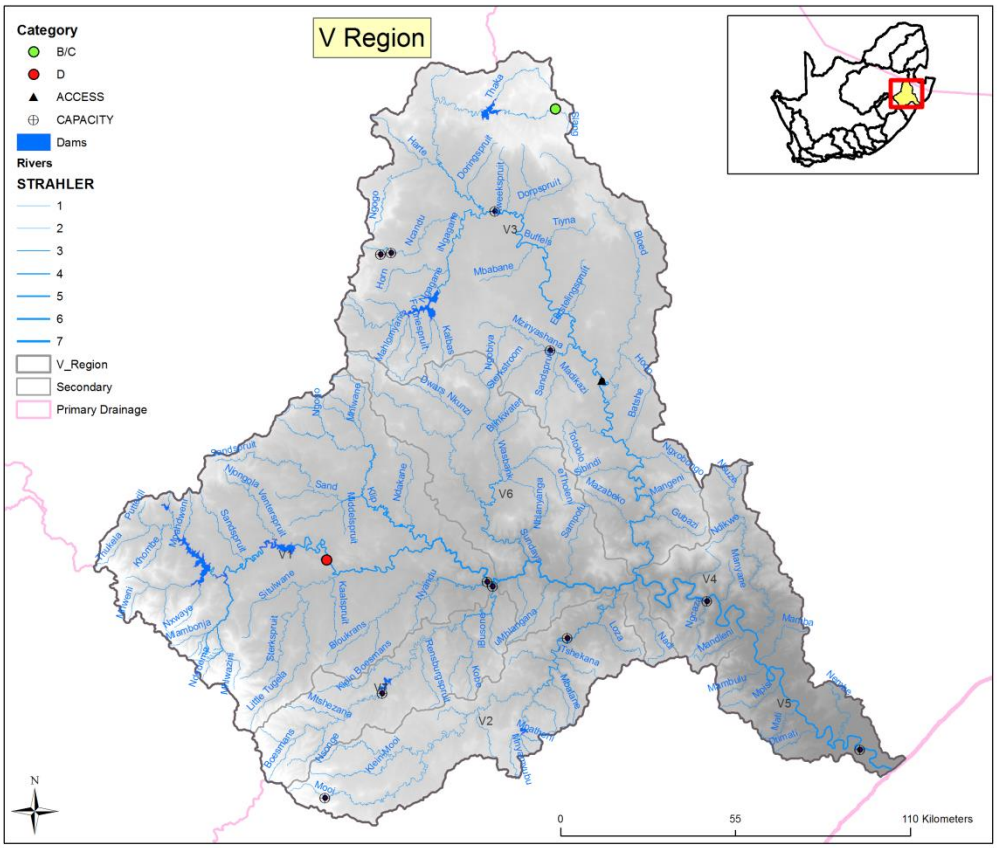

Figure 20. Summary Ecological Categories in primary region V reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Eco-logical Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

V1: Thukela:

This drainage region represents the upper Thukela and the Klein Thukela and the upper sections of Thukela up to the Bushmans River confluence. Only one of the two sites in the upper reaches of the Thukela River could be sampled. This EWR site located downstream of the Spioenkop Dam was in a largely modified (D) condition. The main impacts in this reach apart from flow regulation are related to agricultural activities including irrigation and cattle farming (DWS 2017).

V2: Mooi:

The Mooi River Catchment could not be monitored due to capacity constraints. There are two sites in this secondary catchment. One in a tributary of the Mooi River and the second an EWR site near the town of Mooiriver. In the previous assessment cycle the Kamberg site in the Ukhahlamba Drakensberg Park was in a natural to largely natural (A/B) condition (DWS 2017). This site is mostly impacted by the sedimentation and erosion related to a weir constructed for the old trout hatchery near the site (DWS 2017).

V3: Buffalo:

One of the six sites in the Buffalo catchment was monitored: the Slang River in the upper part of the catchment was in a largely natural to moderately modified (B/C) condition. The only impacts at this site are

related to the local farming activities; mainly erosion and sedimentation due to some trampling in the riparian zone (DWS 2017).

V4: Thukela:
This secondary drainage region comprises the Thukela River from the confluence of the Buffalo River up to the Middledrift area just upstream of the Washi confluence. The only site in this secondary catchment (V4THUK-EWR15) was not monitored due to capacity constraints.

V5: Thukela:
This secondary drainage region comprises the Thukela River from the Middledrift area up to the Thukela River mouth near Mandini. The only site in this drainage region could not be monitored due to a lack of capacity.

V7: Bushmans:
This secondary drainange region comprises the Bushmans River and its tributaries. The two sites on the Bushmans River could not be monitored due to a lack of capacity.

DRAINAGE REGION W (PONGOLA-MTAMVUNA AND INKOMATI USUTHU WATER MANAGEMENT AREAS)

The W primary drainage region falls within the Pongola-Mtamvuna and the Inkomati Usuthu (W5) WMAs. The KwaZulu Natal regional office is responsible for monitoring the Pongola-Mtamvuna WMA and the Inkomati Usuthu Catchment Management Ageny (IUCMA) the Usuthu (W5) drainage region. The IUCMA uses the Mpumalanga Parks and Tourism Agency (MTPA) to do the biomonitoring in the Usuthu catchment. This detailed monitoring is only done once in five years. The IUCMA monitors a limited number of sites twice yearly. Until November 2017, DWS used an implementing agent do the monitoring. Since the termination of the services of the implementing agent, few sites have been monitored. Staff from the Resource Quality Information Services Directorate (RQIS) assisted with the monitoring but due to the challenges with travel as well as a limited budget only a few sites could be sampled. The condition of the rivers in primary drainage region W is provided in Figure 21. There are 77 REMP monitoring sites in this drainage region but only seven had enough data for determining the conditions. There are seven secondary drainage regions, but W6 and W7 are not monitored. W6 falls within eSwatini and Mozambique, whereas W7 comprises the Kosi Lakes system where no suitable river habitat is available. A list of the monitoring sites including reasons for not sampling is provided in Annexure W.

- W1: Mhlatuze
- W2: Mfolozi
- W3: Mkuzi
- W4: Phongola
- W5: Usuthu
- W6: Mbuluzi (not sampled)
- W7: Kosi Lakes (not sampled)

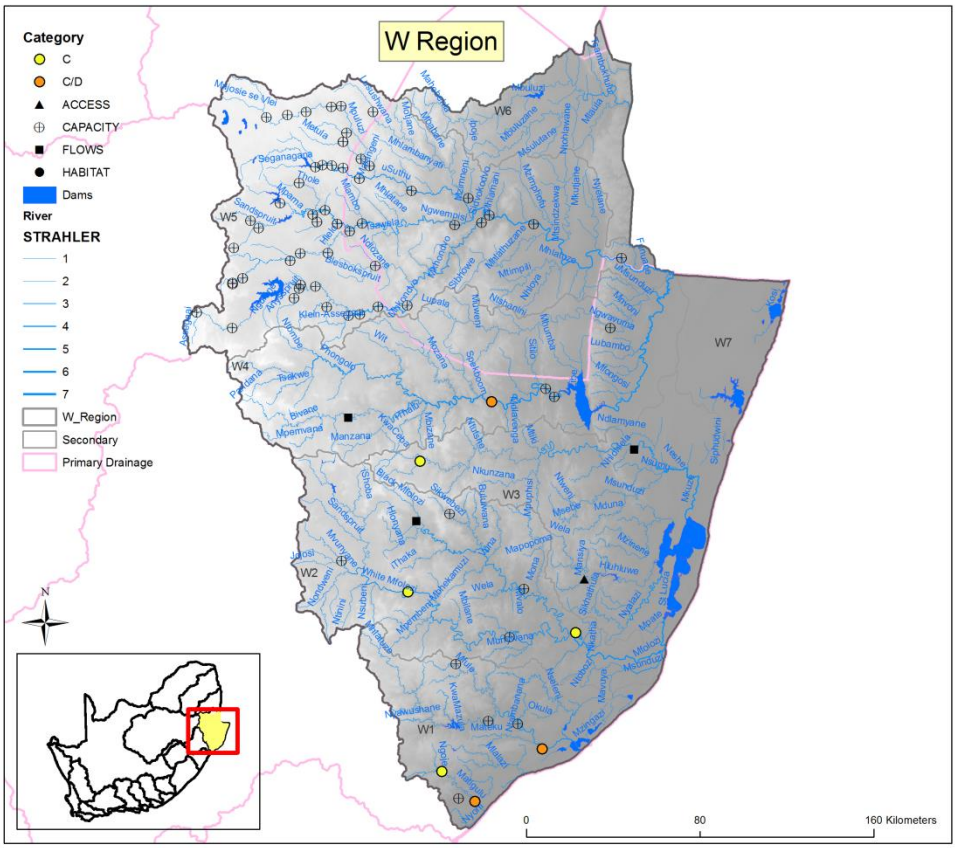

Figure 21. Summary Ecological Categories in primary drainage region W reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

W1: Mhlatuze:

The Mhlatuze catchment comprises the Mhlatuze River as well as the Matikulu, Mlalzi and Nhlabane rivers. Only three of the seven sites in this drainage region were sampled. The sites on the Mhlatuze and Matikulu Rivers were in a moderately to largely modified (C/D) condition while the Nwaku tributary of the Matikulu were in a slightly better moderately modified (C) condition. The main impacts on the Nwaku are related to livestock grazing and trampling leading to erosion and resulting in sedimentation of the river channel (DWS 2017). Similarly the lower Matikulu is also modified, not only by livestock grazing and trampling, but also by the local community driving through the channel as there is no formal river crossing in the vicinity (DWS 2017). The site on the Mhlatuze is located at the R102 crossing. This accessibility to the river has resulted in it being used as an informal and illegal rubbish dump. The local community also use it as a watering point for their livestock resulting in erosion of the riparian zone.

W2: Mfolozi:

This drainage region comprises the Mfolozi River as well as its two main tributaries the Black Mfolozi and the White Mfolozi. Only two of the seven sites in this drainage region could be monitored. The White Mfolozi and the Mfolozi downstream of the confluence of the Black and White Mfolozi were in a moderately modified (C) condition. The White Mfolozi is mainly impacted by upstream activities whereas

the site in the Main Mfolozi is situated close to a coal mine. The main impacts are livestock trampling and grazing but more recently the mining company has also been disturbing the riparian zone.

W3: Mkuze:

This drainage region comprises the Mkuze and Hluhluwe rivers. Only one of the three sites in this drainage region was sampled. This site in the upper reaches of the Mkuze River was in a moderately modified (C) condition. The main impacts in the upper reaches of the Mkuze River are linked to commercial forestry, road crossings, coal mines and agricultural activities (DWS, 2014).

W4: Phongola:

This secondary drainage region comprises the Phongola River and its tributaries. The Phongola catchment is shared with eSwatini and Mozambique (WSDP). Only one of the six sites in this drainage region was sampled. The Phongola River upstream of Pongola Town and approximately 3km downstream of the Grootdraai Weir was in a moderately to largely modified (C/D) condition. Water for irrigation is diverted from the Grootdraai weir. South Africa is obligated to make releases to Mozambique from the Pongolapoort Dam. In addition there are operating rules in place that specify the frequency and magnitude of flood releases for ecological and social requirements to the floodplain downstream of the dam. The main land uses in the Phongola catchment are large scale commercial forestry in the upper part of the catchment and extensive irrigated sugarcane in the lower reaches of the catchment.

W5: Usuthu:

The source of the Usuthu is in the Mpumalanga Highveld near the town of Amsterdam. It flows through the Kingdom of eSwatini and into Mozambique (Diedericks et al. 2017). The main impacts in this drainage region are due to Forestry, Mining, agricultural activites as well as municipal Waste Water Treatment Works. Another large impact is related to Interbasin transfers to the Vaal and Olifants catchments mostly to provide cooling water to ESKOM power stations (Diedericks et al. 2017). The IUCMA is responsible for monitoring the Usuthu catchment. Due to capacity constraints no information is available for this assessment period. The last comprehensive survey of the Usuthu catchment was done in 2015 (Diedericks *et al.* 2016). The Usuthu catchment is scheduled to be sampled during the low-flow season of 2019.

In 2015 the Usuthu catchment was mostly in a moderately modified (C) condition. Nine percent of the sites were in a C category while 24% were in a C/D and 27% in a D category (Diedericks et al 2016). The Nwempisi and the main stem Usuthu rivers were generally in a largely modified condition (Diedericks *et al.* 2016)

DRAINAGE REGION X (INKOMATI USUTHU WATER MANAGEMENT AREA)

The X primary drainage (Inkomati) region falls within the Inkomati Usuthu WMA. The Inkomati Usuthu Catchment Management Agency (IUCMA) is responsible for monitoring this drainage region, while the sites that fall within the Kruger National Park are monitored annually by Mr Hendrik Sithole of SANPARKS. The IUCMA uses the Mpumalanga Parks and Tourism Agency (MTPA) to do the biomonitoring in the Usuthu

catchment. This detailed monitoring is only done once in five years. The IUCMA staff monitors a limited number of sites twice yearly. The condition of the rivers in primary drainage region X is provided in Figure 22. There are 202 REMP monitoring sites in this drainage region but only 52 had enough data to determine the conditions. There are four secondary drainage regions but region X4 comprising seasonal systems within the Kruger National Park is not monitored. A list of the monitoring sites including reasons for not sampling is provided in Annexure X.

- X1: Komati
- X2: Crocodile (East)
- X3: Sabie
- X4: Nwaswitsontso, Nwanedzi, Sweni (Seasonal systems in KNP not sampled).

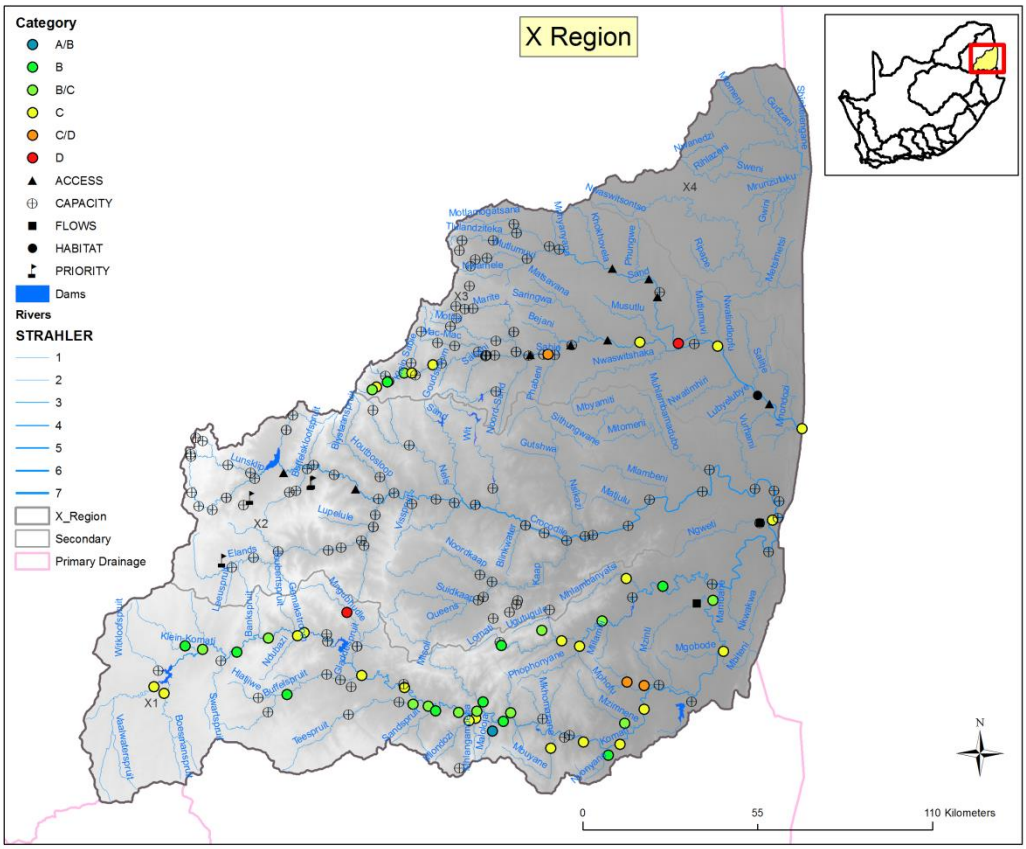

Figure 22. Summary Ecological Categories in primary drainage region X reflecting the macroinvertebrate condition for selected sites monitored during 2017/2018 hydrological year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

X1: Komati

The IUCMA performed a detailed survey of the Komati River during the low flow season of 2018 (Roux et al 2019). There are 68 sites in the Komati catchment, 41 of which were sampled during the assessment period. The ecological condition in the drainage region ranged from natural to largely natural (A/B) in the Malolotja River to largely modified (D) in the Gladdespruit. Approximately 41% of the sites were in a moderately modified (C) condition, 24% in a largely natural or better (A/B, B) condition with only 7% of the

sites in a more than moderately modified (C/D, D) condition (Roux et al 2019). The source of the Komati River is near Breyton in Mpumalanga, the middle reaches of the river flow through eSwatini before entering South Africa again. The Komati River flows into Mozambique at Komatipoort. The catchment is highly stressed due to water demands, with ESKOM and agriculture (mainly irrigation in the lower reaches) being the major water users (Roux et al 2019). The numerous weirs and dams in the system alter the natural flow regime and impede fish migration (Roux et al 2019).

X2: Crocodile

This drainage region comprises the Crocodile River (east) and its tributaries (Elands, Kaap, etc.). Of the 71 REMP sites in the X2 drainage region the majority have been abandoned for various reasons (see Annexure X). None of the sites in this drainage region had enough data to determine the conditions. The IUCMA, however, did a detailed survey of the Crocodile Catchment from June to September 2017(Roux et al 2018). Results from that survey are presented in Figure 22. The upper reaches of Crocodile River were in a natural to largely natural (A/B) condition, the section between the confluence of the Kareekraal River and the Buffelskloofspruit was in a largely natural (B) condition, after which the condtion deteriorated to moderately modified (C). The condition of the tributaries ranged from the largely natural (B) Buffelskloofspruit to the moderately to largely modified (C/D) Gladdespruit. The Elands River was mostly in a moderately modified (C) condition. The Crocodile River downstream of Kwena Dam is largely modified by unseasonal releases from the dam for irrigation. The Crocodile River catchment is impacted by commercial forestry, agricultural activities, including large scale irrigation of fruit orchards (mainly citrus and banana), vegetables and sugar cane as well as rural and urban settlements (Roux et al 2018).

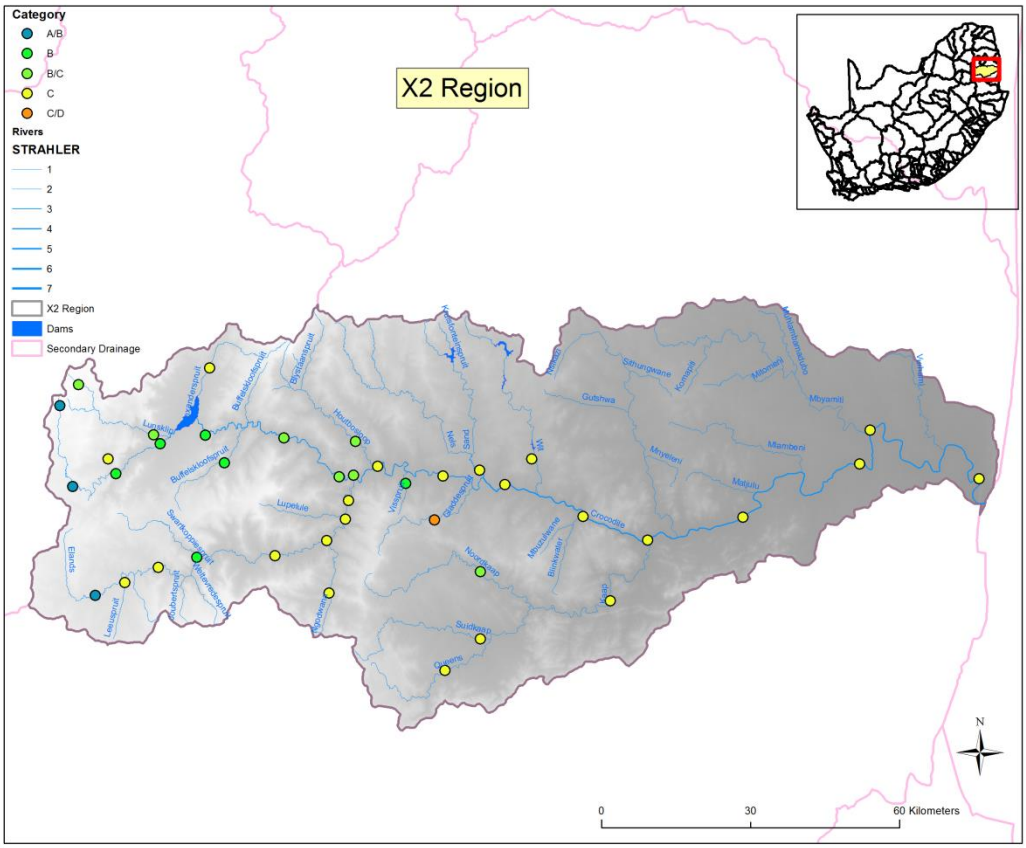

Figure 23. Summary Ecological Categories in secondary drainage region X2 reflecting the macroinvertebrate condition for selected sites monitored during the 2017 calendar year. The colour of the circles indicates the Ecological Condition with green representing relatively good conditions while the red and purple reflect relatively poor conditions.

X3: Sabie Sand

This drainage region comprises the Sabie and Sand Rivers and their tributaries. The IUCMA targeted this catchment for a detailed survey in 2016 (Roux et al 2017). Only 11 of the 63 sites in this drainage region were monitored during the assessment period (Figure 21). The lower Sand River near Skukuza in the Kruger National Park was the most impacted site in the drainage region. The largely modified (D) condition of the Sand River could to a large degree be attributed to low flows. The condition of the main stem Sabie River ranged from largely natural (B) and largely natural to moderately modified (B/C) upstream of Sabie town to C/D (moderately to largely modified) upstream of the Kruger National Park, whereafter it improves again to a moderately modified (C) condition. The Sabie River itself is not impounded but Da Gama Dam on the White Waters and the Injaka Dam on the Marite still modifies the flow conditions of the lower reaches of the Sabie. The Sabie catchment is affected by a variety of land uses including commercial forestry and agriculture, as well as rural and urban impacts.

IMPLEMENTATION CHALLENGES

Inactive sites:

There are a large number of inactive sites that are currently not sampled (see Annexures A-X). A major portion of the sites are inactive due to either access problems (39 sites) or unsuitable flow conditions (57 sites). The sites that could not be accessed are normally on private land where the permission of land-owners is required. It is generally not a problem to obtain permission and make arrangements to access the sites provided the contact details of the land-owners are available. However the individual land owners and their contact details are often unobtainable. Many of the sites in the Limpopo WMA in particular are located on private game farms where the owners do not live on the property. A number of the sites could not be accessed due to roads that are blocked or in an unsafe condition. The majority of sites that were not sampled due to unsuitable flow conditions will be re-activated once the river flows have normalised. Certain sites, particularly some of the sites in the Vaal and Orange catchments, are too ephemeral in nature and will have to be discontinued altogether for the in-stream assessments. These sites will only be used to do riparian assessments. The habitats at 11 of the sites were altered to such an extent that it has become impossible to do macrocinvertebrate assessments. Depending on the habitat at these sites they might still be used to assess some of the other indicators. There were health and safety concerns at 12 sites. Two sites have been discontinued due to the consistent high level of raw sewage at the sites which constitutes a health risk to staff. The majority of inactive sites with safety concerns are located in nature reserves or game farms where wild animals (crocodiles, hippos, leopards, etc.) are a hazard. The safety concerns may be addressed to a certain extent by providing wildlife awareness courses to the sampling teams or providing them with a trained, experienced and armed game guard. These interventions will however come at a cost.

Other challenges

A lack of capacity remains a major challenge with implementing the REMP. At this stage only the macroinvertebrates are monitored on a regular basis in all the WMAs. Even though all the regions are monitoring the macroinvertebrates there are still some regions with no or only one accredited SASS practitioner. There are SASS5 training courses available but at about R7000 per candidate it is quite an expensive exercise. In addition to the formal SASS5 courses the staff can also receive internal SASS5 training to gain the necessary experience. This method has proven to be successful in the Gauteng/ North West as well as the Northern Cape. Apart from receiving the SASS training there seems to be reluctance in certain instances for individuals to undergo the SASS accreditation process. Another major challenge is the inabilities of the regional staff to run the EcoStatus models. There is currently a systematic training process under way to provide the necessary training. Additional training in fish and plant identification is also being investigated at the moment.

Financial constraints are a major challenge in the implementation of the REMP. Due to the nature of the programme, the samplers have to go out in teams of at least two staff members. The only way of implementing the programme is by physically visiting the rivers, which involves transport (often using four wheel drive vehicles due to the road conditions), subsistence and travel. The recent cost-cutting measures implemented in the department necessitated the reduction in the number of sites monitored. Further financial implications are related to the procurement of essential sampling equipment and Personal Protective Equipment (PPE) without which sampling cannot take place.

RECOMMENDATIONS

Parts of the country have experienced low flow conditions, with some rivers ceasing to flow during the reporting period and thus not being sampled. The Limpopo, KwaZulu-Natal, Free State, Eastern Cape, Northern Cape and Western Cape experienced drought conditions, exacerbated by heavy water use in these areas. As more phenomena like these are experienced due to climate change, the country needs to put in place, and execute, strategies to lessen the impacts, while better managing land use and protection of water resources. For the latter, for example, tracking and enforcing adherence to the Reserve and Resource Quality Objectives and rehabilitating water resources that have deteriorated to an unsustainable state.

River sites in the densely populated areas like Gauteng, Western Cape, KwaZulu Natal, and some parts of Eastern Cape (Port Elizabeth, East London and Mthatha) have indicated poor conditions due to the lack of proper management and maintenance of sewage treatment works and the exceeding of carrying capacities. Rural areas, especially in the Eastern Cape still lack proper sanitation. Pit latrines are widely used and we cannot shy away from the possible contamination of water resources. Proper and well-managed sanitation solutions should thus be a priority in the country. Poor sanitation, whether urban or rural, is a threat to aquatic and human health, and is one of the largest contributors to the deterioration of water resources.

Formal and informal developments, mining and farming have caused severe deterioration of riparian zones and instream habitats. Healthy river habitats are beneficial to the environment and humans. They support a high biodiversity of aquatic fauna and flora, and are able to provide goods and services beneficial to surrounding communities. Riparian plants can buffer impacts of temperature increases due to climate change on instream habitats, and reduce erosion. Everyone needs to contribute to sustainable solutions in this space. Municipalities need better and greener town planning and improve service delivery to densely populated areas. Mining companies need to be held accountable where there has been improper management of mining activities. Compliance and enforcement measures need to be tightened, for exmple on the illegal sand and diamond mining prevalent in Eastern Cape and Northern Cape.

Sustainable agricultural practices are encouraged, where preserving of biodiversity and protection of the environment are practised with reduced use of fertilisers and water. Other environmentally-friendly farming methods include drip irrigation, low tillage to reduce erosion and water use, and crop and livestock rotation to improve water quality and increase carbon sequestration.

To solve implementation challenges, the programme needs to be well resourced. Financial investment is needed to cover the operational costs, in terms of travelling, provision of proper PPE, sampling equipment and attendance of training to up-skill implementers so that more monitoring indicators can be sampled. The provinces with limited resources will need support until they are able to implement the programme independently. These challenges pose a huge risk of causing information gaps, preventing a robust understanding of our river systems.

In a nutshell, Integrated Water Resource Management is essential for the successful management of any type of water resource. Strong government, private and public inter-relations are needed for promoting the values of the National Water Act: protection, management, and equitable and sustainable use.

REFERENCES

Basson MS and Rossouw JD. 2003. *Olifants/Doorn Water Management Area Overview of Water Resources Availability and Utilisation: National Water Resources Strategy Project.* Department of Water Affairs and Forestry Report No. P WMA 17/000/0203

Dabrowski J, Oberholster PJ, Dabrowski JM, Le Brasseur J and Gieskes J. 2013. Chemical Characteristics and Limnology of Loskop Dam on the Olifants River (South Africa), in light of recent fish and crocodile mortalities. *Water SA* 39: 675–686.

Department of Water Affairs (DWA). 2010. *Mbashe River Trends Report (2007-2010): Draft Technical Report*.

Department of Water Affairs (DWA). 2011a. *Mzimkhulu River Catchment Water Resource Study (WRP990).* Prepared by A. Tanner, Aurecon South Africa. Report Number WMA 11/T50/00/3009 Volume 1

Department of Water Affairs (DWA). 2011b*. Development of a Reconciliation Strategy for the Olifants River Water Supply System (WP10197): Water Quality Report.* Prepared by Aurecon South Africa. Report no.: P WMA 04/B50/00/8310/7

Department of Water Affairs (DWA). 2013. *Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area.* Prepared by: Rivers for Africa eFlows Consulting (Pty) Ltd.

Department of Water and Sanitation (DWS). 2014a. *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Secondary: K1.* Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 30 August 2019.

Department of Water and Sanitation (DWS). 2014b. *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Secondary: K2.* Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 30 August 2019.

Department of Water and Sanitation (DWS). 2014c. *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Secondary: K3.* Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 30 August 2019.

Department of Water and Sanitation (DWS). 2014d*. A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Secondary: K4.* Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 30 August 2019.

Department of Water and Sanitation (DWS). 2014e. *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Secondary: K8.* Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 30 August 2019.

Department of Water and Sanitation (DWS). 2014f. *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in*

South Africa. Secondary: K9. Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 30 August 2019.

Department of Water and Sanitation (DWS). 2014g. *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Secondary: U4.* Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 2 September 2019.

Department of Water and Sanitation (DWS). 2014h. *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Secondary: W3.* Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on 3 September 2019.

Department of Water and Sanitation (DWS). 2016. *River Ecostatus Monitoring Programme in the Olifants River Catchmnet: Draft Quarterly Report.*

Department of Water and Sanitation (DWS). 2017. *River Ecostatus Monitoring Programme: State of the rivers of KwaZulu-Natal (April 2016 to March 2017 update),* Draft Final report. 201pp.

Department of Water and Sanitation (DWS). 2018a. *River Ecostatus Monitoring Programme in Kouga/Gamtoos River Catchment: Draft technical report*.

Department of Water and Sanitation (DWS). 2018b. *River Ecostatus Monitoring Programme in Kowie River Catchment: Draft technical report*.

Department of Water and Sanitation (DWS). 2018c. *River Ecostatus Monitoring Programme in Great Kei River Catchment: Draft technical report*.

Department of Water and Sanitation (DWS). 2018d. *River Ecostatus Monitoring Programme in the Keiskamma River Catchment: Draft technical report.*

Department of Water and Sanitation (DWS). 2019a*. River Ecostatus Monitoring Programme in the Olifants River Catchment: Draft Technical Report.*

Department of Water and Sanitation (DWS). 2019b. *River Ecostatus Monitoring Programme in Kromme River Catchment: Draft technical report.*

Department of Water and Sanitation (DWS). 2019c. *River Ecostatus Monitoring Programme in Swartkops River Catchment: Draft technical report.*

Department of Water and Sanitation (DWS). 2019d. *River Ecostatus Monitoring Programme in Mthatha River Catchment: Draft technical.*

Department of Water and Sanitation (DWS). 2019e*. River Ecostatus Monitoring Programme in the Mzimvubu River Catchment: Draft Technical Report.*

Dickens CWS and Graham PM. 2002. The South African Scoring System (SASS) Version 5 Rapid Bioassessment Method for Rivers. *African Journal of Aquatic Science* 27:1-10.

Diedericks GJ, Roux F, Hoffman AC and Selepe M. 2016. *Ecostatus of the Usuthu-Lusutfu Catchment. Document 1: Summary.* Internal Inkomati Usuthu Catchment Management Agency Report. 77pp.

Freshwater Biodiversity Information System (FBIS). 2019. FBIS Version 2. Downloaded from https://www.freshwaterbiodiversity.org on 9 September 2019

Internal Strategic Perspective (ISP). 2004. *Development of an Internal Strategic Perspective for the Amatola - Kei Catchment Area of the Mzimvubu to Keiskamma Water Management Area.* Department of Water Affairs and Forestry.

Kleynhans CJ. 1996. *A qualitative procedure for the assessment of the habitat integrity status of the Luvuvhu River (Limpopo system, South Africa).* Journal of Aquatic Ecosystem Health 5:41-54.

Kleynhans CJ. 1999. The development of a fish index to assess the biological integrity of South African rivers. *Water SA* 25:265-278.

Kleynhans CJ and Louw MD. 2008. *River Ecoclassification. Manual for Ecostatus Determination (Version 2). Module A: Ecoclassification and Ecostatus Determination.* WRC Report No TT332/08.

Orange-Senqu River Commission (ORASECOM). 2015. *Orasecom Joint Basin Survey (JBS2) – Final Report. Aquatic Ecosystem Health and Water Quality Monitoring in 2015.* ORASECOM report no ORASECOM/001/2015. 254pp.

River Health Programme (RHP). 2004a. *State-of-Rivers Report: Berg River System.* Department of Water Affairs and Forestry, Pretoria. ISBN No: 0-620-32075-3

River Health Programme (RHP). 2004b. *State-of-Rivers Report: Buffalo River System.* Department of Water Affairs and Forestry, Pretoria. ISBN No: 0-620-33052-X

River Health Programme (RHP) 2005. *State of Rivers Report: Greater Cape Town's Rivers.* Department of Water Affairs and Forestry, Pretoria. ISBN No: 0-620-34026-6

River Health Programme (RHP). 2006. *State of Rivers Report: Olifants/Doring and Sandveld Rivers.* Department of Water Affairs and Forestry, Pretoria. ISBN No: 0-620-36021-6

River Health Programme (RHP). 2007. *State of Rivers Report: Rivers of the Gouritz Water Management Area.* Department of Water Affairs and Forestry, Pretoria. ISBN No: 0-620-38676-0

River Health Programme (RHP). 2011. *State of Rivers Report: Rivers of the Breede Water Management Area.* Department of Water Affairs, Western Cape, Republic of South Africa. ISBN No: 978-0-620-50001

Roux F, Diedericks G, Kleynhans CJ, Thirion C, Hoffman AC and Selepe M. 2017. *Ecostatus of the Sabi-Sand River Catchment. Inkomati River System. Phase II (2016).* Internal Inkomati Usuthu Catchment Management Agency Report. 254 pp.

Roux F, Diedericks G, Hoffman AC, Selepe M, Scherman P and Riddel E. 2018. *Ecostatus of the Crocodile River Catchment. Inkomati River System. Phase II (2017).* Internal Inkomati Usuthu Catchment Management Agency Report. 328 pp.

Roux F, Diedericks G, Hoffman AC, Scherman P and Selepe M. 2019. *Ecostatus of the Komati River Catchment. Inkomati River System. Phase II (2018).* Internal Inkomati Usuthu Catchment Management Agency Report. 361 pp.

Thirion C. 2007. *Module E. Macroinvertebrate Response Assessment Index in River EcoClassifiction: Manual for EcoStatus Determination (version2).* Joint Water Research Commission and Department of Water Affairs and Forestry report. WRC Report No. TT332/08. Water Research Commission, Pretoria. 43pp.

Thirion C. 2016. *The determination of flow and habitat requirements for selected riverine macroinvertebrates.* Unpublished PhD thesis of the North West University, Potchefstroom, South Africa.

Van Vuuren L 2010. *Vaalharts –a garden in the Desert*. The Water Wheel Jan/Feb 2010. Water Research Commission, South Africa.

ANNEXURES

Annexure A: MONITORING SITES IN PRIMARY DRAINAGE REGION A

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
A1NGOT-DINOK	-25.4553	25.85377	Ngotwane	Ngotwane	Limpopo	A10A-00915	D	C
A2APIE-DEOND	-25.6168	28.19158	Apies	Apies	Limpopo	A23F-00827	E	D
A2APIE-PRETO	-25.7269	28.17192	Apies	Apies	Limpopo	A23E-01071	F	D/E
A2BLOU-KROMD	-25.9814	27.78806	Crocodile	Crocodile West	Limpopo	A21D-01185	D	D
A2BLOU-ZWART	-25.9772	27.83389	Bloubankspruit	Crocodile West	Limpopo	A21D-01185	D	D
A2BRAA-PARKH	-26.1383	28.01072	Braamfonteinspruit	Jukskei	Limpopo	A21C-01262	E	D/E
A2CROC-BOBBE	-25.8079	27.90983	Crocodile	Crocodile West	Limpopo	A21H-01107	D	FLOWS
A2CROC-ELAND	-25.9464	27.87878	Crocodile	Crocodile West	Limpopo	A21E-01162	E	D
A2CROC-KOEDO	-24.8894	27.51738	Crocodile	Crocodile West	Limpopo	A24C-00596	D	C
A2CROC-MAKOP	-24.4065	27.11516	Crocodile	Crocodile West	Limpopo	A24J-00438	D	FLOWS
A2CROC-MOUNT	-25.7168	27.8421	Crocodile	Crocodile West	Limpopo	A21J-01053	E	D
A2CROC-ROODE	-26.0635	27.8416	Muldersdrif se loop	Crocodile West	Limpopo	N/A	N/A	D
A2EDEN-LEEUW	-25.678	28.4017	Edendalespruit	Pienaars	Limpopo	A23A-01045	D	D
A2ELAN-BESTE	-25.4639	26.78925	Elands	Elands	Limpopo	A22E-00940	D	C
A2ELAN-KLIPB	-25.7266	26.72044	Elands	Elands	Limpopo	A22A-01001	C	C
A2ELAN-NOOIT	-25.5818	26.67822	Elands	Elands	Limpopo	A22A-01001	C	FLOWS
A2HART-KAMEE	-25.6565	28.30846	Hartbeesspruit	Pienaars	Limpopo	A23A-01049	D	D/E
A2HENN-HENNO	-25.8256	27.98944	Hennops	Hennops	Limpopo	A21B-01135	E	E
A2HEXR-OLIFA	-25.8184	27.27073	Elands	Elands	Limpopo	A22G-01131	C	C
A2HEXR-PAARD	-25.6083	27.28897	Elands	Elands	Limpopo	A22J-00878	E	E
A2HEXR-ROOIW	-25.5214	27.37528	Elands	Elands	Limpopo	A22J-00878	E	C/D
A2JUKS-EDENV	-26.1357	28.1351	Jukskei	Jukskei	Limpopo	N/A	N/A	E
A2JUKS-GULLU	-26.1715	28.11807	Jukskei	Jukskei	Limpopo	A21C-01262	E	E
A2KOST-NAAUW	-25.7527	26.8901	Elands	Elands	Limpopo	A22B-01014	C	FLOWS
A2MAGA-BULTF	-25.8413	27.66586	Magalies	Magalies	Limpopo	A21F-01116	D	D
A2MAGA-HARTE	-25.87	27.615	Magalies	Magalies	Limpopo	A21F-01116	D	C
A2MAGA-MALON	-26.0217	27.56472	Magalies	Magalies	Limpopo	A21F-01208	C	B
A2MODD-MODDE	-26.1095	28.16897	Modderfonteinspruit	Jukskei	Limpopo	A21C-01268	E	E
A2MORE-FAIRY	-25.7737	28.29178	Moreletaspruit	Pienaars	Limpopo	A23A-01074	E	D
A2PIEN-BUFFE	-25.1396	27.69114	Pienaars	Pienaars	Limpopo	A23L-00706	C	C
A2PIEN-KLIPD	-25.4008	28.31269	Pienaars	Pienaars	Limpopo	A23B-00896	C	C
A2PLAT-KOMAN	-24.8293	28.2225	Bufflespruit	Pienaars	Limpopo	N/A	N/A	B
A2RIET-MERIN	-26.0189	28.30442	Rietvlei	Hennops	Limpopo	A21A-01178	D	D
A2SKEE-R506B	-25.791	27.77073	Skeerpoort	Magalies	Limpopo	A21G-01126	C	D
A2SKEE-SKEER	-25.8362	27.78435	Skeerpoort	Magalies	Limpopo	A21G-01126	C	B
A2SOUT-RIETG	-25.5118	28.1255	Kutswane	Pienaars	Limpopo	A23J-00782	D	D
A2STER-BUFFE	-25.8074	27.47814	Sterkstroom	Crocodile West	Limpopo	A21K-01124	C	B/C
A2STER-MAMOG	-25.5984	27.50575	Sterkstroom	Crocodile West	Limpopo	A21K-00959	C	C
A2SWAR-ELAND	-25.9692	28.30111	Rietvlei	Hennops	Limpopo	A21K-01178	D	D/E
A2SWAV-ZWAVE	-25.8344	28.37006	Swavelpoortspruit	Pienaars	Limpopo	N/A	N/A	D

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
A2WATE-BAVIA	-25.7414	27.2568	Waterkloofsprui	Elands	Limpopo	A22H-01070	B	B
A3GMAR-KOEDO	-25.6587	26.436	Groot Marico	Groot Marico	Limpopo	A31B-01039	C	B
A3GMAR-LOTTE	-24.8444	26.486	Groot Marico	Groot Marico	Limpopo	A32D-00539	C	FLOWS
A3GMAR-RIEKE	-25.4612	26.39189	Groot Marico	Groot Marico	Limpopo	A31B-00923B	D	C
A3GMAR-WONDE	-25.5893	26.41215	Groot Marico	Groot Marico	Limpopo	A31B-00923A	D	B/C
A3KAAL-RIETS	-25.777	26.43339	Kaaloog se loop	Groot Marico	Limpopo	A31A-04004/ Kaaloog se loop	B	B/C
A3KMAR-KALKD	-25.5163	26.15861	Klein Marico	Groot Marico	Limpopo	A31E-00926	D	FLOWS
A3POLK-TWYFE	-25.647	26.48928	Polkadraaspruit	Groot Marico	Limpopo	A31B-01009	C	B/C
A4DWAR-JIMSE	-24.2718	28.1997	Dwars	Mokolo	Limpopo	A42E-00398	C	C
A4DWAR-ZANDD	-24.2629	28.2103	Dwars	Mokolo	Limpopo	A42E-00384	C	C
A4FRIK-SHAM1	-24.3425	27.96355	Frikkie se loop	Mokolo	Limpopo	A42D-00385	B	SAFETY
A4KLSA-DONKE	-24.4171	28.34367	Klein Sand	Mokolo	Limpopo	A42C-00432	D	FLOWS
A4MAMB-DIAMT	-24.22	27.58	Matlabas	Matlabas	Limpopo	A41B-00334	C	C/D
A4MATL-HOOPD	-24.3082	27.51628	Matlabas	Matlabas	Limpopo	A41A00340	C	C
A4MATL-WATER	-24.3456	27.55022	Matlabas	Matlabas	Limpopo	A41A00340	C	C
A4MATL-ZANDD	-23.974	27.16541	Matlabas	2016	Limpopo	A41D-00206	C	FLOWS
A4MATL-ZWART	-24.4834	27.5689	Matlabas	2016	Limpopo	N/A	N/A	ACCESS
A4MOKO-ALMAB	-24.4859	28.0737	Sand	Mokolo	Limpopo	A42A-00462	C	FLOWS
A4MOKO-DNYAL	-23.6875	27.74557	Mokolo	Limpopo	Limpopo	A42H-00194	D	C/D
A4MOKO-MARKE	-23.6522	27.75973	Mokolo	Limpopo	Limpopo	A42H-00194	D	C
A4MOKO-MOKOL	-24.058	27.79485	Mokolo	Limpopo	Limpopo	A42F-00285	C	FLOWS
A4MOKO-TWEEF	-24.4272	28.1047	Mokolo	Mokolo	Limpopo	A42C-00445	C	HABITAT
A4MOKO-VAALW	-24.2894	28.0924	Mokolo	Limpopo	Limpopo	A42C-00392	C	C/D
A4MOKO-WITFO	-24.1137	27.80235	Mokolo	Limpopo	Limpopo	A42F-00285	C	SAFETY
A4MOKO-WITKO	-23.8477	27.79033	Mokolo	Mokolo	Limpopo	A42G-00225	C	FLOWS
A4MOKO-WWORK	-23.9707	27.72595	Mokolo	Mokolo	Limpopo	A42G-00241	C	D
A4RIET-WATER	-23.8649	27.65303	Rietspruit	Mokolo	Limpopo	A42G-00226	C	C
A4STER-WELG1	-24.3645	27.80962	Sterkstroom	Mokolo	Limpopo	A42D-00416	B	B/C
A4STER-WELG2	-24.3057	27.8971	Sterkstroom	Mokolo	Limpopo	A42D-00383	B	C
A4TAAI-WELG1	-24.2636	27.84038	Taaibosspruit	Mokolo	Limpopo	A42F-00331	B	SAFETY
A4TAAI-WELG2	-24.2592	27.83663	Taaibosspruit	Mokolo	Limpopo	A42F-00331	B	SAFETY
A5LEPH-ABBOT	-23.4624	28.0956	Lephalale	Limpopo	Limpopo	A50H-00110	D	C/D
A5LEPH-BEAUT	-23.2181	27.8918	Lephalale	Limpopo	Limpopo	A50H-00110	D	C
A5LEPH-GOERG	-24.1143	28.4638	Lephalale	Limpopo	Limpopo	A50B-00298	B	FLOWS
A5LEPH-KROON	-23.5752	28.1215	Lephalale	Limpopo	Limpopo	A50H-00110	D	C
A5LEPH-MELKR	-23.9941	28.4156	Lephalale	Limpopo	Limpopo	A50B-00262	C	C
A5LEPH-MOERD	-23.8801	28.3365	Lephalale	Limpopo	Limpopo	A50D-00229	B	B/C
A5LEPH-WITPO	-23.3280	27.9978	Lephalale	Limpopo	Limpopo	A50H-00110	D	C/D
A5LEPH-WITWA	-24.0927	28.4767	Lephalale	Limpopo	Limpopo	A50B-00298	B	C
A5RIET-MAKOU	-24.2693	28.4324	Rietbokvleispruit	Lephalale	Limpopo	N/A	N/A	C/D
A6KLEIN-ENTAB	-24.1750	28.6080	Klein Sterk	Mogalakwena	Limpopo	A61J-00306	C	C
A6MMAD-ENTAB	-24.2120	28.4240	Mmadikiri	Mogalakwena	Limpopo	A61J-00359	D	D

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
A6MOGA-ASHTO	-22.7658	28.7788	Mogalakwena	Limpopo	Limpopo	A63B-00046	D	FLOWS
A6MOGA-BGLEN	-23.1561	28.6814	Mogalakwena	Limpopo	Limpopo	A63A-00071	D	C
A6MOGA-STEIL	-23.4928	28.6553	Mogalakwena	Limpopo	Limpopo	A62J-00142	C	C/D
A6OLIF-JASPE	-24.7098	28.4797	Nyl	Mogalakwena	Limpopo	A61B-00552	C	D
A6OLIF-RIETS	-24.6629	28.3355	Nyl	Mogalakwena	Limpopo	N/A	N/A	FLOWS
A6STER-APPIN	-23.9760	28.6910	Sterk	Mogalakwena	Limpopo	A61J-00267	C	C
A8LUPH-UPPER	-22.7179	30.4293	Luphephe	Limpopo	Limpopo	A80H-00060	C	C
A8NWAN-ADELA	-22.4093	30.5549	Nwanedi	Limpopo	Limpopo	A80J-00028	D	C/D
A8NWAN-CONFL	-22.6298	30.3999	Nwanedi	Limpopo	Limpopo	A80J-00028	D	C
A8NWAN-CROSS	-22.5141	30.4477	Nwanedi	Limpopo	Limpopo	A80J-00028	D	C
A8NWAN-DFORD	-22.6689	30.4491	Luphephe	Limpopo	Limpopo	A80H-00064	B	B/C
A8NWAN-FALLS	-22.6613	30.3749	Nwanedi	Limpopo	Limpopo	A80H-00064	B	B
A8NWAN-FOLOR	-22.4710	30.4633	Nwanedi	Limpopo	Limpopo	A80J-00028	D	C
A8NWAN-GORGE	-22.6138	30.3999	Nwanedi	Limpopo	Limpopo	A80J-00028	D	C
A8NWAN-UPPER	-22.7336	30.3841	Nwanedi	Limpopo	Limpopo	A80H-00064	B	C
A8NZHE-FUNYU	-22.8810	30.1110	Nzhelele	Limpopo	Limpopo	A80B-00069	D	C/D
A8NZHE-MUSEK	-22.8310	30.0610	Nzhelele	Limpopo	Limpopo	A80B-00069	D	C/D
A8NZHE-PLANT	-22.9100	30.3150	Nzhelele	Limpopo	Limpopo	A80A-00089	E	B
A9DZIN-CROCO	-23.0063	30.4735	Dzindi	Luvuvhu	Limpopo	A91E-00103	D	C
A9DZIN-VHAVE	-22.9883	30.35064	Dzindi	Luvuvhu	Limpopo	A91E-00103	D	ACCESS
A9LATO-FORES	-23.0513	30.2345	Latonyanda	Luvuvhu	Limpopo	A91D-00108	D	C
A9LATO-ENTAB	-23.0262	30.20227	Latonyanda	Luvuvhu	Limpopo	A91D-00108	D	C
A9LUVU-BEJAB	-23.0918	30.06717	Luvuvhu	Luvuvhu	Limpopo	A91A-00105	C	C/D
A9LUVU-BOBOM	-22.4277	31.20942	Luvuvhu	Luvuvhu	Limpopo	A91K-00035	B	D
A9LUVU-BOTSO	-22.7875	30.8485	Luvuvhu	Luvuvhu	Limpopo	A91H-00045	C	ACCESS
A9LUVU-DONGA	-22.7098	30.88843	Luvuvhu	Luvuvhu	Limpopo	A91H-00045	C	C/D
A9LUVU-GWEIR	-23.1085	30.38767	Luvuvhu	Luvuvhu	Limpopo	A91F-00111	C	D
A9LUVU-HASAN	-23.084	30.46933	Luvuvhu	Luvuvhu	Limpopo	A91F-00111	C	C
A9LUVU-LAMBA	-22.7365	30.88217	Luvuvhu	Luvuvhu	Limpopo	A91F-00111	C	C
A9LUVU-MALAM	-22.9525	30.649	Luvuvhu	Luvuvhu	Limpopo	A91F-00093	D	C
A9LUVU-MHING	-22.753	30.88917	Luvuvhu	Luvuvhu	Limpopo	A91H-00045	C	C
A9LUVU-NANDO	-22.9715	30.60167	Luvuvhu	Luvuvhu	Limpopo	A91F-00093	D	C
A9LUVU-SHIDZ	-22.6349	30.95915	Luvuvhu	Luvuvhu	Limpopo	A91H-00045	C	C/D
A9LUVU-TSHIF	-22.8428	30.7515	Luvuvhu	Luvuvhu	Limpopo	A91H-00045	C	ACCESS
A9MBWE-BRIDG	-22.8348	30.65717	Mbwedi	Mutshundudi	Limpopo	A91G-00079	D	C
A9MUKH-CYCAD	-22.8103	30.64783	Mukhase	Mutshundudi	Limpopo	A91G-00078	B	B/C
A9MUTA-BRIDG	-22.7007	30.639	Mutale	Luvuvhu	Limpopo	A92B-00051	C	C
A9MUTA-MUTAL	-22.474	30.8805	Mutale	Luvuvhu	Limpopo	A92D-00030	C	C
A9MUTA-MBEND	-22.4377	31.07745	Mutale	Luvuvhu	Limpopo	A92D-00030	C	C
A9MUTA-GUYUN	-22.586	30.80533	Mutale	Luvuvhu	Limpopo	A92B-00051	C	ACCESS
A9MUTA-ROADS	-22.8042	30.41667	Mutale	Luvuvhu	Limpopo	A92B-00051	C	C
A9MUTA-SCHOO	-22.789	30.44267	Mutale	Luvuvhu	Limpopo	A92B-00051	C	C
A9MUTA-TSHIK	-22.6713	30.7015	Mutale	Luvuvhu	Limpopo	A92B-00051	C	C

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
A9MUTA-TSHIR	-22.8141	30.39539	Mutale	Luvuvhu	Limpopo	A92B-00051	C	B/C
A9MUTS-GWEIR	-22.8533	30.6855	Mutshindudi	Luvuvhu	Limpopo	A91G-00086	C	SAFETY
A9MUTS-DZING	-22.8998	30.5608	Mutshindudi	Luvuvhu	Limpopo	A91G-00091	C	SAFETY
A9MUTS-MALAV	-22.8567	30.6395	Mutshindudi	Luvuvhu	Limpopo	A91G-00091	C	ACCESS
A9MUTS-PHIPH	-22.9433	30.4	Mutshindudi	Luvuvhu	Limpopo	A91G-00098	D	ACCESS
A9MUTS-WATER	-22.8862	30.58683	Mutshindudi	Luvuvhu	Limpopo	A91G-00091	C	C
A9SAMB-BRIDG	-22.7183	30.6505	Sambandou	Mutale	Limpopo	N/A	N/A	HABITAT
A9TBDI-BRIDG	-22.7572	30.475	Tshiombedi	Mutale	Limpopo	N/A	N/A	C
A9TSHI-MUTAL	-22.8092	30.39117	Tshirovha	Mutale	Limpopo	N/A	N/A	ACCESS

Annexure B: MONITORING SITES IN PRIMARY DRAINAGE REGION B

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
B1KOLI-HENDR	-25.9142	29.62978	Klein Olifants	Olifants	Olifants	B12B-01217	D	ACCESS
B1KOLI-MIDDE	-25.8169	29.59041	Klein Olifants	Olifants	Olifants	B12C-01153	C	C
B2BRON-KLIPE	-25.828	28.717	Bronkhorstspruit	Wilge	Olifants	B20D-01146	C	C/D
B2BRON-VLAKF	-25.864	28.708	Bronkhorstspruit	Wilge	Olifants	B20D-01146	C	C
B2BRON-WAAIK	-26.01	28.677	Bronkhorstspruit	Wilge	Olifants	B20A-01245	D	E
B2WILG-BOSSE	-25.9021	28.85138	Wilge	Olifants	Olifants	B20F-01150	C	C
B3BOEK-BANKP	-25.4974	29.35392	Boekenhoutloop	Klein-Olifants	Olifants	B32A-00965	B	HABITAT
B3ELAN-DETWE	-25.5488	28.56559	Elands	Olifants	Olifants	B31A-00963	C	C
B3ELAN-DOORB	-25.1155	28.9571	Elands	Olifants	Olifants	B31A-00963	C	ACCESS
B3ELAN-RHENO	-25.1155	28.9571	Elands	Olifants	Olifants	B31F-00654	D	C
B3ELAN-SPRIN	-25.408	28.569	Elands	Olifants	Olifants	B31C-00770	C	ACCESS
B3KRAN-ZEEK	-25.4376	29.4758	Elands	Olifants	Olifants	B32A-00950	C	C
B3SELO-DEWAG	-25.3703	29.39929	Selons	Olifants	Olifants	B32C-00936	C	SAFETY
B4SPEK-LEIDE	-25.0094	30.5003	Spekboom	Steelpoort	Olifants	B42D-00705	C	SAFETY
B4STEE-STOFF	-25.3831	29.83837	Steelpoort	Olifants	Olifants	B41B-00912	C	D
B4STEE-WAPAD	-25.5836	29.87936	Steelpoort	Olifants	Olifants	B41A-01025	C	C
B4STER-LYDEN	-25.1493	30.53652	Sterkspruit	Steelpoort	Olifants	N/A	N/A	C
B4WATE-HADED	-24.8961	30.31074	Waterval	Spekboom	Olifants	B42F-00634	C	C
B5OLIF-ADRIA	-24.528	29.54612	Olifants	Olifants	Olifants	B51G-00482	C	D
B5OLIF-MOHLAP	-24.4151	29.73723	Olifants	Olifants	Olifants	B52E-00439	D	D
B5OLIF-POWER	-24.6179	29.47537	Olifants	Olifants	Olifants	B51C-00411	D	D
B6BLYD-PILGU	-24.9028	30.74658	Blyde	Olifants	Olifants	B60A-00653	C	C
B6BLYD-VAALH	-24.7344	30.77816	Blyde	Olifants	Olifants	B60B-00566	B	C
B7GASE-MIDDL	-24.1612	30.25425	GaSelati	Olifants	Olifants	B72F-00367	B	B/C
B7MOHL-GEMINI	-24.1671	30.10583	Mohlapitsi	Olifants	Olifants	B71C-00292	B	C
B7MOHL-VALLI	-24.1172	30.1141	Mohlapitsi	Olifants	Olifants	B71C-00292	B	C
B7OLIF-BALUL	-24.0529	31.72998	Olifants	Olifants	Olifants	B73H-00311	C	C
B7OLIF-CONFL	-23.9917	31.82709	Olifants	Olifants	Olifants	B73H-00311	C	C/D
B7OLIF-MAMBA	-24.0424	31.21503	Olifants	Olifants	Olifants	B73C-00308	D	C
B8BROE-BRIDG	-23.8007	29.97741	Broederstroom	Groot Letaba	Olifants	B81A-00242	C	C
B8DEBE-WATER	-23.8139	30.029	Debengeni	Politsi	Olifants	N/A	N/A	C
B8GLET-APPEL	-23.915	30.05241	Groot Letaba	Groot Letaba	Olifants	B81B-00264	C	C
B8KLET-BRIDG	-23.2598	30.37073	Klein Letaba	Groot Letaba	Olifants	B82F-00128	C	FLOWS
B8LETA-CONFL	-23.9816	31.81423	Letaba	Letaba	Olifants	B83E-00265	C	D
B8LETA-MAHLA	-23.6505	31.14842	Letaba	Letaba	Olifants	B83A-00220	B	C
B8LETA-KLIPK	-23.9434	31.73133	Letaba	Letaba	Olifants	B83E-00265	C	FLOWS
B8LETA-MBEWU	-23.7596	31.37062	Letaba	Letaba	Olifants	B83A-00235	C	D
B8LETS-CRAIGH	-23.9746	30.16511	Letsitele	Groot Letaba	Olifants	B81D-00272	D	B/C
B8LETS-TANKB	-23.8888	30.36193	Letsitele	Groot Letaba	Olifants	B81D-00271	D	D
B8MOLOT-BRIDG	-23.5734	30.71258	Molototsi	Groot Letaba	Olifants	B81H-00171	D	FLOWS
B8NSAM-BANAN	-23.2893	30.8242	Nsama	Klein Letaba	Olifants	B82H-00127	C	FLOWS
B8NSAM-BRIDG	-23.2026	30.66332	Nsama	Klein Letaba	Olifants	B82H-00127	C	FLOWS
B8NSAM-YOUTH	-23.3556	30.9151	Nsama	Klein Letaba	Olifants	B82H-00157	B	FLOWS
B8POLI-MAGOEB	-23.7959	30.0997	Politsi	Groot Letaba	Olifants	B81B-00240	C	ACCESS
B8POLI-AVOFA	-23.7923	30.11532	Politsi	Groot Letaba	Olifants	B81B-00240	C	B/C

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
B8SHIN-BRIDG	-23.0736	30.6735	Shingwedzi	Rio Singuedeze	Olifants	N/A	N/A	FLOWS
B8THAB-RAMOD	-24.0255	30.18423	Thabina	Groot Letaba	Olifants	B81D-00277	D	B/C

Annexure C: MONITORING SITES IN PRIMARY DRAINAGE REGION C

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
C1WATE-UPPER	-26.9600	28.7446	Waterval	Vaal	Vaal	C12G-01963	D	D
C2BLES-MARAI	-26.4750	28.4319	Blesbokspruit	Suikerbosrant	Vaal	C21F-01447	C	E
C2KLIP-ROTHD	-26.6079	28.0018	KlipRiver	Vaal	Vaal	C22E-01520	E	D
C2LEEU-SASOL	-26.8022	27.7988	Leeuspruit	Vaal	Vaal	C22K-01812	E	HABITAT
C2MOOI-EWR02	-26.8803	26.9641	Mooi	Vaal	Vaal	C23L-01827	D	D
C2RIET-RIETS	-26.4292	28.16061	Natalspruit	Klip	Vaal	C22B-01437	E	E
C2SKOO-URANI	-26.9345	26.66427	Schoonspruit	Vaal	Vaal	C24H-01860	D	D/E
C2SKOO-VENTE	-26.326	26.82887	Schoonspruit	Vaal	Vaal	C42E-01164	D	FLOWS
C2SUIK-BADFO	-26.6812	28.0501	Suikebosrant	Vaal	Vaal	C21G-01692	D	ACCESS
C2SUIK-DEHOE	-26.4032	28.1023	Suikebosrant	Vaal	Vaal	C21C-01675	C	D
C2SUIK-GOEDV	-26.6467	28.3820	Suikebosrant	Vaal	Vaal	C21G-01627	C	D
C2TAAI-SASOL	-27.7947	27.9071	Taaibospruit	Vaal	Vaal	N/A	N/A	D
C2VAAL-BARRA	-26.7666	27.6827	Vaal Barrage	Vaal	Vaal	C23B-01731	D	D/E
C2VAAL-EWR13	-27.1041	26.52185	Vaal	Vaal	Vaal	C24J-02016	C	D
C2VAAL-PARYS	-26.7685	27.6781	Vaal	Vaal	Vaal	C23C-01847	C	D
C2VAAL-SCAND	-26.9310	27.0165	Vaal	Vaal	Vaal	C23L-01792	D	D
C2VAAL-VERMA	-26.9363	26.8503	Vaal	Vaal	Vaal	C24B-01817	C	D
C3HART-DELPO	-28.418	24.29017	Harts	Harts	Vaal	C33C-02836	D	C
C3HART-PAMPI	-27.7869	24.70531	Harts	Harts	Vaal	C33A-02470	D	C
C3HART-TASUN	-27.5734	24.744	Harts	Harts	Vaal	C31F-02140	D	D
C4GVET-VDRIE	-28.7124	26.95911	Groot Vet	Vaal	Vaal	C41C-03248	B	C
C4KVET-VVIER	-28.6188	27.01643	Klein Vet	Vaal	Vaal	C41B-03157	B	C/D
C4SAND-R73BR	-28.113	26.9072	Sand	Vaal	Vaal	C41J-02716	D	C
C4SAND-SENEK	-28.3055	27.60675	Sand	Vaal	Vaal	C42B-02841	C	C/D
C4VET-HOOPS	-27.935	26.12583	Vet	Vaal	Vaal	C43A-02561	C	D
C5MODD-MODDE	-29.0289	24.639	Modder	Modder	Orange	C52K-03183	D	D
C5MODD-SANNAS	-29.1611	26.57194	Modder	Modder	Orange	C52B-03819	D	D
C5RIET-IFR01	-29.0446	24.58685	Riet	Riet	Orange	C51M-03519	D	REPLACED
C5RIET-JACOB	-29.0997	24.69889	Riet	Riet	Orange	C51K-03878	D	D
C5VANZ-DWNWR	-30.1108	25.84972	Van-Zyl	Orange	Orange	C51G-04759	C	C
C6VALS-LINDL	-27.8706	27.9062	Vals	Vaal	Vaal	C60C-02552	C	C
C6VALS-PROKL	-27.4869	26.81305	Vals	Vaal	Vaal	C60J-02262	C	C
C7RENO-R501B	-27.041	26.99639	Renoster	Vaal	Vaal	C70J-01955	C	ACCESS
C8LIEB-MAFAH	-27.5313	28.4759	Liebenbergsvlei	Wilge	Vaal	C83H-02392	C	D
C8WILG-FRAN	-27.3099	28.5338	Wilge	Vaal	Vaal	C82H-02200	D	FLOW
C9VAAL-DELPO	-28.3776	24.30186	Vaal	Vaal	Vaal	C91E-02969	D	C/D
C9VAAL-GONGG	-28.4881	24.40869	Vaal	Vaal	Vaal	C91E-02969	D	C/D
C9VAAL-SCHMI	-28.7119	24.07244	Vaal	Vaal	Vaal	C92B-02903	D	C/D
C9VAAL-STCLA	-29.0549	23.8213	Vaal	Vaal	Vaal	C92B-03590	D	C
C9VAAL-VAALB	-28.3776	24.30186	Vaal	Vaal	Vaal	C91E-02969	D	C/D
C9VAAL-WARRE	-28.3247	24.71283	Vaal	Vaal	Vaal	C91D-02644	D	C/D
C9VAAL-WINDS	-28.3246	24.71281	Vaal	Vaal	Vaal	C91D-02644	D	HABITAT
C9VAAL-WVALE	-28.0958	24.86975	Vaal	Vaal	Vaal	C91D-02644	D	D

Annexure D: MONITORING SITES IN PRIMARY DRAINAGE REGION D

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
D1KRAA-ALIWAL	-30.6901	26.74157	Kraai	Orange	Orange	D13M-05442	C	C
D1KRAA-ROODE	-30.8306	26.92056	Kraai	Orange	Orange	D13M-05565	C	C
D2GROOT-FARM1	-28.6806	28.13972	Groot	Caledon	Orange	D21G-03101	C	D
D2LCAL-EWR01	-28.5269	28.48132	Little Caledon	Caledon	Orange	D21D-03094	C	C
D2LCAL-EWR02	-28.6114	28.30194	Little Caledon	Caledon	Orange	D21E-03142	C	D
D2LEEU-EWR06	-29.5217	27.13583	Leeu	Modder	Orange	D23E-04213	C	D
D3ORAN-DONKE	-30.5038	25.24003	Orange	Orange	Orange	D34E-05154	C	ACCESS
D3ORAN-HOPET	-29.6003	24.08934	Orange	Orange	Orange	D33G-04051	C	C
D4MOLO-MODIM	-25.8594	25.44972	Molopo	Molopo	Limpopo	D41A-01055	E	FLOWS
D4MOLO-WELTE	-25.8518	25.79552	Molopo	Molopo	Limpopo	D41A-01138	D	C
D7ORAN-GIFKL	-28.4372	21.40097	Orange	Orange	Orange	D73E-02957	D	C
D7ORAN-GROBL	-28.8665	22.04244	Orange	Orange	Orange	D73D-03267	D	C
D7ORAN-KAKAM	-28.777	20.74167	Orange	Orange	Orange	D73F-03393	D	C/D
D7ORAN-KANON	-28.6359	21.09061	Orange	Orange	Orange	D73F-03193	D	C
D7ORAN-KEIMO	-28.7284	20.98508	Orange	Orange	Orange	D73F-03193	D	C
D3ORAN-MARKS	-29.661	22.75538	Orange	Orange	Orange	D33K-03723	C	C
D7ORAN-PRIES	-29.661	22.75538	Orange	Orange	Orange	D72B-04273	C	C
D7ORAN-UPING	-28.4525	21.25988	Orange	Orange	Orange	D73E-03072	D	C
D8ORAN-BLOUP	-28.5105	20.17215	Orange	Orange	Orange	D81B-03140	C	C
D8ORAN-GOODH	-28.8952	18.22163	Orange	Orange	Orange	D82D-03653	C	C
D8ORAN-ONSEE	-28.7409	19.33386	Orange	Orange	Orange	D81E-03349	C	C
D8ORAN-PELLA	-28.9637	19.14553	Orange	Orange	Orange	D81F-03445	B	C
D8ORAN-RICHT	-28.7622	17.72844	Orange	Orange	Orange	D82J-02886	C	B/C
D8ORAN-VIOOL	-28.0778	16.94247	Orange	Orange	Orange	D82F-03531	C	C

Annexure E: MONITORING SITES IN PRIMARY DRAINAGE REGION E

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
E1JAND-BOSKL	-32.2088	18.9752	Jan Dissel	Olifants	Berg Olifants	E10H-07331	D	SCHEDULE
E1NOOR-OFFTA	-32.7203	19.06633	Noordhoeks	Olifants	Berg Olifants	E10E-07770	D	SCHEDULE
E1OLIF-ALGER	-32.3653	18.95278	Olifants	Olifants	Berg Olifants	E10G-07443	D	SCHEDULE
E1OLIF-CITRU	-32.565	19.002	Olifants	Olifants	Berg Olifants	E10E-07765	C	SCHEDULE
E1OLIF-CLANW	-32.1739	18.87111	Olifants	Olifants	Berg Olifants	E10G-07341	C	SCHEDULE
E1OLIF-KEERO	-32.85	19.085	Olifants	Olifants	Berg Olifants	E10D-08044	D	SCHEDULE
E1OLIF-VISGA	-33.0769	19.21639	Olifants	Olifants	Berg Olifants	E10A-08299	C	SCHEDULE
E1OLIF-ZYPHE	-31.9406	18.71	Olifants	Olifants	Berg Olifants	E10K-06999	C	SCHEDULE
E1RATE-BEAVE	-32.8736	19.08333	Ratels	Olifants	Berg Olifants	E10C-08136	B	SCHEDULE
E1ROND-EWR03	-32.3703	19.05361	Rondegat	Olifants	Berg Olifants	E10G-07406	D	SCHEDULE
E1ROND-KEURB	-32.2647	18.97166	Rondegat	Olifants	Berg Olifants	E10G-07406	D	SCHEDULE
E2BIED-WELBE	-32.152	19.18523	Biedouw	Doring	Berg Olifants	E24J-07174	B	SCHEDULE
E2BRAN-TRAVE	-32.0686	19.07215	Brandewyn	Doring	Berg Olifants	E24L-07087	D	SCHEDULE
E2BRAN-VOGEL	-32.565	19.3625	Brandkraal	Doring	Berg Olifants	E21J-07721	B	SCHEDULE
E2DORI-BIEDO	-32.9706	19.22153	Doring	Olifants	Berg Olifants	E10B-08204	D	SCHEDULE
E2DORI-KRUIT	-32.3139	19.55008	Doring	Olifants	Berg Olifants	E22G-07463	C	SCHEDULE
E2DRIE-SANDD	-32.4878	19.2675	Driehoeks	Doring	Berg Olifants	E21K-07583	B	SCHEDULE
E2GROO-EWR06	-32.6457	19.40694	Groot	Doring	Berg Olifants	E21J-07804	B	SCHEDULE
E2LEEU-GAUGE	-32.7805	19.28341	Leeu	Doring	Berg Olifants	E21H-07937	B	SCHEDULE
E2MATJ-BRIDG	-32.5186	19.35055	Matjies	Doring	Berg Olifants	E21K-07583	B	SCHEDULE
E2OORL-OORLO	-31.545	19.10624	Oorlogskloof	Doring	Berg Olifants	E40D-06588	B	SCHEDULE
E2TANK-ELAND	-32.3142	19.56	Tankwa	Doring	Berg Olifants	E23K-07401	B	SCHEDULE
E2TANK-OUDER	-32.4076	20.07553	Tankwa	Doring	Berg Olifants	E23D-07527	A	SCHEDULE
E2TRAT-WUPPE	-32.2709	19.22444	Tra Tra	Doring	Berg Olifants	E24A-07408	B	SCHEDULE
E3DORI-OUDRI	-31.8569	18.91317	Doring		Berg Olifants	E24M-06892	B	SCHEDULE
E3HANT-R27RO	-31.1824	19.20101	Hantam	Olifants	Berg Olifants	E32E-06096	B	SCHEDULE
E3OLIF-KLAWE	-31.7694	18.61111	Olifants	Olifants	Berg Olifants	E33G-06752	D	SCHEDULE
E3OLIF-LUTZV	-31.5781	18.3823	Olifants	Olifants	Berg Olifants	E33H-06563	N/A	SCHEDULE
E3SOUT-N7BRI	-31.3968	18.66383	Sout	Olifants	Berg Olifants	E33E-06438	D	SCHEDULE
E3TROE-VANRH	-31.6297	18.69472	Troe Troe	Olifants	Berg Olifants	E33G-06630	C	SCHEDULE
E4KOEB-DEHOO	-31.6479	19.05497	Koebee	Doring	Berg Olifants	E40D-06644	B	SCHEDULE

Annexure G: MONITORING SITES IN PRIMARY DRAINAGE REGION G

Site code	latititude	longitude	river	WMA	SQR	PES	CATEGORY
G1BERG-BRBM1	-33.9562	19.0726	Berg	Berg-Olifants	G10A-09199	A	C
G1BERG-HERMO	-33.4333	18.95556	Berg	Berg-Olifants	G10F-08726	D	C/D
G1BERG-DRIEH	-33.1306	18.86298	Berg	Berg-Olifants	G10J-08414	D	C
G1BERG-BRBM6	-32.998	18.78042	Berg	Berg-Olifants	G10K-08197	D	FLOWS
G1BERG-DEWDA	-33.8997	19.05284	Berg	Berg-Olifants	G10A-09172	B	C
G1KROM-BEIBT	-33.6224	19.08483	krom	Berg-Olifants	G10D-08928	D	C
G1PLAT-GOEDV	-32.8647	18.67928	Platkloof	Berg-Olifants	G10K-08061	C	B/C
G1TWEN-HALMA	-33.1516	18.98019	Vier-en-twintig	Berg-Olifants	G10J-08463	D	D
G1WEMM-WEMME	-33.8535	19.04055	Wemmershoek	Berg-Olifants	G10B-09136	D	C
G2DIEP-KALBA	-33.4773	18.70683	Diep	Berg-Olifants	G21D-08761	D	D/E
G2EERS-JONKE	-33.9939	18.9751	Eerste	Berg-Olifants	G22F-09247	A	B
G2HOUT-ORANJ	-34.0052	18.39044	Hout Bay	Berg-Olifants	G22B-09261	D	C
G2HOUT-VICTO	-34.0307	18.35355	Hout Bay	Berg-Olifants	G22B-09261	D	D
G2KEYS-LISMO	-34.0542	18.4453	Keysers	Berg-Olifants	G22D-09294	D	D
G2LOUR-BROAD	-34.098	18.82722	Lourens	Berg-Olifants	G22J-09266	D	C/D
G2LOUR-RADLO	-34.0831	18.86938	Lourens	Berg-Olifants	G22J-09266	D	C/D
G2RIEB-RUSTF	-33.4464	18.75583	Riebeeck	Berg-Olifants	G21C-08703	D	D
G2SILV-SUNBI	-34.1148	18.41085	Silvermine	Berg-Olifants	G22A-09324	C	C/D
G2SIRL-WEDDE	-34.1115	18.92006	Sir Lowry's	Berg-Olifants	G22K-09315	E	D
G3JAKK-KOOKF	-32.0894	18.35241	Jakkalsvlei	Berg-Olifants	G30G-07159	D	SCHEDULE
G3KRUI-PIKET	-32.7462	18.81433	Kruisman	Berg-Olifants	G30B-07953	D	SCHEDULE
G3KRUI-R365B	-32.6114	18.77444	Kruisman	Berg-Olifants	G30B-07783	D	SCHEDULE
G3LANG-REDEL	-32.2105	18.37833	Langvlei	Berg-Olifants	G30F-07350	C	SCHEDULE
G3VELO-REDEL	-32.4656	18.51667	Verlorenvlei	Berg-Olifants	G30E-07487	D	SCHEDULE
G4BATH-CALE1	-34.2281	19.46556	Bath	Breede Gouritz	N/A	N/A	DATA
G4BATH-CALE2	-34.2281	19.46083	Bath	Breede Gouritz	N/A	N/A	DATA
G4BATH-CALE3	-34.2283	19.44417	Bath	Breede Gouritz	N/A	N/A	DATA
G4BOTR-DORIN	-34.452	19.60453	Bot	Breede Gouritz	G40E-09299	D	C
G4BOTR-KANAA	-34.1166	19.235	Bot	Breede Gouritz	G40E-09299	D	DATA
G4BOTR-WILDE	-34.2409	19.21808	Bot	Breede Gouritz	G40E-09360	D	DATA
G4HERM-SAFCO	-34.294	19.11781	Hermanus	Breede Gouritz	G40G-09370	D	DATA
G4KLEI-BLUEG	-34.4167	19.53972	Klein	Breede Gouritz	G40L-09411	D	DATA
G4KLEI-GOUDI	-34.4106	19.19297	Klein	Breede Gouritz	G40K-09354	D	C/D
G4KLEI-WABOO	-34.4046	19.60658	Klein	Breede Gouritz	G40L-09411	D	DATA
G4ONRU-BRIDG	-34.4107	19.193	Onrus	Breede Gouritz	G40G-09398	D	D
G4ONRU-HAYGR	-34.3519	19.26836	Onrus	Breede Gouritz	G40H-09398	D	DATA
G4ONRU-VOLMO	-34.3784	19.23261	Onrus	Breede Gouritz	G40H-09398	D	DATA
G4PALM-ARIES	-34.244	18.99443	Palmiet	Breede Gouritz	G40C-09305	D	DATA
G4PALM-ELGIN	-34.1636	19.02056	Palmiet	Breede Gouritz	G40C-09305	D	DATA
G4PALM-GRABO	-34.1517	19.02468	Palmiet	Breede Gouritz	G40C-09305	D	D
G4PALM-KODAM	-34.225	18.99167	Palmiet	Breede Gouritz	G40C-09305	D	DATA
G4PALM-KOGEL	-34.2787	18.9949	Palmiet	Breede Gouritz	G40D-09369	B	C
G4PALM-KOGFR	-34.3194	18.96957	Palmiet	Breede Gouritz	G40D-09369	B	DATA
G4PALM-NUWEB	-34.0583	19.04167	Palmiet	Breede Gouritz	G40C-09305	D	C
G4PALM-R45BR	-34.094	19.054	Palmiet	Breede Gouritz	G40C-09305	D	DATA

Site code	latititude	longitude	river	WMA	SQR	PES	CATEGORY
G4SWAR-CONFL	-34.2596	19.22483	Swart	Breede Gouritz	G40F-09365	E	DATA
G4UILK-BAARD	-34.58	19.481	Uilkraal	Breede Gouritz	G40M-09414	C	DATA
G4UILK-GOEDV	-34.5271	19.53919	Uilkraal	Breede Gouritz	G40M-09414	C	DATA
G4UILK-PAARD	-34.4402	19.61956	Uilkraal	Breede Gouritz	G40M-09414	C	C
G4UILK-SALMO	-34.4402	19.61956	Uilkraal	Breede Gouritz	G40M-09414	C	DATA
G5HEUNI-RIVER	-34.6886	20.03361	Heuningnes	Breede Gouritz	G50F-09424	N/A	DATA
G5HOTN-CONFL	-34.2872	20.02417	Hotnotskraal	Breede Gouritz	G50H-09340	D	DATA
G5KARS-KARS	-34.4133	19.82058	Kars	Breede Gouritz	G50D-09393	E	DATA
G5KARS-ROOID	-34.4297	19.91531	Kars	Breede Gouritz	G50D-09393	E	DATA
G5KARS-SOUTK	-34.4725	20.05753	Kars	Breede Gouritz	G50E-09404	E	C
G5KLEI-BOSKL	-34.5473	19.80733	Klein Pietersieliesklоof	Breede Gouritz	N/A	N/A	DATA
G5KLIP-KLIPPE	-34.4517	19.90119	Klipdrftrivier	Breede Gouritz	N/A	N/A	DATA
G5NUWE-BRAKP	-34.634	19.865	Nuwejaars	Breede Gouritz	G50B-09418	C	DATA
G5NUWE-UNSPE	-34.5787	19.75787	Nuwejaars	Breede Gouritz	G50B-09418	C	C
G5NUWE-KERS	-34.5786	19.75771	Nuwejaars	Breede Gouritz	G50B-09419	C	DATA
G5PIET-BOSKL	-34.5423	19.81867	Pietersieliesklоof	Breede Gouritz	N/A	N/A	DATA
G5RATE-DIRKU	-34.7127	19.69803	Ratel	Breede Gouritz	G50A-09428	D	DATA
G5SOES-SOESR	-34.3434	20.15356	Soe	Breede Gouritz	G50H-09390	C	DATA
G5SOUT-BRAKF	-34.3686	20.23775	Sout	Breede Gouritz	G50H-09387	C	DATA
G5SOUT-DWAFW	-34.292	20.02336	Sout	Breede Gouritz	G50G-09352	D	DATA
G5SOUT-KLIPD	-34.223	19.96242	Sout	Breede Gouritz	G50G-09352	D	C/D
G5SOUT-KYKOE	-34.3433	20.15336	Sout	Breede Gouritz	G50H-09390	C	DATA
G5SOUT-SOUTK	-34.2693	19.87472	Sout	Breede Gouritz	G50G-09373	E	DATA
G5SOUT-WYDGE	-34.3964	20.2905	Sout	Breede Gouritz	G50H-09400	C	DATA

Annexure H: MONITORING SITES IN PRIMARY DRAINAGE REGION H

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
H1BREE-MOOIP	-33.5205	19.18695	Breede	Breede	Breede Gourtiz	H10F-08730	C	D
H1BREE-R101B	-33.6507	19.33482	Breede	Breede	Breede Gourtiz	H10G-08844	D	DATA
H1BREE-WITBR	-33.4208	19.26667	Breede	Breede	Breede Gourtiz	H10F-08730	C	C
H1DWAR-EIKEN	-33.3419	19.30417	Dwars	Breede	Breede Gourtiz	H10C-08644	C	DATA
H1ELAN-TUNNE	-33.7333	19.115	Elandspad	Molenaars	Breede Gourtiz	H10J-09000	B	DATA
H1HOLS-RAWSO	-33.6932	19.32585	Holsloot	Breede	Breede Gourtiz	H10K-08972	C	DATA
H1HOLS-STETT	-33.8369	19.2575	Holsloot	Breede	Breede Gourtiz	H10K-08972	C	DATA
H1JAND-ELSKL	-33.5556	19.34333	Jan du Toits	Breede	Breede Gourtiz	H10H-08826	D	DATA
H1KOEK-BRDG4	-33.3631	19.27639	Koekedouw	Dwars	Breede Gourtiz	H10C-08648	D	D
H1KOEK-UCDAM	-33.3386	19.26611	Koekedouw	Dwars	Breede Gourtiz	H10C-08560	D	DATA
H1MOLE-GWEIR	-33.7233	19.17028	Molenaars	Smalblaar	Breede Gourtiz	H10J-08990	C	C
H1SMAL-RAWSO	-33.6886	19.31905	Smalblaar	Breede	Breede Gourtiz	H10L-08968	E	DATA
H1TITU-ACHTE	-33.3953	19.3575	Titus	Breede	Breede Gourtiz	H10B-08700	C	D
H1WITE-MITCH	-33.4206	19.28278	Witels	Breede	Breede Gourtiz	H10F-08730	C	C
H1WITT-TWEED	-33.5701	19.13912	Wit	Breede	Breede Gourtiz	H10E-08836	A	B
H2AMAN-KLIPH	-33.5122	19.49972	Amandel	Hex	Breede Gourtiz	H20E-08786	B	DATA
H2HEXR-AMAND	-33.5289	19.54028	Hex	Breede	Breede Gourtiz	H20H-08839	D	C
H2SAND-ROODE	-33.5097	19.53	Sanddriftskloof	Amandel	Breede Gourtiz	H20D-08627	B	DATA
H3KEIS-BERGR	-33.7822	20.11472	Keisie	Kogmanskloof	Breede Gourtiz	H30D-09015	D	DATA
H3KEIS-PIETE	-33.7092	20.05881	Keisie	Kogmanskloof	Breede Gourtiz	H30D-08966	D	DATA
H3KING-ABRIK	-33.8264	20.23972	Kingna	Kogmanskloof	Breede Gourtiz	H30B-09048	D	DATA
H3KING-LEGOL	-33.8142	20.09	Kingna	Kogmanskloof	Breede Gourtiz	H30E-09032	D	DATA
H4BREE-LECHA	-33.8167	19.69167	Breede	Breede	Breede Gourtiz	H40F-09026	B	DATA
H4DORI-HIGHL	-33.9128	19.42639	Doring	Breede	Breede Gourtiz	N/A	N/A	DATA
H4HOEK-MODDE	-33.8583	19.40833	Hoeks	Breede	Breede Gourtiz	H40E-09059	D	D
H4KEIS-MCGRE	-33.9333	19.845	Keisers	Breede	Breede Gourtiz	H40K-09150	D	DATA
H4NUYR-ABDAM	-33.57	19.70278	Nuy	Breede	Breede Gourtiz	H40B-08847	C	C
H4NUYR-GLENO	-33.6486	19.63917	Nuy	Breede	Breede Gourtiz	H40B-08880	D	DATA
H4NUYR-LOWER	-33.7169	20.09	Nuy	Breede	Breede Gourtiz	H30D-08966	D	D
H5GROO-STEEN	-33.9869	19.89	Groot	Breede	Breede Gourtiz	H50A-09161	D	DATA
H5POEJ-SEVEN	-33.9561	19.58944	Poesjenels	Breede	Breede Gourtiz	H40G-09195	B	DATA
H6BAVI-GENAD	-34.0292	19.55833	Baviaans	Riviersonderend	Breede Gourtiz	H60E-09217	C	DATA
H6DUTO-WEIR1	-33.9417	19.17083	Dutoits	Riviersonderend	Breede Gourtiz	H60B-09162	B	DATA
H6ELAN-HIGHN	-33.9542	19.28111	Elands	Riviersonderend	Breede Gourtiz	H60C-09164	D	DATA
H6FREE-N2ROA	-34.1058	20.27972	Freek Bothas	Riviersonderend	Breede Gourtiz	H60L-09291	D	DATA
H6GOBO-GREYT	-34.0414	19.61917	Gobos	Riviersonderend	Breede Gourtiz	H60F-09248	C	DATA
H6RIVI-GREYT	-34.0722	19.62222	Riviersonderend	Breede	Breede Gourtiz	H60F-09277	D	DATA
H6RIVI-HELDE	-34.085	19.37139	Riviersonderend	Breede	Breede Gourtiz	H60D-09271	D	DATA
H6RIVI-STORM	-34.0819	20.09556	Riviersonderend	Breede	Breede Gourtiz	H60K-09263	D	DATA
H7BREE-BONTE	-34.0764	20.45444	Breede	Breede	Breede Gourtiz	H70B-09251	C	DATA
H7BREE-FELIX	-34.1447	20.47861	Breede	Breede	Breede Gourtiz	H70G-09308	C	DATA
H7BUFF-ABN2R	-34.0456	20.535	Buffeljags	Breede	Breede Gourtiz	H70E-09184	D	DATA
H7BUFF-SUURB	-34.0042	20.65833	Buffeljags	Breede	Breede Gourtiz	H70D-09183	E	DATA
H7GLEN-SWELL	-34.0125	20.45028	Glen	Breede	Breede Gourtiz	N/A	N/A	DATA
H7HUIS-BARRY	-33.9158	20.74639	Huis	Tradou	Breede Gourtiz	H70C-09131	C	DATA
H7KOOR-SWELL	-34.0239	20.44361	Koornlands	Breede	Breede Gourtiz	N/A	N/A	DATA

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
H7LEEU-SWELL	-34.0028	20.33167	Leeu	Breede	Breede Gourtiz	H70A-09186	E	DATA
H7MELK-INFAN	-34.3869	20.68639	Melkhout	Breede	Breede Gourtiz	N/A	N/A	DATA
H7TRAD-BARRY	-33.9281	20.70861	Tradou	Buffeljags	Breede Gourtiz	H70D-09157	B	DATA
H7TRAD-SANDR	-33.9258	20.60556	Tradou	Buffeljags	Breede Gourtiz	H70C-09066	D	DATA
H8DUIW-VERMA	-34.2516	20.99183	Duiwenhoks	Duiwenhoks	Breede Gourtiz	H80E-09314	D	C/D
H9GOUK-GWEIR	-34.0926	21.29366	Goukou	Goukou	Breede Gourtiz	H90C-09229	D	FLOWS
H9GOUK-KLPFN	-34.2714	21.29833	Goukou	Goukou	Breede Gourtiz	H90E-09343	C	FLOWS

Annexure J: MONITORING SITES IN PRIMARY DRAINAGE REGION J

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
J1BUFF-EWR05	-33.3845	20.94169	Buffels	Groot	Breede Gourtiz	J11H-08557	C	FLOWS
J1DORI-EWR07	-33.7914	20.92699	Doring	Touws	Breede Gourtiz	J12L-08985	D	DATA
J1TOUW-EWR03	-33.7271	21.16507	Touws	Groot	Breede Gourtiz	J12M-08904	D	FLOWS
J2GAMK-EWR04	-33.3647	21.63051	Gamka	Gamka	Breede Gourtiz	J25A-08567	C	FLOWS
J3GROO-MEIRI	-33.4091	22.55655	Groot	Groot	Breede Gourtiz	J33D-08571	C	DATA
J3KAMM-EWR10	-33.7329	22.6974	Kammanassie	Groot	Breede Gourtiz	J34C-08869	C	FLOWS
J3KLEI-EWR05	-33.4232	22.25748	Klein Le Roux	Grobbelaars	Breede Gourtiz	J35A-08551	D	DATA
J3OLIF-EWR01	-33.5707	22.42054	Olifants	Olifants	Breede Gourtiz	J33E-08757	D	HEALTH
J3OLIF-EWR09	-33.4381	23.20587	Olifants	Olifants	Breede Gourtiz	J31D-08592	C	FLOWS
J4GOUR-EWR06	-33.9098	21.65233	Gouritz	Gouritz	Breede Gourtiz	J40B-09073	C	FLOWS

Annexure K: MONITORING SITES IN PRIMARY DRAINAGE REGION K

Site Code	Latititude	Longitude	River	Main river	WMA	SQR	PES	CATEGORY
K1MOOR-PRIVA	-34.0122	22.13935	Moordkuil	Klein Brak	Breede Gourtiz	K10F-09139	D	C/D
K2GROO-KLEIN	-33.977	22.19183	Groot Brak	Groot Brak	Breede Gourtiz	K20A-09083	C	C
K2VARI-KLEIN	-33.9598	22.24143	Varing	Groot Brak	Breede Gourtiz	N/A	N/A	C
K3GWAI-USN2R	-34.0066	22.40084	Gwaing	Gwaing	Breede Gourtiz	K30B-09151	D	DATA
K3KAAI-GWEIR	-33.9711	22.54773	Kaaimans	Kaaimans	Breede Gourtiz	K30C-09065	B	C
K3MAAL-GWEIR	-34.0066	22.35002	Maalgate	Maalgate	Breede Gourtiz	K30A-09087	D	ACCESS
K3MALG-OUTEN	-33.9377	22.42185	Malgas	Gwaing	Breede Gourtiz	K30B-09082	B	C
K3SILW-BRIDG	-33.965	22.5617	Silver	Kaaimans	Breede Gourtiz	K30C-09065	B	C
K3SWAR-KNYSN	-33.9675	22.52112	Swart	Kaaimans	Breede Gourtiz	K30C-09093	D	DATA
K3TOUW-BOSPL	-33.9469	22.61292	Touws River	Touws River	Breede Gourtiz	K30D-09042	B	C
K4DIEP-DIEPR	-33.938	22.70821	Diep	Diep	Breede Gourtiz	K40A-09027	C	C
K4HOMT-KNYSN	-33.9483	22.91941	Homtini	Homtini	Breede Gourtiz	K40E-09016	C	C
K4KARA-KNYSN	-33.9219	22.85329	Karatara	Karatara	Breede Gourtiz	K40C-09036	B	ACCESS
K4WOLW-BARND	-33.9785	22.71915	Wolwe	Diep	Breede Gourtiz	K40A-09027	C	D
K5KNYS-EWR01	-33.891	23.02901	Knysna	Knysna	Breede Gourtiz	K50A-09069	B	C
K6BITO-WITTE	-33.9996	23.34128	Bitou	Keurbooms	Breede Gourtiz	K60F-09092	C	C
K6KEUR-EWR08	-33.8892	23.24373	Keurbooms	Keurbooms	Breede Gourtiz	K60C-08992	B	C
K7BLOU-LOWER	-33.9558	23.63877	Bloukrans	Bloukrans	Mzimvubu-Tsitsikamma	K70B-09055	B	ACCESS
K7BLOU-UPPER	-33.9176	23.63881	Tributary	Bloukrans	Mzimvubu-Tsitsikamma	K70B-09055	B	C
K8ELAN-LOWER	-33.9668	23.77482	Elandsbos	Elandsbos	Mzimvubu-Tsitsikamma	K80A-09053	C	B/C
K8ELAN-UPPER	-33.9713	24.06408	Elands	Elands	Mzimvubu-Tsitsikamma	K80C-09098	B	ACCESS
K8GROO-LOWER	-34.035	24.20761	Groot	Groot	Mzimvubu-Tsitsikamma	K80D-09182	C	C
K8GROO-UPPER	-33.9728	24.12125	Groot	Groot	Mzimvubu-Tsitsikamma	K80D-09124	B	ACCESS
K8LOTT-LOWER	-33.9729	23.74716	Lotterings	Lotterings	Mzimvubu-Tsitsikamma	N/A	N/A	C
K8LOTT-UPPER	-33.933	23.72953	Lotterings	Lotterings	Mzimvubu-Tsitsikamma	N/A	N/A	C
K8STOR-LOWER	-33.9886	23.91925	Storms	Storms	Mzimvubu-Tsitsikamma	K80B-09071	B	C
K8STOR-UPPER	-33.9492	23.91953	Tributary	Storms	Mzimvubu-Tsitsikamma	K80B-09071	B	C/D
K9KROM-BOJAN	-33.8808	24.07528	Kromme	Kromme	Mzimvubu-Tsitsikamma	K90A-09040	D	C
K9KROM-DEWIL	-33.9558	24.34909	Kromme	Kromme	Mzimvubu-Tsitsikamma	K90A-09040	D	C
K9KROM-MELHO	-33.9373	24.27208	Kromme	Kromme	Mzimvubu-Tsitsikamma	K90A-09040	D	ACCESS

Annexure L: MONITORING SITES IN PRIMARY DRAINAGE REGION L

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
L7GROO-KOMDO	-33.6953	24.61194	Groot	Kouga	Mzimvubu-Tsitsikamma	L70G-08902	B	HABITAT
L7WITR-GROOT	-33.6603	24.53501	Wit	Kouga	Mzimvubu-Tsitsikamma	L70G-08818	B	C
L8BAVI-SITE1	-33.5389	23.96388	Baviaanskloof	Kouga	Mzimvubu-Tsitsikamma	L81B-08697	B	SAFETY
L8BAVI-SITE2	-33.9561	24.26916	Baviaanskloof	Kouga	Mzimvubu-Tsitsikamma	L81B-08697	B	SAFETY
L8KOUG-BOKOU	-33.7166	23.41128	Kouga	Gamtoos	Mzimvubu-Tsitsikamma	L82A-08911	C	C
L8KOUG-OPKOM	-33.7884	24.02531	Kouga	Gamtoos	Mzimvubu-Tsitsikamma	L82D-08977	B	C
L8NABO-JOURB	-33.8178	23.84055	Nabooms	Kouga	Mzimvubu-Tsitsikamma	L82D-08974	C	ACCESS
L9GAMT-PATEN	-33.7609	24.69359	Gamtoos	Gamtoos	Mzimvubu-Tsitsikamma	L90A-08877	C	D

Annexure M: MONITORING SITES IN PRIMARY DRAINAGE REGION M

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
M1KWAZ-VYEBO	-33.7221	25.30069	Kwazunga	Swartkops	Mzimvubu-Tsitsikamma	M10C-08897	D	B/C
M1BRAKR-CONFL	-33.7931	25.41405	Brak	Swartkops	Mzimvubu-Tsitsikamma	M10C-08989	D	HEALTH
M1SWAR-KRUIS	-33.7522	25.3425	Swartkops	Swartkops	Mzimvubu-Tsitsikamma	M10C-08879	D	HABITAT
M1TRIB-UITEN	-33.7478	25.34361	Unnamed Tributary	Swartkops	Mzimvubu-Tsitsikamma	N/A	N/A	FLOWS

Annexure P: MONITORING SITES IN PRIMARY DRAINAGE REGION P

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
P4BLOU-BRIDG	-33.3905	26.70707	Bloukrans	Kowie	Mzimvubu-Tsitsikamma	P40A-08472	C	C
P4BLOU-RAILW	-33.3237	26.60003	Bloukrans	Kowie	Mzimvubu-Tsitsikamma	P40A-08472	C	D/E
P4KOWI-BARTH	-33.5069	26.74464	Kowie	Kowie	Mzimvubu-Tsitsikamma	P40C-08731	B	C
P4KOWI-GRACE	-33.4578	26.69305	Kowie	Kowie	Mzimvubu-Tsitsikamma	P40B-08599	B	ACCESS
P4KOWI-UPPER	-33.3493	26.56006	Kowie	Kowie	Mzimvubu-Tsitsikamma	P40A-08535	C	C
P4LASH-BRIDG	-33.4631	26.80972	Lashington	Kowie	Mzimvubu-Tsitsikamma	P40B-08673	B	ACCESS

Annexure Q: MONITORING SITES IN PRIMARY DRAINAGE REGION Q

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
Q9BALF-BALFO	-32.5457	26.67275	Balfour	Kat	Mzimvubu-Tsitsikamma	Q94C-07530	C	B/C
Q9ELAN-SEYMO	-32.5456	26.79833	Elands	Kat	Mzimvubu-Tsitsikamma	N/A	N/A	DATA
Q9KATR-BRIDG	-32.5783	26.67947	Kat	Kat	Mzimvubu-Tsitsikamma	Q94D-07647	C	B/C

Annexure R: MONITORING SITES IN PRIMARY DRAINAGE REGION R

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
R1KEIS-BEAMW	-32.7598	27.06847	Keiskamma	Keiskamma	Mzimvubu-Tsitsikamma	R10D-07807	D	UNKNOWN
R1KEIS-BESAD	-32.7219	27.10561	Keiskamma	Keiskamma	Mzimvubu-Tsitsikamma	R10D-07807	D	B/C
R1KEIS-BESMA	-32.6831	27.15483	Keiskamma	Keiskamma	Mzimvubu-Tsitsikamma	R10B-07769	D	D
R1KEIS-GCINI	-33.0236	27.08591	Keiskamma	Keiskamma	Mzimvubu-Tsitsikamma	R10K-08150	C	C
R1KEIS-SMBR	-32.6405	27.19061	Keiskamma	Keiskamma	Mzimvubu-Tsitsikamma	R10A-07658	C	C
R1KIES-BEXEB	-32.8187	26.99417	Keiskamma	Keiskamma	Mzimvubu-Tsitsikamma	R10E-07844	D	C
R1TYUM-BECON	-32.9017	26.92778	Tyume	Keiskamma	Mzimvubu-Tsitsikamma	R10H-07938	C	B/C
R1TYUM-FORTH	-32.7791	26.85597	Tyume	Keiskamma	Mzimvubu-Tsitsikamma	R10G-07651	D	C
R1TYUM-HOGSB	-32.6111	26.94783	Tyume	Keiskamma	Mzimvubu-Tsitsikamma	R10G-07651	D	B
R2BUFF-BPASS	-33.006	27.82534	Buffalo	Buffalo	Mzimvubu-Tsitsikamma	R20F-08045	D	ACCESS
R2BUFF-EWR01	-32.7693	27.36297	Buffalo	Buffalo	Mzimvubu-Tsitsikamma	R20A-07788	D	DATA
R2BUFF-EWR02	-32.9583	27.52571	Buffalo	Buffalo	Mzimvubu-Tsitsikamma	R20F-08045	D	DATA
R2BUFF-HORSE	-32.8225	27.38028	Buffalo	Buffalo	Mzimvubu-Tsitsikamma	R20B-07915	C	C
R2BUFF-MADEN	-32.7322	27.29368	Buffalo	Buffalo	Mzimvubu-Tsitsikamma	R20A-07788	D	ACCESS
R2BUFF-ZWELI	-32.9136	27.41028	Buffalo	Buffalo	Mzimvubu-Tsitsikamma	R20D-08018	C	DATA
R2MGQA-PIRIE	-32.7881	27.24972	Mgqakwebe	Buffalo	Mzimvubu-Tsitsikamma	R20C-07878	C	B/C
R2NXAM-POSTD	-32.9852	27.63875	KwaNxamkwane	Buffalo	Mzimvubu-Tsitsikamma	R20F-08045	D	D
R2YELL-LONSD	-32.8083	27.37917	Yellowwoods	Buffalo	Mzimvubu-Tsitsikamma	R20B-07915	C	C
R3NAHO-BADEN	-32.9616	27.87194	Nahoon	Nahoon	Mzimvubu-Tsitsikamma	R30F-08066	C	FLOWS
R3NAHO-HORSE	-32.9418	27.89608	Nahoon	Nahoon	Mzimvubu-Tsitsikamma	R30F-08066	C	FLOWS
R3NAHO-NEWLA	-32.8671	27.7655	Nahoon	Nahoon	Mzimvubu-Tsitsikamma	R30E-07893	D	FLOWS
R3NAHO-WOOLF	-32.8567	27.71936	Nahoon	Nahoon	Mzimvubu-Tsitsikamma	R30E-07893	D	FLOWS
R3QWAN-NEWLA	-32.8949	27.75556	Rwantsa	Nahoon	Mzimvubu-Tsitsikamma	R30E-07893	D	FLOWS

Annexure S: MONITORING SITES IN PRIMARY DRAINAGE REGION S

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
S1WKEI-BXOND	-31.8553	27.18958	White Kei	Great Kei	Mzimvubu-Tsitsikamma	S10E-06699	E	DATA
S1WKEI-STMAR	-32.0138	27.37422	White Kei	Great Kei	Mzimvubu-Tsitsikamma	S10J-06985	C	DATA
S3BKEI-BULLH	-32.0345	26.65583	Black Kei	Great Kei	Mzimvubu-Tsitsikamma	S32C-06908	C	DATA
S3BKEI-TURNS	-32.1786	27.33036	Black Kei	Great Kei	Mzimvubu-Tsitsikamma	S32M-07137	C	DATA
S3KLIP-PLAAT	-32.2568	26.86582	Klipplaat	Black Kei	Mzimvubu-Tsitsikamma	S32G-07224	D	C
S4GKEI-GUIKA	-32.2833	27.65253	Great Kei	Great Kei	Mzimvubu-Tsitsikamma	S40F-07265	C	DATA
S5TSOM-KOMKH	-31.6093	27.6765	Tsomo	Great Kei	Mzimvubu-Tsitsikamma	S50D-06475	C	DATA
S5TSOM-R56BR	-31.3673	27.67072	Tsomo	Great Kei	Mzimvubu-Tsitsikamma	S50C-06248	B	C/D
S5TSOM-UPPER	-31.258	27.83001	Tsomo	Great Kei	Mzimvubu-Tsitsikamma	S50A-06076	B	DATA
S6KUBU-BRIDG	-32.5073	27.73156	Kubusi	Great Kei	Mzimvubu-Tsitsikamma	S60E-07531	C	DATA
S7GKEI-GLENK	-32.5448	28.19386	Great Kei	Great Kei	Mzimvubu-Tsitsikamma	S70F-07621	C	DATA
S7GKEI-KEIBR	-32.5072	27.97315	Great Kei	Great Kei	Mzimvubu-Tsitsikamma	S70A-07524	C	DATA

Annexure T: MONITORING SITES IN PRIMARY DRAINAGE REGION T

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
T1MBHA-MVEZO	-31.9587	28.4727	Mbhashe	Mbhashe	Mzimvubu-Tsitsikamma	T13C-06941	B	DATA
T1MBHA-N2BRI	-31.922583	28.454194	Mbhashe	Mbhashe	Mzimvubu-Tsitsikamma	T13B-06866	C	FLOWS
T1NTSU-UPPER	-31.7775	28.36444	Ntsuba	Mbhashe	Mzimvubu-Tsitsikamma	N/A	N/A	C
T1MGWA-MAKHO	-31.846722	28.314306	Mgwali	Mbhashe	Mzimvubu-Tsitsikamma	T12G-06769	C	DATA
T1MGWA-NGCAC	-31.769333	28.122778	Mgwali	Mbhashe	Mzimvubu-Tsitsikamma	T12F-06661	D	DATA
T1MGWA-R61BR	-31.733	27.94925	Mgwali	Mbhashe	Mzimvubu-Tsitsikamma	T12B-06523	C	FLOWS
T1MGWA-TORHA	-31.820717	28.176917	Mgwali	Mbhashe	Mzimvubu-Tsitsikamma	T12F-06661	D	FLOWS
T1MNYO-BRIDG	-31.517222	28.290472	Mnyolo	Mbhashe	Mzimvubu-Tsitsikamma	T11F-06372	C	DATA
T1XUKA-MHLOP	-31.727083	28.269361	Xuka	Mbhashe	Mzimvubu-Tsitsikamma	T11C-06457	C	FLOWS
T1XUKA-R61BRI	-31.668083	28.112028	Xuka	Mbhashe	Mzimvubu-Tsitsikamma	T11C-06457	C	FLOWS
T1XUKA-SLIND	-31.579528	27.959583	Xuka	Mbhashe	Mzimvubu-Tsitsikamma	T11C-06457	C	C
T2LOWE-LNGQU	-31.852056	28.820083	Lower Ngqungqu	Mthatha	Mzimvubu-Tsitsikamma	T20F-06796	C	DATA
T2MTHA-ASAWM	-31.493056	28.477	Mthatha	Mthatha	Mzimvubu-Tsitsikamma	T20A-06409	C	DATA
T2MTHA-BESAW	-31.4825	28.493333	Mthatha	Mthatha	Mzimvubu-Tsitsikamma	T20A-06426	C	DATA
T2MTHA-EYE	-31.506944	28.393472	Mthatha	Mthatha	Mzimvubu-Tsitsikamma	T20A-06409	C	DATA
T2MTHA-KAMBI	-31.471333	28.615056	Mthatha	Mthatha	Mzimvubu-Tsitsikamma	T20B-06274	E	DATA
T2MTHA-MDUMB	-31.925944	29.136222	Mthatha	Mthatha	Mzimvubu-Tsitsikamma	T20G-06794	C	DATA
T2MTHA-TAKAT	-31.685583	28.820583	Mthatha	Mthatha	Mzimvubu-Tsitsikamma	T20D-06659	D	DATA
T3GATB-FORES	-31.2378	28.1319	Gatberg	Mzimvubu	Mzimvubu-Tsitsikamma	T35G-06118	C	C
T3KINI-GWEIR	-30.4816	28.62225	Kinira	Mzimvubu	Mzimvubu-Tsitsikamma	T33E-05213	C	CAPACITY
T3KINI-MABUA	-30.191733	28.596833	Kinira	Mzimvubu	Mzimvubu-Tsitsikamma	T33A-04892	B	DATA
T3MZIM-BHUJE	-31.438972	29.294332	Mzimvubu	Mzimvubu	Mzimvubu-Tsitsikamma	T36A-06354	C	C
T3MZIM-JONES	-30.157917	29.114167	Mzimvubu	Mzimvubu	Mzimvubu-Tsitsikamma	T31D-04926	B	DATA
T3MZIM-N2BRI	-30.850762	29.0697	Mzimvubu	Mzimvubu	Mzimvubu-Tsitsikamma	T33H-05680	C	C
T3MZIM-SPRIN	-30.477217	29.065767	Mzimvubu	Mzimvubu	Mzimvubu-Tsitsikamma	T31G-05071	B	DATA
T3MZIN-EWR	-30.1869	29.34629	Mzintlanga	Mzimvubu	Mzimvubu-Tsitsikamma	T32A-04907	C	DATA
T3MZIN-FRANK	-30.394133	29.448467	Mzintlava	Mzimvubu	Mzimvubu-Tsitsikamma	T32B-05103	B	D
T3MZIN-KUPOY	-31.102149	29.399821	Mzintlava	Mzimvubu	Mzimvubu-Tsitsikamma	T32H-05842	C	C
T3MZIN-NTSHA	-30.826825	29.331393	Mzintlava	Mzimvubu	Mzimvubu-Tsitsikamma	T32F-05464	C	C
T3MZIN-RDM	-30.2647	29.47835	Mzintlava	Mzimvubu	Mzimvubu-Tsitsikamma	T32A-04965	B	C
T3TENT-WETLA	-30.89028	28.20861	Tentkopspruit	Mzimvubu	Mzimvubu-Tsitsikamma	N/A	N/A	HABITAT
T3THIN-HEADW	-30.6409	28.20696	Tina	Mzimvubu	Mzimvubu-Tsitsikamma	T34A-05415	B	C/D
T3TINA-N2ROA	-31.069151	28.892677	Tina	Mzimvubu	Mzimvubu-Tsitsikamma	T34K-05835	B	C
T3TINA-R316R	-30.659267	28.208833	Tina	Mzimvubu	Mzimvubu-Tsitsikamma	N/A	N/A	CAPACITY
T3TINA-TSOLO	-30.630217	28.482417	Tina	Mzimvubu	Mzimvubu-Tsitsikamma	T34B-05351	B	C
T3TSIT-LALEN	-31.245109	28.901664	Tsitsa	Mzimvubu	Mzimvubu-Tsitsikamma	T35L-05976	B	C
T3TSIT-TVALL	-30.87194	28.18167	Tsitsa	Mzimvubu	Mzimvubu-Tsitsikamma	N/A	N/A	C
T4MTAM-MADIK	-30.854566	30.071745	Mtamvuna	Mtamvuna	Pongola Mtmamvuna	T40E-05601	B	C
T4MTVN-SNWAZA	-30.649920	29.670140	Tributary	Mtamvuna	Pongola Mtmamvuna	N/A	N/A	ACCESS
T5MZIM-EWR05	-30.356510	30.048161	Mzimkhulu	Mzimkhulu	Pongola Mtmamvuna	T52D-05155	B	CAPACITY
T5MZIM-HSHOE	-30.628486	30.243697	Mzimkhulu	Mzimkhulu	Pongola Mtmamvuna	T52J-05276	B	ACCESS
T5MZIM-NYAMA	-30.653637	30.220839	Mzimkhulu	Mzimkhulu	Pongola Mtmamvuna	T52J-05276	B	ACCESS
T6MZIN-MIDDL	-31.424611	29.53707	Mzintlava	Mzintlava	Mzimvubu-Tsitsikamma	T60J-06260	C	FLOWS
T6MZIN-UPPER	-31.35171	29.439212	Mzintlava	Mzintlava	Mzimvubu-Tsitsikamma	T60J-06260	C	FLOWS
T7MNGA-LOWER	-31.610483	29.404581	Mngazi	Mngazi	Mzimvubu-Tsitsikamma	T70B-06498	B	FLOWS

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
T7MNGA-MIDDL	-31.543036	29.220292	Mngazi	Mngazi	Mzimvubu-Tsitsikamma	T70A-06366	B	FLOWS
T7MNGA-UPPER	-31.478592	29.03808	Mngazi	Mngazi	Mzimvubu-Tsitsikamma	T70A-06366	B	FLOWS
T7MNGZ-LOWER	-31.62871	29.34435	Mngazana	Mngazi	Mzimvubu-Tsitsikamma	T70C-06551	B	FLOWS
T9SHIX-LOWER	-32.325944	28.672444	Shixini	Shixini	Mzimvubu-Tsitsikamma	T90C-07282	B	FLOWS
T9SHIX-MIDDL	-32.238028	28.587917	Shixini	Shixini	Mzimvubu-Tsitsikamma	T90C-07282	B	FLOWS
T9SHIX-UPPER	-32.173194	28.436222	Shixini	Shixini	Mzimvubu-Tsitsikamma	T90C-07185	B	FLOWS

Annexure U: MONITORING SITES IN PRIMARY DRAINAGE REGION U

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
U1MKMZ-SANIG	-29.647865	29.434046	Mkhomazana	Mkomazi	Pongola Mtmamvuna	U10C-04347	B	CAPACITY
U1MKOM-JOSEB	-30.008200	30.239028	Mkomazi	Mkomazi	Pongola Mtmamvuna	U10J-04799	B	FLOWS
U1MKOM-SHOZI	-30.129716	30.668757	Mkomazi	Mkomazi	Pongola Mtmamvuna	U10M-04746	B	CAPACITY
U2DUZI-MOTOX	-29.607000	30.450800	uMsunduzi	uMngeni	Pongola Mtmamvuna	U20J-04364	E	CAPACITY
U2DUZI-NKANY	-29.611000	30.557800	uMsunduzi	uMngeni	Pongola Mtmamvuna	U20J-04391	B	CAPACITY
U2KARK-USMGN	-29.443797	30.319403	Karkloof	uMngeni	Pongola Mtmamvuna	U20E-04170	B	CAPACITY
U2MGEN-DRGLE	-29.488805	29.903036	uMngeni	uMngeni	Pongola Mtmamvuna	U20A-04253	B	CAPACITY
U2MGEN-DRGLE	-29.488835	29.903037	Mgeni	uMgeni	Pongola Mtmamvuna	U20A-04253	B	CAPACITY
U2MGEN-FOUNT	-29.491252	30.492632	uMngeni	uMngeni	Pongola Mtmamvuna	U20G-04259	B	CAPACITY
U2MGEN-LIONS	-29.414572	30.094444	Lions	uMngeni	Pongola Mtmamvuna	U20B-04173	C	CAPACITY
U2MGEN-MIDMA	-29.488134	30.156002	Mgeni	uMgeni	Pongola Mtmamvuna	U20C-04275	B	CAPACITY
U2MGEN-MPOLW	-29.46458	30.46197	Mgeni	uMgeni	Pongola Mtmamvuna	U20G-04259	B	CAPACITY
U2MGEN-MZINY	-29.720833	30.903937	uMngeni	uMngeni	Pongola Mtmamvuna	U20M-04396	E	C
U2MGEN-PETRU	-29.512469	30.094401	uMngeni	uMngeni	Pongola Mtmamvuna	U20A-04253	B	CAPACITY
U3MDLO-HANZIN	-29.602083	31.009018	Mdloti	Mdloti	Pongola Mtmamvuna	U30A-04360	D	HABITAT
U3TONG-ROADB	-29.559913	31.174085	Tongati	Tongati	Pongola Mtmamvuna	U30D-04315	C	D/E
U4MVOT-EWR12	-29.268696	31.031965	uMvoti	uMvoti	Pongola Mtmamvuna	U40H-04064	B	B/C
U4MVOT-WELVE	-29.356110	31.234120	uMvoti	uMvoti	Pongola Mtmamvuna	U40J-03998	C	CAPACITY
U4MVTI-N2BRI	-29.370004	31.304341	uMvoti	uMvoti	Pongola Mtmamvuna	U40J-03998	C	CAPACITY
U4MVTI-SHANK	-29.15986	30.62869	uMvoti	uMvoti	Pongola Mtmamvuna	U40A-03869	C	CAPACITY
U6MLAZ-KWAND	-29.869000	30.781200	uMlazi	uMlazi	Pongola Mtmamvuna	U60D-04661	C	CAPACITY
U6MLAZ-P0502	-29.809722	30.5	uMlazi	uMlazi	Pongola Mtmamvuna	U60C-04555	C	CAPACITY
U6MLAZ-USBAY	-29.756000	30.289000	uMlazi	uMlazi	Pongola Mtmamvuna	U60A-04533	C	C
U7LOVU-KAMPU	-30.083372	30.661645	Lovu	Lovu	Pongola Mtmamvuna	U70C-04859	B	CAPACITY
U7LOVU-MIDIL	-30.047550	30.502230	Lovu	Lovu	Pongola Mtmamvuna	U70B-04655	D	CAPACITY
U7LOVU-RICHM	-29.861446	30.261955	Lovu	Lovu	Pongola Mtmamvuna	U70B-04655	D	FLOWS

Annexure V: MONITORING SITES IN PRIMARY DRAINAGE REGION V

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
V1THUK-EWR2	-28.716333	29.624167	Thukela	Thukela	Pongola Mtamvuna	V11M-03280	C	D
V1THUK-TUGEL	-28.75607	30.149964	Thukela	Thukela	Pongola Mtamvuna	V14E-03233	A	CAPACITY
V2MOOI-EWR12	-28.904211	30.418753	Mooi	Thukela	Pongola Mtamvuna	V20H-03500	C	CAPACITY
V2UNSP-KMBRG	-29.384350	29.652980	Tributary	Mooi	Pongola Mtamvuna	N/A	N/A	CAPACITY
V3BUFF-CONFL	-27.71562	30.11863	Buffalo	Thukela	Pongola Mtamvuna	V32B-02457	B	CAPACITY
V3BUFF-EWR13	-28.177017	30.490417	Buffalo	Thukela	Pongola Mtamvuna	V32F-02707	B	ACCESS
V3NCND-EWR05	-27.846333	29.790194	Ncandu	Thukela	Pongola Mtamvuna	V31J-02487	D	CAPACITY
V3NCND-LEYDN	-27.85144	29.75663	Tributary	Nkandu	Pongola Mtamvuna	N/A	N/A	CAPACITY
V3SAND-COTSW	-28.098820	30.318530	Mzinyashana	Thukela	Pongola Mtamvuna	V32E-02769	C	CAPACITY
V3SLNG-NCHTW	-27.420670	30.296810	Slang	Thukela	Pongola Mtamvuna	V31A-02319	B	B/C
V4THUK-EWR15	-28.779683	30.867500	Thukela	Thukela	Pongola Mtamvuna	V40B-03429	B	CAPACITY
V5THUK-RAILB	-29.172662	31.391921	Thukela	Thukela	Pongola Mtamvuna	V50D-03903	C	CAPACITY
V7BUSH-MASU	-28.768440	30.167804	Bushmans	Thukela	Pongola Mtamvuna	V70G-03440	B	CAPACITY
V7BUSH-MOORP	-29.083370	29.825037	Bushmans	Thukela	Pongola Mtamvuna	V70C-03745	C	CAPACITY

Annexure W: MONITORING SITES IN PRIMARY DRAINAGE REGION W

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
W1EVTH-GINNE	-29.06745	31.48596	Evutha	Amatikulu	Pongola-Mtamvuna	N/A	N/A	CAPACITY
W1MATI-NYEZA	-29.076547	31.563093	Amatikulu	Amatikulu	Pongola-Mtamvuna	W11C-03893	N/A	C/D
W1MFLE-ELIZB	-28.51589	31.43614	Mfule	Mhlathuze	Pongola-Mtamvuna	W12C-03189	C	CAPACITY
W1MHLA-EWR03	-28.845833	31.868056	Mhlathuze	Mhlathuze	Pongola-Mtamvuna	W12F-03494	E	C/D
W1MHLA-GOEDE	-28.743056	31.605833	Mhlathuze	Mhlathuze	Pongola-Mtamvuna	W12D-03388	D	CAPACITY
W1MHLA-GWEIR	-28.74695	31.74745	Mhlathuze	Mhlathuze	Pongola-Mtamvuna	W12E-03475	D	CAPACITY
W1NWKU-MTGLU	-28.961894	31.396405	Nwaku	Amatikulu	Pongola-Mtamvuna	W11A-03612	C	C
W2BMFO-CHRIS	-27.938900	31.210300	Black Mfolozi	Mfolozi	Pongola-Mtamvuna	W22A-02610	B	FLOWS
W2BMFO-NGOLO	-28.191223	31.737514	Black Mfolozi	Mfolozi	Pongola-Mtamvuna	W22J-02817	B	CAPACITY
W2MFOL-CONFL	-28.3596	31.99434	Mfolozi	Mfolozi	Pongola-Mtamvuna	W23A-03083	B	C
W2MVNY-P0016	-28.118986	30.866828	Mvunyana	Mfolozi	Pongola-Mtamvuna	W21D-02815	C	CAPACITY
W2SKWB-GRTGL	-27.90033	31.36522	Sikwebezi	Mfolozi	Pongola-Mtamvuna	W22E-02605	C	CAPACITY
W2WMFO-DINDI	-28.393483	31.683031	White Mfolozi	Mfolozi	Pongola-Mtamvuna	W21K-03080	B	CAPACITY
W2WMFO-LANGV	-28.231460	31.188300	White Mfolozi	Mfolozi	Pongola-Mtamvuna	W21H-02897	B	C
W3HLHW-HLWGR	-28.138560	32.019950	Hluhluwe	Hluluwe	Pongola-Mtamvuna	W32E-02865	B	ACCESS
W3MKZE-D0230	-27.692560	31.211290	Mkhuze	Mkhuze	Pongola-Mtamvuna	W31A-02534	B	C
W3MKZE-DNYDR	-27.592270	32.217950	Mkhuze	Mkhuze	Pongola-Mtamvuna	W31J-02480	C	FLOWS
W4BIVN-NTLSP	-27.529370	30.861440	Bivane	Pongola	Pongola-Mtamvuna	W41E-02359	C	FLOWS
W4NGWV-D1840	-27.097892	32.068882	Ngwavuma	Pongola	Pongola-Mtamvuna	W43F-02099	C	CAPACITY
W4PONG-GROOT	-27.431450	31.532389	Pongola	Pongola	Pongola-Mtamvuna	W44A-02332	C	C/D
W4PONG-MHLAT	-27.363611	31.783333	Pongola	Pongola	Pongola-Mtamvuna	W44D-02304	C	CAPACITY
W4PONG-N2PONG	-27.394896	31.826288	Pongola	Pongola	Pongola-Mtamvuna	W44D-02304	C	CAPACITY
W4PONG-NDUMO	-26.929964	32.324218	Pongola	Pongola	Pongola-Mtamvuna	W45B-02029	C	HABITATI
W5ANYS-ANYSS	-27.04762	30.57788	Anysspruit	Assegaai	Inkomati-Usuthu	W51C-02074	C	CAPACITY
W5ANYS-KLOP	-27.00776	30.59989	Anysspruit	Assegaai	Inkomati-Usuthu	W51C-02074	C	CAPACITY
W5ASSE-KLIPS	-26.99312	30.60575	Assegaai	Mhkondvo	Inkomati-Usuthu	W51C-02022	D	CAPACITY
W5ASSE-NAAUW	-27.12678	30.12516	Assegaai	Mhkondvo	Inkomati-Usuthu	W51A-02082	C	CAPACITY
W5ASSE-PLATJ	-27.18344	30.29556	Assegaai	Mhkondvo	Inkomati-Usuthu	W51A-02082	C	CAPACITY
W5ASSE-WITK1	-26.99655	30.67699	Assegaai	Mhkondvo	Inkomati-Usuthu	W51C-01981	C	CAPACITY
W5ASSE-ZANDB	-27.06465	30.97461	Assegaai	Mhkondvo	Inkomati-Usuthu	W51E-02049	B	CAPACITY
W5ASSE-ZWART	-27.10162	30.89205	Assegaai	Mhkondvo	Inkomati-Usuthu	W51E-02049	B	CAPACITY
W5BLES-WEEH	-26.89837	30.95267	Blesbokspruit	Ndlozane	Inkomati-Usuthu	W51F-01986	C	CAPACITY
W5BOES-ANHAL	-27.07833	30.7346	Boesmanspruit	Assegaai	Inkomati-Usuthu	W51C-02109	B	CAPACITY
W5BONN-BROAD	-26.50559	30.64736	Bonnie Brook	Usuthu	Inkomati-Usuthu	W54C-01556	C	CAPACITY
W5HLEL-HOLDE	-26.85632	30.72652	Hlelo	Usuthu	Inkomati-Usuthu	W52C-01867	B	CAPACITY
W5HLEL-SWAZI	-26.76133	30.82307	Hlelo	Usuthu	Inkomati-Usuthu	W52D-01862	B	CAPACITY
W5HLEL-THOEK	-26.99887	30.28728	Hlelo	Usuthu	Inkomati-Usuthu	W52A-01983	B	CAPACITY
W5HLEL-TWYFE	-26.89647	30.55205	Hlelo	Usuthu	Inkomati-Usuthu	W52B-01964	C	CAPACITY
W5HLEL-WATER	-26.86321	30.5967	Hlelo	Usuthu	Inkomati-Usuthu	W52C-01867	B	CAPACITY
W5HLEL-WITBANK	-26.97702	30.33379	Hlelo	Usuthu	Inkomati-Usuthu	W52A-01983	B	CAPACITY
W5LUSU-KUHLE	-26.80776	32.10175	uSuthu	Usuthu	Inkomati-Usuthu	W57J-01923	B	CAPACITY
W5LUSU-LIBET	-26.66424	31.47224	uSuthu	Usuthu	Inkomati-Usuthu	W57A-01803	N/A	eSWATINI
W5LUSU-MABUZ	-26.58243	31.10297	uSuthu	Usuthu	Inkomati-Usuthu	W54F-01729	N/A	eSWATINI
W5LUSU-MALUN	-26.59915	31.36973	Lusushwana	Usuthu	Inkomati-Usuthu	W56F-01762	N/A	eSWATINI
W5LUSU-MANGC	-26.54346	30.85552	uSuthu	Usuthu	Inkomati-Usuthu	W54D-01593	B	CAPACITY

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
W5LUSU-ROBIN	-26.26558	30.90338	Lusushwane	Usuthu	Inkomati-Usuthu	W56A-01372	D	CAPACITY
W5LUSU-SIPHO	-26.68981	31.68215	uSuthu	Usuthu	Inkomati-Usuthu	W57E-01810	N/A	eSWATINI
W5METU-FERNI	-26.39529	30.77071	Metula	Usuthu	Inkomati-Usuthu	W55D-01506	C	CAPACITY
W5METU-FERNI	-26.39529	30.77071	Metula	Usuthu	Inkomati-Usuthu	W55D-01506	C	CAPACITY
W5METU-SWAZI	-26.46191	30.85806	Metula	Usuthu	Inkomati-Usuthu	W55D-01506	C	CAPACITY
W5MKHO-NHLAN	-27.05378	31.11166	Mhkondvo	Usuthu	Inkomati-Usuthu	W51E-02049	B	CAPACITY
W5MKHO-SWAZI	-26.69709	31.43789	Mkhondvo	Usuthu	Inkomati-Usuthu	W51H-01808	N/A	eSWATINI
W5MPAM-GLENE	-26.66113	30.49137	Mpama	Ngwempisi	Inkomati-Usuthu	W53D-01764	B	CAPACITY
W5MPUL-ARDE1	-26.24958	30.75242	Mpuluzi	Usuthu	Inkomati-Usuthu	W55C-01395	B	CAPACITY
W5MPUL-BORDE	-26.25341	30.70833	Mpuluzi	Usuthu	Inkomati-Usuthu	W55C-01395	B	CAPACITY
W5MPUL-BUSBY	-26.28034	30.5914	Mpuluzi	Usuthu	Inkomati-Usuthu	W55C-01395	B	CAPACITY
W5MPUL-HAMIL	-26.31093	30.40725	Mpuluzi	Usuthu	Inkomati-Usuthu	W55C-01395	B	CAPACITY
W5MPUL-MIDDE	-26.29665	30.50474	Mpuluzi	Usuthu	Inkomati-Usuthu	W55C-01395	B	CAPACITY
W5MPUL-VELAB	-26.48943	30.89898	Mpuluzi	Usuthu	Inkomati-Usuthu	W55E-01651	N/A	eSWATINI
W5NGWE-INHLO	-26.73396	30.76361	Ngwempisi	Usuthu	Inkomati-Usuthu	W53E-01790	C	CAPACITY
W5NGWE-LEIDE	-26.8544	30.28388	Ngwempisi	Usuthu	Inkomati-Usuthu	W53A-01853	D	CAPACITY
W5NGWE-MPONO	-26.72707	30.87921	Ngwempisi	Usuthu	Inkomati-Usuthu	W53E-01841	N/A	eSWATINI
W5NGWE-MZIMN	-26.71303	31.31287	Ngwempisi	Usuthu	Inkomati-Usuthu	W53G-01788	N/A	eSWATINI
W5NGWE-POMPO	-26.76743	30.39716	Ngwempisi	Usuthu	Inkomati-Usuthu	W53A-01853	D	CAPACITY
W5NGWE-SKURW	-26.68126	30.70271	Ngwempisi	Usuthu	Inkomati-Usuthu	W53E-01790	C	CAPACITY
W5NGWE-STERK	-26.70081	30.64582	Ngwempisi	Usuthu	Inkomati-Usuthu	W53D-01773	C	CAPACITY
W5OHLE-TWYFE	-27.00292	30.28759	Ohlelo	Hlelo	Inkomati-Usuthu	N/A	N/A	CAPACITY
W5SAND-ZANDS	-26.73906	30.35637	Sandspruit	Ngwempisi	Inkomati-Usuthu	W53A-01757	B	CAPACITY
W5SWAR-IZIND	-26.35773	30.78492	Swartwaterspruit	Mhkondvo	Inkomati-Usuthu	W55C-01489	B	CAPACITY
W5SWAR-WOLWE	-26.73056	30.66792	Swartwaterspruit	Mhkondvo	Inkomati-Usuthu	W53D-01814	B	CAPACITY
W5SWAR-ZWART	-27.10922	30.83852	Swartwaterspruit	Mhkondvo	Inkomati-Usuthu	W51D-02151	B	CAPACITY
W5THOL-ATHOL	-26.57401	30.57522	Thole	Ngwempisi	Inkomati-Usuthu	W53C-01679	C	CAPACITY
W5USUT-DEEPG	-26.49576	30.67991	Usuthu	Usuthu	Inkomati-Usuthu	W54D-01593	B	CAPACITY
W5USUT-DINGL	-26.4954	30.72383	Usuthu	Usuthu	Inkomati-Usuthu	W54D-01593	B	CAPACITY
W5USUT-STAFF	-26.50336	30.77666	Usuthu	Usuthu	Inkomati-Usuthu	W54D-01593	B	CAPACITY

Annexure X: MONITORING SITES IN PRIMARY DRAINAGE REGION X

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
X1BLIN-KRANS	-26.04997	31.05354	Mhlangampepa	Komati	Inkomati-Usuthu	X12K-01332	B	C
X1BOES-ROODE	-26.02357	30.06092	Boesmanspruit	Komati	Inkomati-Usuthu	X11B-01272	C	C
X1BUFF-DOORN	-26.06264	30.39378	Buffelspruit	Seekoeispruit	Inkomati-Usuthu	X12A-01305	C	CAPACITY
X1BUFF-ZILVE	-26.01092	30.45119	Buffelspruit	Seekoeispruit	Inkomati-Usuthu	X12C-01271	B	B
X1GLAD-VAALK	-25.77165	30.62716	Gladdespruit	Komati	Inkomati-Usuthu	X11J-01106	D	D
X1GLAD-VYGEB	-25.86514	30.66661	Gladdespruit	Komati	Inkomati-Usuthu	X11K-01194	C	CAPACITY
X1HLAT-RIETF	-26.02361	30.36111	Hlatjiwe	Buffelspruit	Inkomati-Usuthu	X12B-01246	C	CAPACITY
X1KKOM-WELGE	-25.88793	30.12033	Klein Komati	Komati	Inkomati-Usuthu	X11D-01129	C	B
X1KOMA-BHALE	-26.0998	31.51587	Komati	Komati	Inkomati-Usuthu	X13E-01346	C	C
X1KOMA-GEVON	-25.85512	30.38235	Komati	Komati	Inkomati-Usuthu	X11G-01142	C	B/C
X1KOMA-GROOT	-25.85494	30.57146	Komati	Komati	Inkomati-Usuthu	X11H-01140	C	CAPACITY
X1KOMA-HILLC	-26.02966	31.0555	Komati	Komati	Inkomati-Usuthu	X12K-01316	D	B/C
X1KOMA-HOOGE	-26.03632	30.99806	Komati	Komati	Inkomati-Usuthu	X12H-01258	C	B/C
X1KOMA-IFR03	-25.99827	31.58609	Komati	Komati	Inkomati-Usuthu	X13G-01282	D	C
X1KOMA-KOMAT	-26.02341	30.90073	Komati	Komati	Inkomati-Usuthu	X12H-01296	C	B/C
X1KOMA-KPOOR	-25.44667	31.95603	Komati	Komati	Inkomati-Usuthu	X13L-00995	D	C
X1KOMA-LEBOM	-25.43901	31.97341	Komati	Komati	Inkomati-Usuthu	X13L-00996	D	CAPACITY
X1KOMA-LEKKE	-25.83429	30.49537	Komati	Komati	Inkomati-Usuthu	X11H-01140	C	C
X1KOMA-MALOL	-26.05399	31.14151	Komati	Komati	Inkomati-Usuthu	X13A-01324	C	B
X1KOMA-MELET	-26.08214	31.35515	Komati	Komati	Inkomati-Usuthu	X13D-01323	C	CAPACITY
X1KOMA-MOEDI	-25.89598	30.17625	Komati	Komati	Inkomati-Usuthu	X11D-01196	C	B/C
X1KOMA-NYATS	-25.82188	31.82616	Komati	Komati	Inkomati-Usuthu	X13J-01210	E	C
X1KOMA-SILIN	-26.09908	31.39903	Komati	Komati	Inkomati-Usuthu	X13D-01323	C	C
X1KOMA-TJAKA	-25.97453	30.82221	Komati	Komati	Inkomati-Usuthu	X12G-01200	C	C
X1KOMA-TONGA	-25.68168	31.78295	Komati	Komati	Inkomati-Usuthu	X13J-01130	E	B/C
X1KOMA-VYGEB	-25.94631	30.68474	Komati	Komati	Inkomati-Usuthu	X11K-01227	C	C
X1KOMA-WATER	-25.89828	30.2845	Komati	Komati	Inkomati-Usuthu	X11F-01163	B	B
X1LEKKE-VERGE	-25.97977	30.654	Lekkerloop	Seekoeispruit	Inkomati-Usuthu	N/A	N/A	CAPACITY
X1LOMA-HIGHL	-25.83233	31.11699	Lomati	Komati	Inkomati-Usuthu	X14A-01173	C	CAPACITY
X1LOMA-HLELE	-25.81894	31.31144	Lomati	Komati	Inkomati-Usuthu	X14D-01174	D	C
X1LOMA-KLEIN	-25.64993	31.62219	Lomati	Komati	Inkomati-Usuthu	X14H-01066	D	B
X1LOMA-LEKKE	-25.63518	31.77914	Lomati	Komati	Inkomati-Usuthu	X14H-01066	D	CAPACITY
X1LOMA-MBONG	-25.75736	31.43655	Lomati	Komati	Inkomati-Usuthu	X14E-01151	D	B/C
X1LOMA-SCHOE	-25.68629	31.52879	Lomati	Komati	Inkomati-Usuthu	X14G-01128	E	CAPACITY
X1LOMA-TWELLL	-25.84178	31.12153	Lomati	Komati	Inkomati-Usuthu	X14A-01173	C	B
X1MALO-MALOL	-26.08253	31.10888	Malolotja	Komati	Inkomati-Usuthu	X13A-01337	A	A/B
X1MAWE-TJAKA	-25.96386	30.8203	Mawelawela	Komati	Inkomati-Usuthu	X12G-01200	C	CAPACITY
X1MBUL-MPOFU	-25.92469	31.52623	Mbulatana	Komati	Inkomati-Usuthu	X13G-01216	D	C/D
X1MBUY-MKHOM	-26.1221	31.29693	Mbuyane	Komati	Inkomati-Usuthu	X13C-01364	D	C
X1MELE-MELET	-26.08883	31.33933	Meleta	Komati	Inkomati-Usuthu	N/A	N/A	CAPACITY
X1MHLA-GROOT	-25.83626	30.56834	Mhlambanyatsi	Komati	Inkomati-Usuthu	N/A	N/A	CAPACITY
X1MHLA-MPOFU	-25.92661	31.62852	Mhlangatane	Komati	Inkomati-Usuthu	X13H-01197	C	CAPACITY
X1MHLA-RUSOO	-25.63447	31.50451	Mhlambanyatsi	Lomat	Inkomati-Usuthu	X14F-01085	C	C
X1MKHO-MAGUG	-26.03989	31.26615	Mkhomazane	Komati	Inkomati-Usuthu	X13B-01276	C	CAPACITY
X1MLON-KRANS	-26.05772	31.03248	Mlondozi	Komati	Inkomati-Usuthu	X12K-01333	C	C
X1MPOF-MPOFU	-25.93154	31.5815	Mphofu	Komati	Inkomati-Usuthu	X13G-01259	D	C/D
X1MTSO-DIEPG	-26.00281	31.07402	Mtsoli	Komati	Inkomati-Usuthu	X12J-01202	B	B
X1MZIM-MANSE	-26.04071	31.52635	Mzimnene	Komati	Inkomati-Usuthu	X13F-01252	C	B/C
X1MZIN-MASHU	-25.69248	31.73264	Mzinti	Komati	Inkomati-Usuthu	X13J-01141	D	FLOWS
X1NDUB-SAPPI	-25.8447	30.47466	Ndubazi	Komati	Inkomati-Usuthu	X11G-01188	C	C
X1NGWE-KOMAT	-25.45656	31.91683	Ngweti	Komati	Inkomati-Usuthu	X13L-01000	D	FLOWS
X1NKOM-MALOL	-26.02851	31.16358	Nkomazana	Komati	Inkomati-Usuthu	X13A-01255	C	B/C
X1NKWA-COOPE	-25.53515	31.95017	Nkwakwa	Komati	Inkomati-Usuthu	X13K-01068	D	CAPACITY
X1NYON-NYONY	-26.13236	31.48093	Nyonyane	Komati	Inkomati-Usuthu	X13E-01389	C	B

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
X1PHOP-MAGUT	-25.83217	31.3692	Phophonyane	Komati	Inkomati-Usuthu	X14C-01203	D	C
X1SAND-KORTB	-26.0351	30.92432	Sandspruit	Komati	Inkomati-Usuthu	X12H-01318	C	B
X1SAND-TSHAN	-25.96858	31.73546	Sand	Komati	Inkomati-Usuthu	X13H-01299	D	CAPACITY
X1SEEK-DOORN	-25.94773	30.57494	Seekoeispruit	Komati	Inkomati-Usuthu	X12D-01235	C	CAPACITY
X1SEEK-WINKE	-25.96139	30.61846	Seekoeispruit	Komati	Inkomati-Usuthu	X12D-01235	C	CAPACITY
X1SWAR-HEBRO	-25.92519	30.23756	Swartspruit	Komati	Inkomati-Usuthu	X11E-01267	C	CAPACITY
X1TEEES-HEUNI	-26.01573	30.80877	Teespruit	Komati	Inkomati-Usuthu	X12E-01287	C	CAPACITY
X1TEES-TEESP	-26.01939	30.85179	Teespruit	Komati	Inkomati-Usuthu	X12E-01287	C	B/C
X1TEES-WELVE	-26.05785	30.65012	Teespruit	Komati	Inkomati-Usuthu	X12E-01287	C	CAPACITY
X1UGUT-ZEIST	-25.76308	31.24633	Ugutugulo	Lomat	Inkomati-Usuthu	X14B-01166	C	B/C
X1VAAL-BOESM	-26.00713	30.02756	Vaalwaterspruit	Komati	Inkomati-Usuthu	X11A-01248	C	C
X1WITK-WITKL	-25.96086	30.04052	Witkloofspruit	Komati	Inkomati-Usuthu	X11C-01147	C	CAPACITY
X2ALEX-LANGD	-25.226202	30.427059	Alexanderspruit	Crocodile	Inkomati-Usuthu	X21C-00859	C	CAPACITY
X2ALEX-RIETF	-25.269056	30.408583	Alexanderspruit	Crocodile	Inkomati-Usuthu	X21C-00859	C	CAPACITY
X2BUFF-MOOIP	-25.44336	30.427604	Buffelskloofspruit	Crocodile	Inkomati-Usuthu	X21D-00957	C	CAPACITY
X2BUFF-SOMER	-25.438139	30.447917	Buffelskloofspruit	Crocodile	Inkomati-Usuthu	X21D-00957	C	CAPACITY
X2CROC-CROCB	-25.361	31.895	Crocodile	Crocodile	Inkomati-Usuthu	X24H-00880	D	CAPACITY
X2CROC-DNELS	-25.5005	31.17869	Crocodile	Crocodile	Inkomati-Usuthu	X22K-01018	C	CAPACITY
X2CROC-DONKE	-25.46713	30.22966	Crocodile	Crocodile	Inkomati-Usuthu	X21B-00962	C	CAPACITY
X2CROC-DOORN	-25.389833	30.406472	Crocodile	Crocodile	Inkomati-Usuthu	X21D-00938	C	ACCESS
X2CROC-EHOEK	-25.35594	30.11183	Crocodile	Crocodile	Inkomati-Usuthu	X21A-00930	C	CAPACITY
X2CROC-GOEDE	-25.40961	30.31608	Crocodile	Crocodile	Inkomati-Usuthu	X21B-00962	C	CAPACITY
X2CROC-HALLS	-25.44822	30.94975	Crocodile	Crocodile	Inkomati-Usuthu	X22C-00946	C	CAPACITY
X2CROC-INDEM	-25.426417	30.636028	Crocodile	Crocodile	Inkomati-Usuthu	X21E-00943	C	ACCESS
X2CROC-KAAPM	-25.536667	31.311528	Crocodile	Crocodile	Inkomati-Usuthu	X24C-01033	D	CAPACITY
X2CROC-KAMAG	-25.451028	31.016694	Crocodile	Crocodile	Inkomati-Usuthu	X22J-00958	C	CAPACITY
X2CROC-KHAMA	-25.45102	31.01669	Crocodile	Crocodile	Inkomati-Usuthu	X22J-00958	C	CAPACITY
X2CROC-MALEL	-25.485972	31.502	Crocodile	Crocodile	Inkomati-Usuthu	X24D-00994	D	CAPACITY
X2CROC-MAROE	-25.378	31.731	Crocodile	Crocodile	Inkomati-Usuthu	X24F-00953	D	CAPACITY
X2CROC-MATJU	-25.518028	31.393028	Crocodile	Crocodile	Inkomati-Usuthu	X24D-00994	D	CAPACITY
X2CROC-MONTR	-25.44869	30.71016	Crocodile	Crocodile	Inkomati-Usuthu	X21E-00943	C	CAPACITY
X2CROC-MYAMB	-25.315833	31.748333	Crocodile	Crocodile	Inkomati-Usuthu	X24F-00953	D	CAPACITY
X2CROC-N4ROA	-25.5005	31.178694	Crocodile	Crocodile	Inkomati-Usuthu	X22K-01018	C	CAPACITY
X2CROC-NKONG	-25.3913	31.97427	Crocodile	Crocodile	Inkomati-Usuthu	X24H-00934	D	CAPACITY
X2CROC-RIETV	-25.38813	30.56569	Crocodile	Crocodile	Inkomati-Usuthu	X21E-00943	C	CAPACITY
X2CROC-RIVE1	-25.409722	31.565	Crocodile	Crocodile	Inkomati-Usuthu	X24E-00982	D	CAPACITY
X2CROC-RIVUL	-25.43016	30.75744	Crocodile	Crocodile	Inkomati-Usuthu	X22B-00888	C	CAPACITY
X2CROC-ROODE	-25.50247	30.18716	Crocodile	Crocodile	Inkomati-Usuthu	X21B-00962	C	CAPACITY
X2CROC-STER1	-25.3755	30.480389	Crocodile	Crocodile	Inkomati-Usuthu	X21D-00938	C	CAPACITY
X2CROC-STERK	-25.3628	30.49908	Crocodile	Crocodile	Inkomati-Usuthu	X21E-00943	C	CAPACITY
X2CROC-STRKS	-25.44127	30.89102	Crocodile	Crocodile	Inkomati-Usuthu	X22C-00946	C	CAPACITY
X2CROC-TENBO	-25.363611	31.956111	Crocodile	Crocodile	Inkomati-Usuthu	X24H-00934	D	CAPACITY
X2CROC-VALY1	-25.494083	30.143556	Crocodile	Crocodile	Inkomati-Usuthu	X21A-00930	C	CAPACITY
X2CROC-VALYS	-25.457005	30.120046	Crocodile	Crocodile	Inkomati-Usuthu	X21A-00930	C	CAPACITY
X2CROC-VERLO	-25.34972	30.10994	Crocodile	Crocodile	Inkomati-Usuthu	X21A-00930	C	CAPACITY
X2CROC-WELT1	-25.519389	31.239278	Crocodile	Crocodile	Inkomati-Usuthu	X22K-01018	C	CAPACITY
X2ELAN-DOORN	-25.631694	30.324444	Elands	Crocodile	Inkomati-Usuthu	X21G-01037	D	CAPACITY
X2ELAN-GELUK	-25.590583	30.600139	Elands	Crocodile	Inkomati-Usuthu	X21J-01013	C	CAPACITY
X2ELAN-GOEDG	-25.528444	30.698306	Elands	Crocodile	Inkomati-Usuthu	X21K-01035	D	CAPACITY
X2ELAN-HEMLO	-25.60042	30.55969	Elands	Crocodile	Inkomati-Usuthu	X21J-01013	C	CAPACITY
X2ELAN-HOUT	-25.52847	30.69828	Elands	Crocodile	Inkomati-Usuthu	X21K-01035	D	CAPACITY
X2ELAN-LINDE	-25.49431	30.70217	Elands	Crocodile	Inkomati-Usuthu	x21k-00997	C	CAPACITY
X2ELAN-ROODE	-25.56853	30.66269	Elands	Crocodile	Inkomati-Usuthu	X21K-01035	D	CAPACITY
X2FIGT-SHEB2	-25.7125	31.16694	Fig Tree Creek	Kaap	Inkomati-Usuthu	N/A	N/A	CAPACITY
X2FIGT-SHEBA	-25.72358	31.16358	Fig Tree Creek	Kaap	Inkomati-Usuthu	N/A	N/A	CAPACITY
X2HOUT-SUDWA	-25.3875	30.71061	Houtbosloop	Crocodile	Inkomati-Usuthu	X22A-00913	C	CAPACITY

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
X2HYSL-DYCED	-25.76647	31.09261	Hyslop	Suid KaaP	Inkomati-Usuthu	N/A	N/A	CAPACITY
X2JUNG-MOOIP	-25.41247	30.49719	Junglespruit	Crocodile	Inkomati-Usuthu	N/A	N/A	PRIORITY
X2KROK-DOORN	-25.46727	30.23	Krokodilspruit	Crocodile	Inkomati-Usuthu	N/A	N/A	CAPACITY
X2LEEU-GELUK	-25.661722	30.257917	Leeuspruit	Elands	Inkomati-Usuthu	X21F-01092	D	CAPACITY
X2LOUW-STATE	-25.73425	31.27008	Lows Creek	Kaap	Inkomati-Usuthu	N/A	N/A	CAPACITY
X2LUNS-KRUIS	-25.374536	30.229792	Lunsklip	Crocodile	Inkomati-Usuthu	X21B-00925	C	CAPACITY
X2LUNS-UITWA	-25.393556	30.301639	Lunsklip	Crocodile	Inkomati-Usuthu	X21B-00925	C	CAPACITY
X2LUNS-UVERL	-25.303056	30.123222	Lunsklip	Crocodile	Inkomati-Usuthu	X21B-00898	D	CAPACITY
X2LUNS-VERLO	-25.31041	30.14558	Lunsklip	Crocodile	Inkomati-Usuthu	X21B-00898	D	CAPACITY
X2NELS-RHENO	-25.20039	30.67867	Nels	Crocodile	Inkomati-Usuthu	X22D-00843	C	CAPACITY
X2NELS-SPITS	-25.29372	30.79814	Nels	Crocodile	Inkomati-Usuthu	X22F-00842	C	CAPACITY
X2NGOD-GROOT	-25.581944	30.671444	Ngodwana	Elands	Inkomati-Usuthu	X21H-01060	C	CAPACITY
X2NOOR-HILGA	-25.66419	31.08216	Noordkaap	Kaap	Inkomati-Usuthu	X23B-01052	D	CAPACITY
X2NOOR-RIVER	-25.64608	31.04277	Noordkaap	Kaap	Inkomati-Usuthu	X23B-01052	D	CAPACITY
X2NSIK-CONFL	-25.522046	31.368373	Nsikazi	Crocodile	Inkomati-Usuthu	X24C-00978	B	CAPACITY
X2ORAT-MOUNT	-25.74622	31.14289	Tributary	Kaap	Inkomati-Usuthu	N/A	N/A	CAPACITY
X2STER-R539B	-25.415361	30.493917	Sterkspruit	Crocodile	Inkomati-Usuthu	N/A	N/A	PRIORITY
X2SUID-CLARE	-25.70777	31.05852	Suid Kaap	Kaap	Inkomati-Usuthu	X23F-01120	C	CAPACITY
X2SUID-DIXIE	-25.71755	31.04188	Suid Kaap	Kaap	Inkomati-Usuthu	X23F-01120	C	CAPACITY
X2SWAR-KINDE	-25.610389	30.401139	Swarkoppiespruit	Elands	Inkomati-Usuthu	X21G-01016	C	CAPACITY
X2TAUT-WINNA	-25.644194	30.225139	Tautesloop	Elands	Inkomati-Usuthu	N/A	N/A	PRIORITY
X2VISS-ALKMA	-25.45813	30.81628	Visspruit	Crocodile	Inkomati-Usuthu	X22C-00990	C	CAPACITY
X2WHIT-MANCH	-25.40239	31.06839	Witrivier	Crocodile	Inkomati-Usuthu	X22H-00836	E	CAPACITY
X2WILG-WILG1	-25.465111	30.304722	Wilgekraalspruit	Crocodile	Inkomati-Usuthu	N/A	N/A	PRIORITY
X2WILG-WILGE	-25.48538	30.28448	Wilgekraalspruit	Crocodile	Inkomati-Usuthu	N/A	N/A	CAPACITY
X3KSAB-KLEIN	-25.0635	30.79108	Klein Sabie	Sabie	Inkomati-Usuthu	X31A-00741	C	CAPACITY
X3KSAN-ROOIB	-24.658	31.089	Klein Sand	Sabie	Inkomati-Usuthu	X32B-00551	C	CAPACITY
X3LONE-CREEK	-25.1032	30.71144	Lone Creek	Sabie	Inkomati-Usuthu	X31A-00783	C	CAPACITY
X3LONE-CREE2	-25.1182	30.72414	Lone Creek	Sabie	Inkomati-Usuthu	X31A-00783	C	CAPACITY
X3LONE-SABIE	-25.11794	30.72395	Lone Creek	Sabie	Inkomati-Usuthu	X31A-00783	C	CAPACITY
X3MACM-BRAND	-25.0303	31.02602	Mac-Mac	Sabie	Inkomati-Usuthu	X31D-00772	C	CAPACITY
X3MACM-FEATH	-25.00228	30.87057	Mac-Mac	Sabie	Inkomati-Usuthu	X31C-00683	C	CAPACITY
X3MACM-FORES	-24.97389	30.81685	Mac-Mac	Sabie	Inkomati-Usuthu	X31C-00683	C	CAPACITY
X3MACM-PICNI	-25.022	31.00064	Mac-Mac	Sabie	Inkomati-Usuthu	X31C-00683	C	CAPACITY
X3MACM-VENUS	-25.0086	30.92501	Mac-Mac	Sabie	Inkomati-Usuthu	X31C-00683	C	CAPACITY
X3MARI-MARIT	-24.9608	31.10838	Marite	Sabie	Inkomati-Usuthu	X31E-00647	D	CAPACITY
X3MARI-R40RB	-24.96065	31.10851	Marite	Sabie	Inkomati-Usuthu	X31E-00647	D	CAPACITY
X3MARI-SANDF	-25.01534	31.11912	Marite	Sabie	Inkomati-Usuthu	X31G-00728	D	CAPACITY
X3MARI-VERSA	-24.8389	30.96116	Maritsana	Marite	Inkomati-Usuthu	N/A	N/A	CAPACITY
X3MOHL-WELGE	-24.7409	30.92343	Tributary	Tlulandziteka	Inkomati-Usuthu	N/A	N/A	CAPACITY
X3MOHL-ZOEKN	-24.7636	30.97547	Mohlomobe	Mutlumuvi	Inkomati-Usuthu	N/A	N/A	CAPACITY
X3MOTI-DIEPD	-24.98841	31.05294	Motitsi	Sabie	Inkomati-Usuthu	X31F-00695	C	CAPACITY
X3MUTL-NEWF1	-24.75355	31.13753	Mutlumuvi	Sand	Inkomati-Usuthu	X32F-00597	D	CAPACITY
X3MUTL-VIOLE	-24.7572	31.01151	Mutlumuvi	Sand	Inkomati-Usuthu	X32D-00605	D	CAPACITY
X3NGWA-DOORN	-24.90117	30.97625	Ngwaritsana	Marite	Inkomati-Usuthu	X31E-00647	D	CAPACITY
X3NGWA-VERSA	-24.9036	30.95053	Ngwaritsana	Marite	Inkomati-Usuthu	X31E-00647	D	CAPACITY
X3NGWA-WILGE	-24.89695	30.92171	Ngwaritsana	Marite	Inkomati-Usuthu	X31E-00647	D	CAPACITY
X3NSAN-SANBO	-25.0246	31.15843	Noord Sand	Sabie	Inkomati-Usuthu	X31J-00774	D	CAPACITY
X3SABA-BRAND	-25.0322	31.02255	Sabaan	Sabie	Inkomati-Usuthu	X31D-00773	D	CAPACITY
X3SABI-AANDE	-25.0286	31.05172	Sabie	Sabie	Inkomati-Usuthu	X31D-00755	C	CAPACITY
X3SABI-ANTHO	-24.968	31.7498	Sabie	Sabie	Inkomati-Usuthu	X33A-00731	B	C
X3SABI-BORDE	-25.1852	32.03157	Sabie	Sabie	Inkomati-Usuthu	N/A	N/A	C
X3SABI-BRAND	-25.02988	31.02453	Sabie	Sabie	Inkomati-Usuthu	X31D-00772	C	CAPACITY
X3SABI-BRUG	-25.0657	30.85817	Sabie	Sabie	Inkomati-Usuthu	X31B-00757	C	C
X3SABI-BUFFEL	-24.9654	31.67756	Sabie	Sabie	Inkomati-Usuthu	X31M-00747	B	CAPACITY
X3SABI-CAL01	-25.0184	31.24088	Sabie	Sabie	Inkomati-Usuthu	X31K-00752	C	CAPACITY

Site Code	Latititude	Longitude	River	Main River	WMA	SQR	PES	CATEGORY
X3SABI-CAL03	-25.0191	31.20499	Sabie	Sabie	Inkomati-Usuthu	X31K-00752	C	CAPACITY
X3SABI-CASTL	-25.0933	30.76893	Sabie	Sabie	Inkomati-Usuthu	X31A-00778	C	B/C
X3SABI-EWR03	-24.98814	31.29248	Sabie	Sabie	Inkomati-Usuthu	X31K-00715	C	CAPACITY
X3SABI-FRANK	-25.05964	30.88634	Sabie	Sabie	Inkomati-Usuthu	X31B-00757	C	CAPACITY
X3SABI-HFALL	-25.13611	30.68396	Sabie	Sabie	Inkomati-Usuthu	X31A-00799	C	C
X3SABI-HOXAN	-25.019	31.218	Sabie	Sabie	Inkomati-Usuthu	X31K-00752	C	C/D
X3SABI-LONGT	-25.14434	30.67096	Sabie	Sabie	Inkomati-Usuthu	X31A-00799	C	B/C
X3SABI-LOWER	-25.12141	31.92519	Sabie	Sabie	Inkomati-Usuthu	X33B-00804	C	ACCESS
X3SABI-LUBEY	-25.1	31.88563	Sabie	Sabie	Inkomati-Usuthu	X33B-00804	C	HABITAT
X3SABI-NWATI	-24.97	31.4039	Sabie	Sabie	Inkomati-Usuthu	X31M-00681	C	ACCESS
X3SABI-OLIFA	-25.1207	30.71732	Sabie	Sabie	Inkomati-Usuthu	X31A-00799	C	B
X3SABI-RIOOL	-25.0913	30.79376	Sabie	Sabie	Inkomati-Usuthu	X31B-00757	C	C
X3SABI-SANBO	-25.0238	31.16309	Sabie	Sabie	Inkomati-Usuthu	X31K-00758	C	ACCESS
X3SABI-SEKUR	-24.9895	31.28936	Sabie	Sabie	Inkomati-Usuthu	X31K-00715	C	ACCESS
X3SABI-TINGA	-24.97067	31.50496	Sabie	Sabie	Inkomati-Usuthu	X31M-00681	C	C
X3SAND-CASTE	-24.70758	31.02724	Tlulandziteka	Sand	Inkomati-Usuthu	X32A-00583	D	CAPACITY
X3SAND-CHAMP	-24.68299	31.0999	Tlulandziteka	Sand	Inkomati-Usuthu	X32A-00583	D	CAPACITY
X3SAND-HEBRO	-24.71185	30.93015	Tlulandziteka	Sand	Inkomati-Usuthu	X32A-00583	D	CAPACITY
X3SAND-LONDO	-24.7922	31.52279	Sand	Sand	Inkomati-Usuthu	X32H-00578	C	ACCESS
X3SAND-MALA	-24.841	31.553	Sand	Sand	Inkomati-Usuthu	X32J-00602	B	ACCESS
X3SAND-OTHAW	-24.768	31.406	Sand	Sand	Inkomati-Usuthu	X32H-00578	C	ACCESS
X3SAND-ROLLE	-24.722	31.237	Sand	Sand	Inkomati-Usuthu	X32G-00565	C	CAPACITY
X3SAND-SKUKU	-24.96765	31.62646	Sand	Sand	Inkomati-Usuthu	X32J-00602	B	D
X3SAND-THULA	-24.715	31.204	Sand	Sand	Inkomati-Usuthu	X32C-00558	C	CAPACITY
X3SAND-WESTS	-24.82609	31.55846	Sand	Sand	Inkomati-Usuthu	X32J-00602	B	CAPACITY
X3SPIT-RIETF	-25.09706	30.80539	Spitskop	sabie	Inkomati-Usuthu	X31B-00757	C	CAPACITY
X3TSWA-ONVER	-24.78246	30.9617	Mutlumuvi	Sand	Inkomati-Usuthu	X32D-00605	D	CAPACITY
X3Unsp-Marite	-24.9316	30.92501	Unspecified	Sabie	Inkomati-Usuthu	N/A	N/A	CAPACITY
X3Wate-R533B	-24.9551	30.90796	Waterhoutboom	Sabie	Inkomati-Usuthu	X31F-00695	C	CAPACITY
X3WHIT-LOWER	-25.13027	31.0621	White Waters	Sabie	Inkomati-Usuthu	X31H-00819	C	CAPACITY