CONFINEMENT OF MONTANASPRUIT

REVIEW
AQUATIC ASSESSMENT

Review of Existing Aquatic Assessment Reports for the Proposed Confinement of the 1:100 Year Floodplain of the Montanaspruit on Portions 28 to 42, 137 & 138 of Doornpoort 295 JR, City of Tshwane, Gauteng Province

Compiled by

Flori Scientific Services

JULY 2019

1 REPORT INFORMATION

PROJECT TITLE: Confinement of Montanaspruit

STUDY NAME: Review Aquatic Assessment

COMPILED BY: Flori Scientific Services cc

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REPORT STATUS: Final Draft

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2 EXECUTIVE SUMMARY

Background

The City of Tshwane Municipality has over the years received numerous complaints regarding the flooding of the Montanaspruit (Montana Stream) in the Pretoria area since the mid 1990s. The proposed project of remedial action involves the confinement the 1:100 year floodline, widening and flattening of the floodplain and canalisation of the mainstream channel, where necessary. The proposed project activities and actions cover an approximate area of 22.45 hectares on portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tshwane, Gauteng Province.

Most of the specialist studies were conducted a few years ago and need to be reviewed and updated where necessary. Flori Scientific Services cc was appointed as the independent consultancy to conduct the review of the studies.
Field investigations were conducted in March 2019.

Location of the study area

The study site is a section of the Montanaspruit, which is situated on Portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tshwane, Gauteng Province. The site is north of Sefako Makgatho Drive (Zambezi Drive, R513); west of the N1, and south of the N4 (Rustenburg highway).

Reports reviewed

- Aquatic Assessment: Proposed confinement of the 1:100 year floodline on the Montana Spruit (Portions 28 to 42 and 134, 135 and 137 of Doornpoort 295 JR, Tshwane, Gauteng. June 2007. Strategic Environmental Focus (Pty) Ltd.

Summary of review

The following is a summary of the review of the aquatic report:

- Overall the aquatic ecology of the study area itself has altered little over the last few years and the report findings and recommendations are still relevant.
- It is unlikely that any priority aquatic species are present in the study site. The report does not mention the presence of any RDL aquatic species.
- Only three main macro-invertebrate species were observed during the SASS assessment, namely, aquatic earthworms, crabs and midges. These species are still present and none are priority species.

- Although not mentioned in the report, a common dragonfly (Odonata) species was observed in the area, namely the broad scarlet (Crocothemis erythraea). A few other species such as the swamp bluet (*Africallagma glaucum*) and dropwings (Trithemis spp) most likely occur as well. None of these species are however RDL or priority species and their sightings, or lack thereof, will not affect the initial findings and recommendations of the report.
- As mentioned in the aquatic report, the Montanaspruit is a semi-perennial stream and not a perennial stream or river and therefore the SASS index is not totally reliable or accurate, as it is basically designed for a permanent watercourse system. However, the study still does give a good overview of the state of the aquatic environment.
- The aquatic macro-invertebrate was determined to be poor, which is the current state as well. In other words, the stream and immediate aquatic ecosystem are not sensitive in terms of aquatic biota.
- During the initial study and the review assessment no fish were observed in the study area. However, the background data to the initial aquatic study is solid and detailed. No priority fish occur in the study site. The findings of the initial study and supported by the review is that there are no priority fish species present.
- The stream is also not an NFEPA watercourse and is also not a important fish watercourses or fish corridor.
- There are no NFEPA wetlands within a 500m radius of the study site.
- The site investigations for the review conducted in March 2019 found no significant variations in the water quality compared with the earlier studies.
- It is strongly recommended that aquatic monitoring of the Montanaspruit be implemented during the construction phase of the project. Monitoring must take place upstream, in the study area itself and upstream. The greatest potential negative impacts arising from the project are during the construction phase and these are mostly in terms of siltation; loss of riparian vegetation and zone; alteration of the main channel; and introduction of invasive weed species.
- The potential for significant long-term negative impacts on the aquatic fauna arising from project related activities are low.
- No additional significant information or hidden ‘fatal flaws’ were uncovered during the review process, which included site investigations.

3 REVIEW & APPROVAL

Name	Title & Company	Signature	Date
Johannes Maree	Ecologist & Author (Flori Scientific Services)		17/07/2019
Delia De Lange	Lead EAP (TGM Environmental Services)		

4 ACKNOWLEDGEMENTS

The author/s would like to acknowledge and thank TGM Environmental Services and other roleplayers for their assistance with project information and queries related to the project.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PHOTOGRAPHS

5 ACRONYMS

CBA	Critical Biodiversity Areas
CMA	Catchment Management Agencies
DEA	Department of Environment Affairs
DWS	Department Water and Sanitation
EAP	Environmental Authorised Practitioner
EIS	Ecological Importance & Sensitivity
EMC	Environmental Management Class
HGM	Hydrogeomorphic
IHAS	Invertebrate Habitat Assessment System
NFEPA	National Freshwater Ecosystem Priority Areas
NPAES	National Protected Areas Expansion Strategy
PES	Present Ecological State
PDA	Primary Drainage Area
QDA	Quaternary Drainage Area
REC	Recommended Ecological Category (or Class)
REMC	Recommended Ecological Management Category (or Class)
RHP	River Health Programme
RVI	Riparian Vegetation Index
SANBI	South African National Biodiversity Institute
SASS	South African Scoring System
SWSA	Strategic Water areas of South Africa
VEGRAI	Riparian vegetation response assessment index
WMA	Water Management Areas
WUL	Water Use Licence
WULA	Water Use Licence Application

6 BACKGROUND

6.1 Project overview

The City of Tshwane Municipality has over the years received numerous complaints regarding the flooding of the Montanaspruit (Montana Stream) in the Pretoria area since the mid 1990s. The proposed project of remedial action involves the confinement the 1:100 year floodline, widening and flattening of the floodplain and canalisation of the mainstream channel, where necessary. The proposed project activities and actions cover an approximate area of 22.45 hectares on portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tshwane, Gauteng Province.

The specialist studies were conducted a few years ago and need to be reviewed and updated if and where necessary. Flori Scientific Services cc was appointed as the independent consultancy to conduct the review of the studies.
Additional field investigations were conducted in March 2019.

6.2 Reports reviewed

Only aquatic reports were reviewed in this review report and are as follows:

- Aquatic Assessment: Proposed confinement of the 1:100 year floodline on the Montana Spruit (Portions 28 to 42 and 134, 135 and 137 of Doornpoort 295 JR, Tshwane, Gauteng. June 2007. Strategic Environmental Focus (Pty) Ltd.

6.3 Study Site Location

The study site is a section of the Montanaspruit, which is situated on Portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tshwane, Gauteng Province. The site is north of Sefako Makgatho Drive (Zambezi Drive, R513); west of the N1 Highway, and south of the N4 (Rustenburg Highway) (Figure 1). However, the larger Montanaspruit system, as shown in Figure 2 below, was also investigated and needs to be taken into consideration as well.

Figure 1: Study Site

Figure 2: Area investigated

6.4 GPS Coordinates of the Main Landmarks

The GPS coordinates of the main landmarks within the project area are as follows:

- North end of site (Montanaspruit): 25°38'37.07"S; 28°15'35.13"E.
- South end of site area (Montanaspruit): 25°40'50.19"S; 28°15'42.34"E.
- Erasmia: 25°48'23.80"S; 28°05'31.69"E.
- 1:50 000 Topo Map reference (QDS): 2528CB (Silverton).
- Quaternary Drainage Area (QDA): A21B.

6.5 Purpose of the study

The study is a review and update of existing specialist studies and reports. The initial studies were conducted a few years ago and it is considered pertinent that they be reviewed and updated were and if necessary. The project involves the proposed confinement of the Montanaspruit in the area of Montana Park, Mondustria and Doornpoort. Project activities trigger numerous environmental requirements, including the need for certain specialist studies.

6.6 Quality and age of base data

The latest data sets were used for the report in terms of background information for veld types, ecosystems, threatened ecosystems, red data listed (RDL) fauna and flora species, priority areas (including protected areas, strategic expansion areas, wetlands, watercourses, etc. The data used was sourced from the same data sets that are nationally used and approved by all consultants and governmental organisations.

The source and age of data used included the following:

- Threatened ecosystems: Latest datasets were obtained from the SANBI website (www.bgis.sanbi.org).
- RDL species: Red List of South Africa Plants (latest update) – (www.redlist.sanbi.org).
- Veld types and ecosystems: Mucina & Rutherford, 2006, 2010. Updated in 2012 (National vegetation maps 2012 beta 2).
- South African Scoring System (SASS) version 5.
- Health Programme (RHP) 2007 version 3.
- SANBI data sets – latest updated website data (www.bgis.sanbi.org).
- Plants of Southern Africa: 2012 - (www.posa.sanbi.org).
- National environmental screening tool (Dept. Environmental Affairs) - (www.environment.gov.za).
- Gauteng Conservation Plan (C-Plan) version 3.3.

6.7 Update of environmental plans and frameworks

During the last few years important environmental conservation plans and frameworks have been updated as shown below. The aquatic assessment was conducted in 2007 and the plans and frameworks listed below do not have any impact on the findings, conclusions and recommendations of the study, which focuses on the health and present state of the aquatic ecosystem.

- The latest conservation plan (v3.3) for the Gauteng Province came out in 2011. The CBAs and ESAs have been updated according to this C-Plan v3.3.
- The latest GPEMF was adopted in 2018 (Gazette 41473: Notice 164 of 2 March 2018). Publication of the GPEMF Standard for Implementation. Adoption of the GPEMF Standard and exclusion of associated activities from the requirement to obtain environmental authorisation in terms of section 24(2)(d) and 24(10)(a), read with section 24(10)(d), of the National Environmental Management Act, 1998.

6.8 Assumptions and limitations

The assumptions and limitations for the assessment are as follows:

- All information regarding the proposed project and related activities as provided by the Client are taken to be accurate;
- Additional field investigations were conducted on 28 March 2019.
- Precise buffer zones, regulated zones, etc. or exact GPS positions cannot be made using generalised corridors or kml files on Google Earth. However, the buffer zones drawn are accurate to within 2-3m;
- Standard and acceptable methodologies as required and used in South Africa were used.
- The latest data sets were used in terms of obtaining and establishing background information and desktop reviews for the project. The data sets were taken to be accurate, but were verified and refined during field investigations.

7 METHODOLOGY

7.1 Desktop assessment

A literature review was conducted regarding the existing specialist studies (reports) and compared to the latest existing base data such shown above in Section 6, as some of these have changed and been updated during the last few years. Various online environmental screening tools were also used to assess the latest data available, such as the DEA national environmental screening tool.

7.2 Field surveys

A site investigation was conducted for the purpose of ground-truthing and to determine to what extent the study area has changed during the last few years. During the field surveys, cognisance was taken of the following environmental features and attributes:

- Biophysical environment, including terrestrial and aquatic ecosystems;
- Regional and site specific vegetation;
- Habitats ideal for potential red data fauna and flora species;
- Sensitive faunal and floral habitats; and
- Red data and orange data fauna and flora species.

Digital photographs and GPS reference points of importance where recorded and used throughout the report when and where necessary.

The original aquatic study used methodologies that are still valid in 2019. These include the River Health Programme (RHP) 2007, South African Scoring System (SASS) version 5, and the Invertebrate Habitat Assessment System (IHAS) version 2,2.

8 REVIEW OF REPORTS

8.1 Assessment of the study site

The study site is situated within the original extent of Marikana Thornveld. The veld type is part of the Central Bushveld Bioregion, which is part of the Savanna Biome of South Africa. Marikana Thornveld is a threatened veld type with a threat status of vulnerable (VU). Over the past 11 to 12 years (2007 – 2019) the areas to the south (in particular) and to the east of the study site have increased in terms of urbanisation, while areas in the north of the site and to north of the site itself have not altered much as can be seen in satellite images from the various years.

The natural environment of the study site is moderately transformed to largely transformed. In general, the riparian and aquatic ecology of the study area itself has remained quite constant and altered little over the last few years. An increase in urbanisation and encroachment on the Montanaspruit has resulted in a slight in crease in stormwater run-off and channelled stormwater into the system. This has had the slight impact of likely causing the stream to remain active for slightly longer than would have naturally occurred. The increase in wetness and pools of open water will give a slight increase in opportunity for small aquatic fauna, such as macro-invertebrates, including insects such as dragonflies, shore files, etc. This is offset to an extent by the increase in urbanisation and the associated negative anthropogenic impacts, such as loss of riparian and nearby natural veld, increase in pollution of the water, etc. In other words, the results are that there might be slight changes in the overall ecosystem where certain species benefit slightly, while others don't, resulting in a fairly similar overall present ecological state or assessment of the system.

Figure 3, below, shows the Montanaspruit (Stream), which is the main watercourse in the area and the only one that flows through the study site. The Blinkblaarspruit (to the south) and the Katdoringspruit (to the north / northeast) are tributaries of the Montanaspruit and also part of the larger aquatic ecosystem of the area.

The existing 50-year and 100-year floodlines have also been delineated, as shown in below in Figure 4

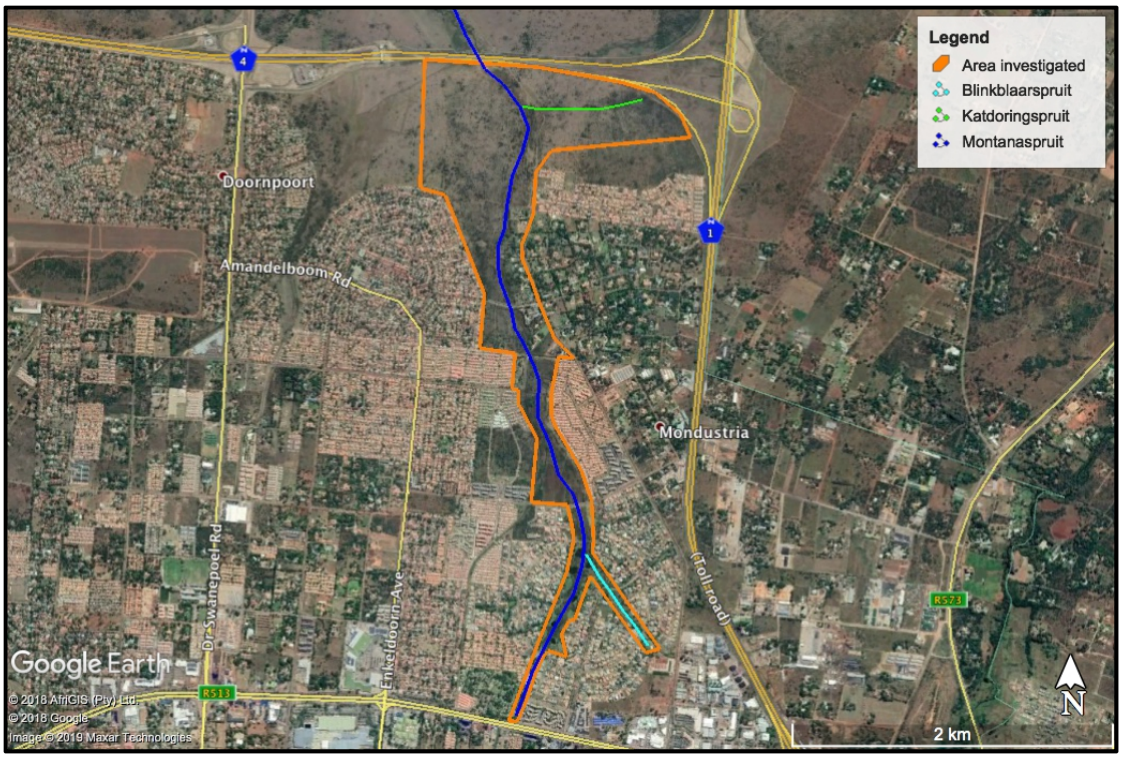

Figure 3: Main watercourses in the study site and greater area

Figure 4: 50-year and 10-year floodlines of the Montanaspruit in the study site

The study area is not within a 500m radius of any wetlands, including freshwater pans. There are also no National Freshwater Ecosystem Priority Areas within the

study area, or within a 500m radius of the study area. The montanaspruit in the study area is not a designated NFEPA priority watercourse either (Figure 5).

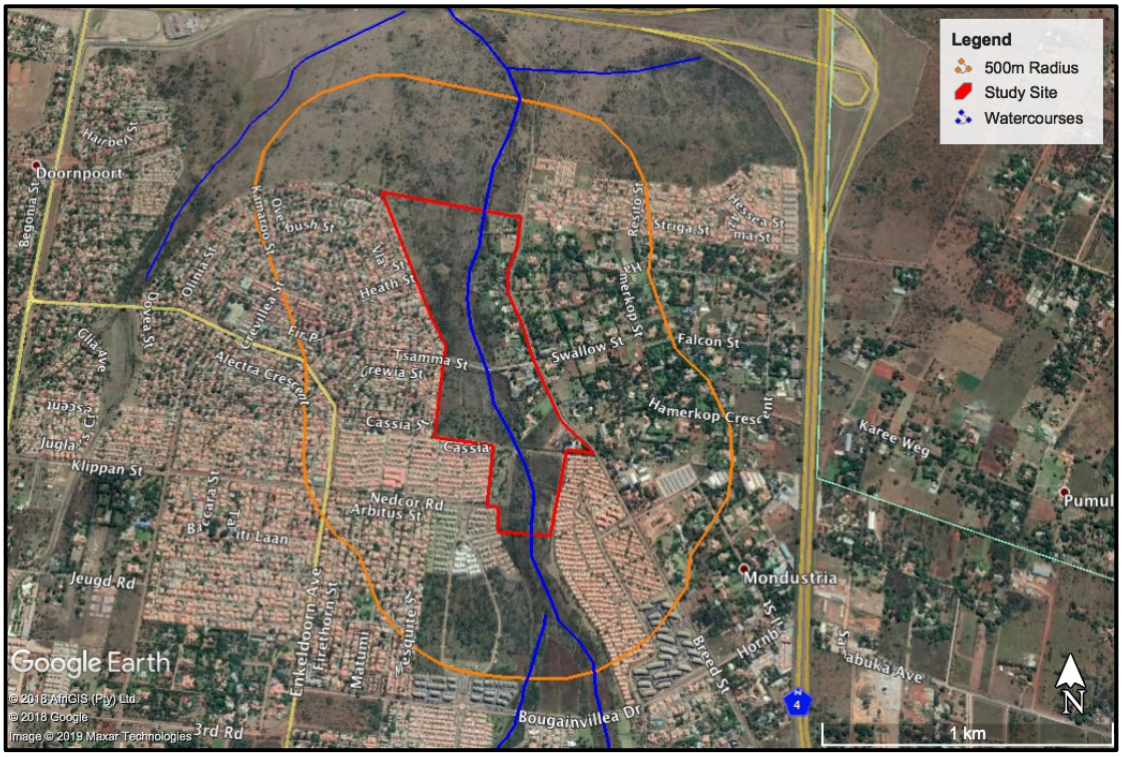

Figure 5: Study area and 500m radius showing no NFEPA watercourses or wetlands

South Africa is geographically divided up into a number of naturally occurring Primary Drainage Areas (PDAs) and Quaternary Drainage Areas (QDAs). The different areas are demarcated into Water Management Areas (WMAs) and Catchment Management Agencies (CMAs). Until recently there were 19 WMAs and 9 CMAs (during the time of the initial aquatic report). As of September 2016, these were revised and there are now officially only nine WMAs, which correspond directly in demarcation to the nine new CMAs (Government Gazette, 16 September 2016. No.1056, pg. 169-172). A layout of the new and the old WMAs are shown in maps in the appendices.

Below is a summary of the information for the catchment area in which the study area is situated (Table 1). This summary was not given in the aquatic assessment. It should also be kept in mind that the amount and designation of water management areas (WMAs) and Catchment

Table 1: Summary of catchment area

Level	Category
Primary Drainage Area (PDA)	A
Quaternary Drainage Area (QDA)	A23E
Water Management Area (WMA) – Previous / Old	Crocodile (West) & Marico
Water Management Area (WMA) – New (as of Sept. 2016)	Vaal (WMA 5)
Sub-Water Management Area	Apies / Pienaars
Catchment Management Agency (CMA)	Vaal (CMA 5)
Priority Quaternary Catchment	No
SWSA area	No
NFEPA Rivers in Study Area	No
NFEPA Wetlands in Study Area	No
Fish FEPA Catchment	No
Fish FEPA River	No
Fish FSA	No
Fish Migratory Catchment	No
Fish Corridor	No

8.2 Summary of review

The following is a summary of the review of the aquatic report:

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watercourse system. However, the study still does give a good overview of the state of the aquatic environment.

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- During the initial study and the review assessment no fish were observed in the study area. However, the background data to the initial aquatic study is solid and detailed. No priority fish occur in the study site. The findings of the initial study and supported by the review is that there are no priority fish species present.
- The stream is also not an NFEPA watercourse and is also not a important fish watercourses or fish corridor.
- There are no NFEPA wetlands within a 500m radius of the study site.
- The site investigations for the review conducted in March 2019 found no significant variations in the water quality compared with the earlier studies.
- It is strongly recommended that aquatic monitoring of the Montanaspruit be implemented during the construction phase of the project. Monitoring must take place upstream, in the study area itself and upstream. The greatest potential negative impacts arising from the project are during the construction phase and these are mostly in terms of siltation; loss of riparian vegetation and zone; alteration of the main channel; and introduction of invasive weed species.
- The potential for significant long-term negative impacts on the aquatic fauna arising from project related activities are low.

9 APPENDICES

9.1 Photographs

Photo 1: Montanaspruit (Stream)

Photo 2: Built up suburbs and gardens along Montanaspruit

Photo 3: Stream showing dense grasses and rushes along the banks and in the riparian zone

Photo 4: Low-level bridge and road crossing over stream (Tsamma St)

Photo 5: Dense rushes in steam and floodplain. Also notice alien invasive weeds (morning glory and zinnia)

9.2 Maps of new and old WMAs and CMAs

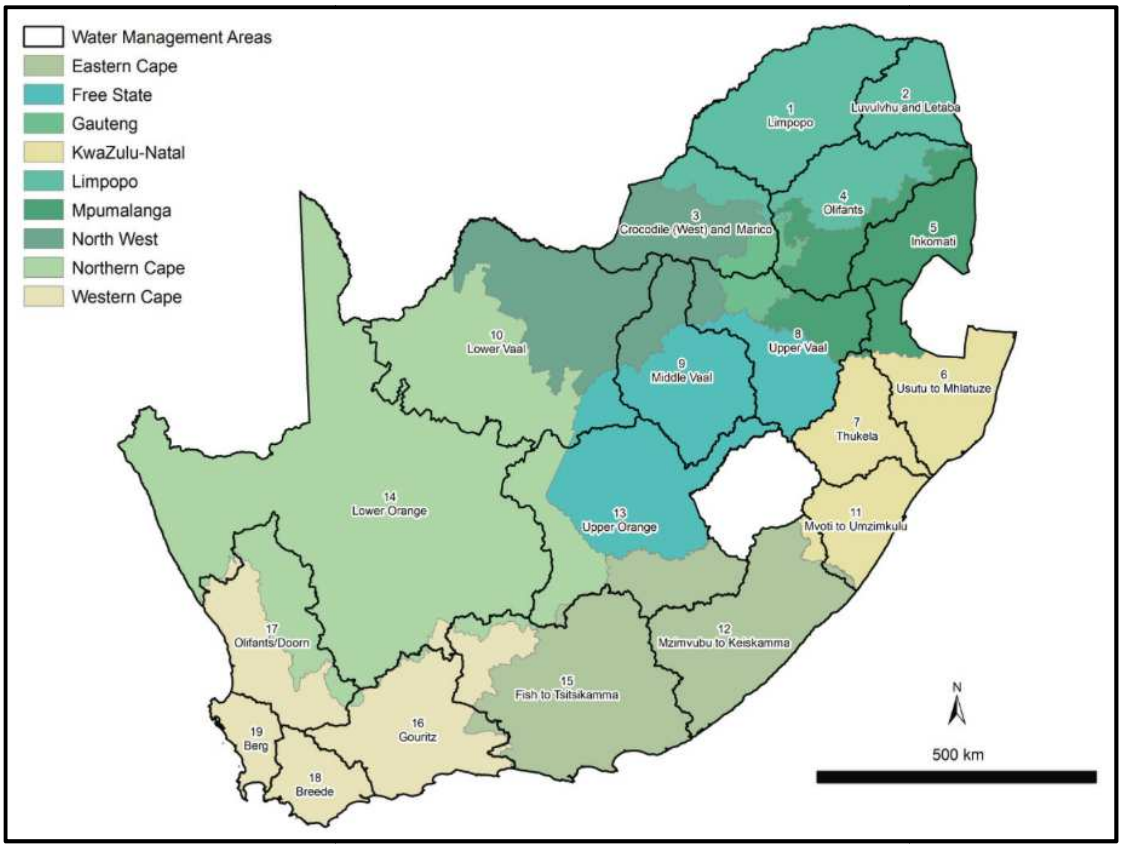

Figure 6: Old WMAs of South Africa

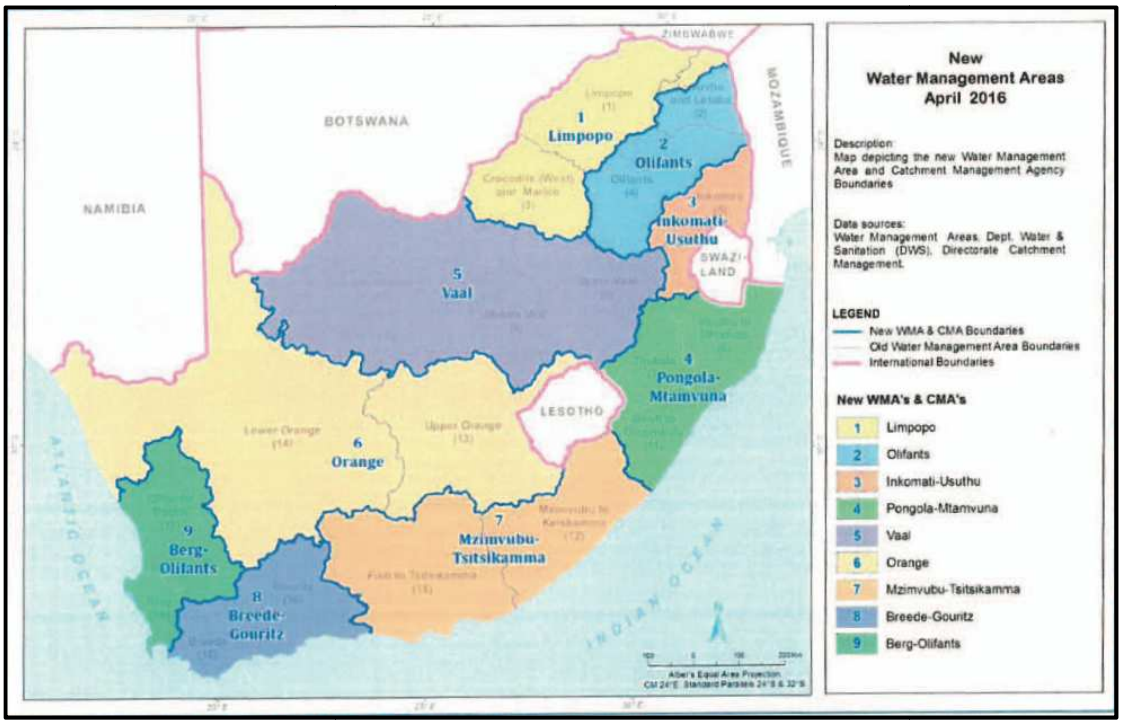

Figure 7: New WMAs & CMAs of South Africa

9.3 Historical satellite images of area

Figure 8: 2008

Figure 9: 2015

Figure 10: 2017

Figure 11: 2019

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11 DECLARATION

DECLARATION OF INDEPENDENCE

I, **Johannes Oren Maree** , do hereby declare that I :

- Act as an independent ecologist, wetland specialist and environmental specialist in compiling this report;
- Do not have any financial interests, or stand to gain in any way whatsoever in the undertaking of this activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- Do not have, nor will have, any vested interest in the proposed activity proceeding;
- Have no, neither will engage in, conflicting interests in the undertaking of this activity;
- Undertake to disclose, to the competent authority, any material information that has, or may have, the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2014; and
- Will provide the competent authority with access to all information at my disposal regarding the investigations, studies and application, whether such information is favourable to the applicant or not.

The South African Council for Natural Scientific Profession (SACNASP) certifies that in terms of Section 20(3)(a) of the Natural Scientific Professions Act, 2003 (Act 27 of 2003), that Mr. J.O. Maree is registered as a Professional Natural Scientist.
Reg. No: 400077/91

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SIGNATURE: _____

NAME OF COMPANY: **Flori Scientific Services cc**

DATE: __15 July 2019 ____