DETERMINATION OF WATER RESOURCE CLASSES AND ASSOCIATED RESOURCE QUALITY OBJECTIVES IN THE THUKELA CATCHMENT

(WP11255)
ORDER NO: 138904

CAPACITY BUILDING REPORT

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water & sanitation

Department:
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(WP11255)
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CAPACITY BUILDING REPORT

DECEMBER 2021

Title:	*Capacity Building Report*
Authors:	*L Boyd, P Moodley, T Coleman, R Stassen, E van Wyk, G Snow, M Vosloo, G Marneweck, D Kassier and J Crafford, J Schroder*
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…… *……..*

Trevor Coleman *Date*

Project Director, Golder Associates

DEPARTMENT OF WATER AND SANITATION

Chief Directorate: Water Ecosystems Management

Approved for DWS by:

…… *……*

Mohlapa Sekoele *Date*

Project Manager: Water Resource Classification

…… *……*

Mkhevu Mnisi *Date*

Scientific Manager: Water Resource Classification

…… *……..*

Lebogang Matlala *Date*

Director: Water Resource Classification

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ABBREVIATIONS

DWS	Department of Water and Sanitation
PSP	Professional Service Provider
RDM	Resource Directed Measures
RQOs	Resource Quality Objectives
WMA	Water Management Area
REC	Recommended Ecological Category
PES	Present Ecological Category
TEC	Target Ecological Category
EIS	Ecological Importance and Sensitivity
WCS	Wetland Consulting Services
IUA	Integrated Units of Analysis
WRYM	Water Resource Yield Model
WRPM	Water Resource Planning Model

1 INTRODUCTION

1.1 INTRODUCTION

The Project: Determination of Water Resource Classes and associated Resource Quality Objectives in the Thukela Catchment is currently underway. Golder Associates Africa (Pty) Ltd was appointed to lead the study supported by a group of specialists including water resource modellers, ecologists, socio-economists, hydraulics, groundwater, wetland, and estuary specialists.

1.2 PROJECT OBJECTIVES

The main objectives of the study are to determine appropriate water resource classes and Resource Quality Objectives (RQOs) for all significant water resources in the Thukela River catchment area that would facilitate sustainable use of the water resources while maintaining ecological integrity, specifically maintaining, or improving the present ecological state of the water resources.

The project approach and methodology that will be applied is in accordance with the 7-step process of the WRCS outlined in Regulation 810, the DWS manual 'Procedures to Develop and Implement RQOs' (DWA, 2011), and the integrated process outlined in study entitled, Development of Procedures to operationalise Resource Directed Measures (DWS, 2017).

1.3 OBJECTIVES OF THE CAPACITY BUILDING PROGRAMME

Capacity building has been realised through the following mechanisms:

- **Mentorship**

Mentoring of the Thukela study DWS project manager and DWS Water Resource Classification team - which will involve dedicated, one-on-one guided sessions with the identified specialists on the team addressing wetlands and IUA delineation as the subject matter.

- **Training Workshops**

Participation of identified DWS officials - in dedicated day workshops on water resource components and classification aspects which will build their capacity and broaden their skills base with respect to the WRCS and RQO process as well in terms of specific technical content.

- **Stakeholder Engagement**

Stakeholder involvement over the course of the project, through their participation. Stakeholder groups will develop an understanding of water resource protection through the Classification/ RQO Process and its relevance. This will also assist in the enhancement of their understanding of the concepts of integrated water resource management and sustainable development.

This report is the final report that outlines the capacity building undertaken for the period September 2019 to November 2021 in respect of mentorship and training workshops undertaken. Stakeholder Engagement is not included in this report as it is reported on separately.

1.4 CAPACITY BUILDING PARTICIPANTS AND TOPICS

The participants who were invited to attend the various capacity building programs and the topics that have been covered are included in Table 1.

Table 1: Capacity building recipients and topics

Activity	Recipients	Topics to be addressed
Mentorship	Mohlapa Sekoele Koleka Makanda	• Wetlands
	Mohlapa Sekoele Koleka Makanda Mkhevu Mnisi Mohlapa Sekoele Esther Lekalake Adaora Okonkwo Lawrence Mulangaphuma	• Integrated Units of Analysis Delineation • Usutu Report Review
Training Workshops	Portia Mokoena Lindelani Lalumbe Ramusiya Fhedzisani Smangele Mgquba Azwidohwi Neswiswi Modukanale Salagae Molefi Mazibuko Philani Khoza Boniwe Nobubele Koleka Makanda Mkhevu Mnisi Mohlapa Sekoele Mthembu Sazi Sibongile Mwale Noloyiso Mbiza	• Overview of the Classification and RQOs determination process • Socio-economic Analysis • Surface Water hydrology and Water Resource Modelling • Water Quality • Groundwater • Introduction to Estuaries • Evaluation of scenarios and determination of classes • RQO RU and sub-component prioritisation • Use of the tools for setting RQOs for rivers and dams, wetlands and estuaries

2 CAPACITY BUILDING SCHEDULE

The initial schedule submitted to the DWS in October 2019 is set out in Table 2, however due to the onset of the COVID-19 pandemic, changes had to be made over the course of the project and these changes are described in the event descriptions to follow.

Table 2: Capacity Building Schedule

Activity	Topic/ Approach	Time Requirement for Mentee	Proposed scheduling	Output	Trainer
Thukela Classification and RQO Study Mentorship: Wetlands **MENTEE:** Ms. Mohlapa Sekoele					
Preliminary identification of significant wetland resources.	Using existing datasets (electronic and available literature) identify significant wetland resources in the Thukela catchment.	1 day at WCS offices	February 2020	Draft Priority Wetland layer.	Wetland Consulting Services
Workshop to determine which wetlands are likely to be providing key ecosystem services (ecosystem services assessment).	Team workshop with Wetland Specialists and Golder team to understand the catchment stresses and to provide input into the determination of the IUA's.	1 day team workshop at Golder	February/ March 2020	• Indication of areas expected to be wetland ecosystem service hotspots; • Identification of priority quaternary catchments from a wetland perspective; and	

Activity	Topic/ Approach	Time Requirement for Mentee	Proposed scheduling	Output	Trainer
				Input into the delineation of IUA's.	
Preliminary identification of significant wetland resources.	Using existing datasets (electronic and available literature) identify significant wetland resources in the Thukela catchment.	1 day at WCS offices	February 2020	Draft Priority Wetland layer.	
Workshop to determine which wetlands are likely to be providing key ecosystem services (ecosystem services assessment).	Team workshop with Wetland Specialists and Golder team to understand the catchment stresses and to provide input into the determination of the IUA's.	1 day team workshop at Golder	February/ March 2020	• Indication of areas expected to be wetland ecosystem service hotspots; • Identification of priority quaternary catchments from a wetland perspective; and Input into the delineation of IUA's.	
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Activity	Topic/ Approach	Time Requirement for Mentee	Proposed scheduling	Output	Trainer
(ecosystem services assessment).				• Identification of priority quaternary catchments from a wetland perspective; and Input into the delineation of IUA's.	
Thukela Classification and RQO Study Mentorship IUA delineation **MENTEE:** Classification Team					
IUA Delineation	Application and demonstration: Delineation of IUAs – Workshop	2 days	April/May 2020	Mapping of IUAs	Priya Moodley and Lee Boyd
Training Workshops					
Overview of the Classification and RQOs determination process		6 hours	March 2020	Understanding of process, components and steps	Priya Moodley and Lee Boyd
Water Quality		6 hours	April 2020	Basics of Water Quality and assessment as part of process	Priya Moodley and Lee Boyd
Socio-economic Analysis		8 hours	June 2020	Understanding biophysical processes; Resource economics; Socio-economic analysis aspects	Prime Africa
Surface Water hydrology and Water Resource Modelling		8 hours	June 2020	Basics of hydrology, Water Resource assessments (WRYM and WRPM)	Jonathan/ Trevor
Groundwater		8 hours	May 2020	Understanding, process, components and steps	Eddie van Wyk
Estuaries		8 hours	May 2020	Introduction to Estuaries – key aspects to consider	Gavin Snow/ Matthys Vosloo

3 MENTORSHIP

3.1 WETLANDS

3.1.1 Preliminary identification of significant wetland resources

Date: 28th of February 2020

Attendees: Ms Mohlapa Sekoele and Ms Koleka Makanda

Event details: Preliminary identification of significant wetland resources. Significant wetland resources in the Thukela catchment were identified using existing datasets (electronic and available literature).

Outputs: Draft Priority Wetland Layer

Date: 4th of March 2020

Attendees: Ms Mohlapa Sekoele and Ms Koleka Makanda

Event details: Workshop to determine which wetlands are likely to provide key ecosystem services (ecosystem services assessment). Team workshop with Wetland Specialists and Golder's team to understand the catchment stresses and to provide input into the determination of the IUAs.

Outputs: Wetland ecosystem service hotspots; Identification of priority quaternary catchments from a wetland perspective; and input into the delineation of IUAs.

3.1.2 Wetland field visit

Date: 24th of November 2021

Attendees: Ms Mohlapa Sekoele and Ms Koleka Makanda

Event details: Field visit to understand wetland delineation using soil profiles and vegetation.

The focus of the training was on the application of the wetland delineation guidelines and using the various indicators to identify wetlands and define wetland boundaries. The participants looked at:

- terrain unit indicators
- soil forms
- soil wetness (including use of the Munsell colour chart), and
- vegetation indicators.

Focus was also on interpreting and understanding wetland drivers, especially hydrology, wetlands typing, as well as wetland assessment of condition and importance and sensitivity.

The various wetland assessment tools (WET-Health, EIS assessment, and functional assessment) were also discussed.

The project team acknowledges Ezemvelo Natura Reserve and especially John de Jager for granting permission to undertake the training within the Ezemvelo Nature Reserve.

Outputs: A better understanding of:

- Wetland delineation using soil profiles
- Wetland vegetation indicators
- Interpreting and understanding wetland drivers, especially hydrology,
- Categorisation of wetlands, and

- Various wetland assessment tools.

Figure 1 shows the area that was assessed and where soil samples were augured.

Appendix K includes some photographs from the field visit.

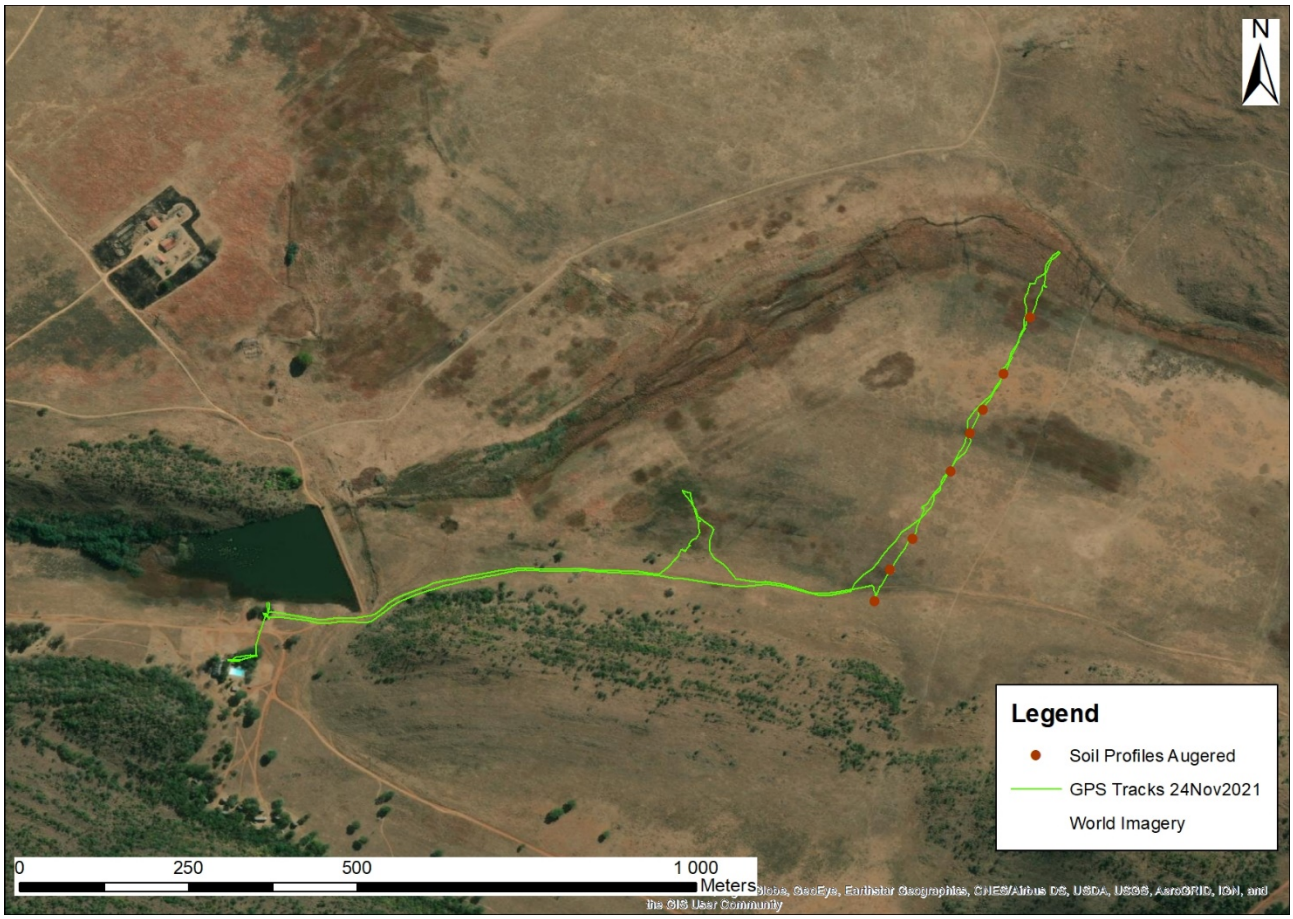

Figure 1: Map showing area where field visit took place

3.2 IUA DELINEATION

Date: 18th and 19th of June 2020

Invitees: Mkhevu Mnisi, Mohlapa Sekoele, Esther Lekalake, Lawrence Mulangaphuma, Koleka Makanda, and Adaora Okonkwo

Attendees: Mkhevu Mnisi, Mohlapa Sekoele and Koleka Makanda

Event details: Application and demonstration: Delineation of Integrated Units of Analysis (IUAs). The contents of the presentation and activities are included as Appendix A.

3.3 USUTU STATUS QUO AND IUA DELINEATION REPORT - REVIEW

One of the capacity building aspects was mentorship through the review of a draft Status Quo and IUA Delineation report that was compiled by the following DWS Officials.

- Mr Mkhevu Mnisi
- Ms Mohlapa Sekoele
- Mr Lawrence Mulangaphuma
- Ms Adaora Okonkwo
- Esther Lekalake
- Koleka Makanda

The report was received by Golder on the 5th of July 2021 and a feedback session was held on the 21st of July 2021. The team mentioned above attended an on-line Teams meeting.

Details of the review are included in Appendix I (electronic).

4 TRAINING WORKSHOPS

The following training workshops have been held. The sessions were held on-line with Microsoft Teams, with the Project Team presenting from the Golder Associates Africa Training Room, or online. Those invited to the training sessions are listed in Table 3.

A CD containing all the presentations, activities, spreadsheets, and other documents used is included with this report.

Table 3: Trainees invited

Trainee	Email address
1. Mokoena Portia	mokoenap@dws.gov.za
2. Lalumbe Lindelani	lalumbel@dws.gov.za
3. Ramusiya Fhedzisani	ramusiyaf@dws.gov.za
4. Smangele Mgquba	mgqubas@dws.gov.za
5. Neswiswi Azwidohwi	neswiswia@dws.gov.za
6. Salagae Modukanale	salagaem@dws.gov.za
7. Molefi Mazibuko	mazibukom@dws.gov.za
8. Philani Khoza	khozap@dws.gov.za
9. Nobubele Boniwe	boniwen@dws.gov.za
10. Koleka Makanda	makandac@dws.gov.za
11. Mkhevu Mnisi	Mnisim2@dws.gov.za
12. Mohlapa Sekoele	sekoelem@dws.gov.za
13. Mthembu Sazi	Mthembus1@dws.gov.za
14. Mwale Sibongile	mwales@dws.gov.za
15. Mbiza Noloyiso	mbizan@dws.gov.za

4.1 OVERVIEW OF THE CLASSIFICATION AND RQO'S DETERMINATION PROCESS

Date: 22nd of June 2020

Attendees: Portia Mokoena; Lindelani Lalumbe; Smangele Mgquba; Neswiswi Azwidohwi; Salagae Modukanale; Koleka Makanda; Mkhevu Mnisi; Mohlapa Sekoele

Event details: Overview of the Classification and RQOs determination process. The presentation included understanding of the process, the various components, and the steps involved.

4.2 GROUNDWATER

Date: 23rd of June 2020

Attendees: Portia Mokoena; Lindelani Lalumbe; Fhedzisani Ramusiya; Smangele Mgquba; Neswiswi Azwidohwi; Salagae Modukanale; Koleka Makanda; Mkhevu Mnisi; Mohlapa Sekoele

Event details: Basics of water quality and its' assessment as part of the classification process, and how the groundwater RQOs are determined, were presented and discussed.

4.3 SURFACE WATER QUALITY

Date: 24th of June 2020

Attendees: Portia Mokoena; Lindelani Lalumbe; Smangele Mgquba; Neswiswi Azwidohwi; Salagae Modukanale; Koleka Makanda; Mkhevu Mnisi; Mohlapa Sekoele

Event details: Surface water quality: Understanding, process, components and steps

4.4 ESTUARIES

Date: 25th of June 2020

Attendees: Portia Mokoena; Lindelani Lalumbe; Smangele Mgquba; Neswiswi Azwidohwi; Salagae Modukanale; Mkhevu Mnisi; Mohlapa Sekoele

Event details: Introduction to Estuaries included the following sessions.

1. Session 1: Introduction to estuaries
2. Session 2: Estuarine Functional Zone (EFZ)
3. Session 3: Benefits of estuarine biodiversity
4. Session 4: Pressures on estuarine ecosystems
5. Session 5: Resource Directed Measures (RDM), and
6. Session 6: Classification and Resource Quality Objectives (RQOs)

4.5 SURFACE WATER HYDROLOGY AND WATER RESOURCE MODELLING

Date: 26th of June 2020

Attendees: Portia Mokoena; Lindelani Lalumbe; Smangele Mgquba; Neswiswi Azwidohwi; Salagae Modukanale; Mkhevu Mnisi; Mohlapa Sekoele

Even details: Surface Water hydrology and Water Resource Modelling: Basics of hydrology, Water Resource assessments (WRYM and WRPM)

4.6 SOCIO-ECONOMIC ANALYSIS

Date: 30th of June 2020

Attendees: Portia Mokoena; Lindelani Lalumbe; Smangele Mgquba; Neswiswi Azwidohwi; Salagae Modukanale; Koleka Makanda; Mkhevu Mnisi; Mohlapa Sekoele; Fhedzisani Ramusiya

Event details: Socio-economic Analysis. Understanding biophysical processes; Resource economics; Socio-economic analysis aspects

4.7 EVALUATION OF SCENARIOS AND DETERMINATION OF CLASSES

Date: 20th of November 2020

Invitees: Portia Mokoena; Lindelani Lalumbe; Smangele Mgquba; Neswiswi Azwidohwi; Salagae Modukanale; M Mazibuko; Philani Khoza; Nobulele Boniwe; Koleka Makanda; Mkhevu Mnisi; Mohlapa Sekoele; Fhedzisani Ramusiya; S Mthembu; M Wales; Noloyiso Mbiza; Renelle Pillay; Manisha Maharaj; Strinvasen Govender; N Makwabasa; L Ntenga; Bernice Becker; Michael Maluleke

Attendees: Renelle Pillay; Noloyiso Mbiza; Manisha Maharaj; Mohlapa Sekoele; Mkhevu Mnisi; Michael Maluleke Ramusiya Fhedzisani; Ntombethu Makwabasa; Portia Mokoena and Koleka Makanda

Event details: Evaluation of scenarios to inform the management class of each IUA.

It was agreed after this session that a follow-up session would be held in the Provincial Office in February 2020.

4.8 DEMONSTRATION OF SETTING OF RESOURCE QUALITY OBJECTIVES USING THE RQO TOOLS

Demonstration of the setting of RQOs using the RQO tools via a Teams meeting took place on the 7th of July 2021.

An on-line presentation was done demonstrating the use of the following tools. A copy of each of the excel tools was forwarded to the invitees.

- Resource Unit Evaluation Tool_Rivers (version March 2011)
- Resource Unit Evaluation Tool_Wetlands (version March 2011)
- Resource Unit Evaluation Tool_Estuaries (version March 2011)

The following DWS Officials attended the session:

- Renelle Pillay pillayr@dws.gov.za
- Navika Govender govendern1@dws.gov.za
- Nosisa Ngwenya ngwenyan@dws.gov.za
- Krishnee Naidoo naidook@dws.gov.za
- Makwabasa Ntombethu MakwabZ@dws.gov.za
- Sekoele Mohlapa SekoeleM@dws.gov.za
- Michael Maluleke malulekemic@dws.gov.za
- Hassina Aboobaker aboobakerh@dws.gov.za
- Lwandle Sibango SibangoL@dws.gov.za
- Mkhevu Mnisi mnisim2@dws.gov.za
- Coleen Moonsamy moonsamyc@dws.gov.za
- Antonia Steenkamp steenkampa2@dws.gov.za
- Ziyanda Malibiji MalibijiZ@dws.gov.za

Copies of the tools are included as Appendix J (electronic).

5 PSP TEAM CONTRIBUTION

The following PSP team members contributed to the capacity building events held:

Trevor Coleman	Dieter Kassier
Lee Boyd	Dr Mathys Vosloo
Priya Moodley	Dr Gavin Snow
Oudi Modisha	Johnathan Schroder
Eddie van Wyk	Gerald de Jager
Mmakhumo Mogapi	Jackie Crafford
Gary Marneweck	Dineo Maila

ELECTRONIC APPENDICES (on CD)

- APPENDIX A: Mentorship: IUA Delineation
- APPENDIX B: Training Workshop: Overview of the Classification and RQOs determination process
- APPENDIX C: Training Workshop: Groundwater - Basics of Water Quality and assessment as part of process
- APPENDIX D: Training Workshop: Surface Water Quality - Understanding, process, components, and steps
- APPENDIX E: Training Workshop: Introduction to Estuaries – key aspects to consider
- APPENDIX F: Training Workshop: Basics of hydrology, Water Resource assessments (WRYM and WRPM)
- APPENDIX G: Training Workshop: Understanding biophysical processes; Resource economics; Socio-economic analysis aspects
- APPENDIX H: Training Workshop: Evaluation of Scenarios and determination of Classes
- APPENDIX I: Review of Usutu Status Quo and Delineation Report
- APPENDIX J: Tools for determining Resource Quality Objectives for determining Rivers, Wetlands and Estuaries

APPENDIX K: photographs from the wetlands mentorship field visit undertaken on the 24th of November 2021 in the Ezemvelo Nature Reserve

Photographs showing wetland vegetation and augering to assess soil profiles (24th November 2021, Ezemvelo Nature Reserve) in the area of coordinates: latitude -25.701902; longitude 28.952475

Photographs showing different wetland vegetation (24th November 2021, Ezemvelo Nature Reserve) in the area of coordinates: latitude -25.701902; longitude 28.952475