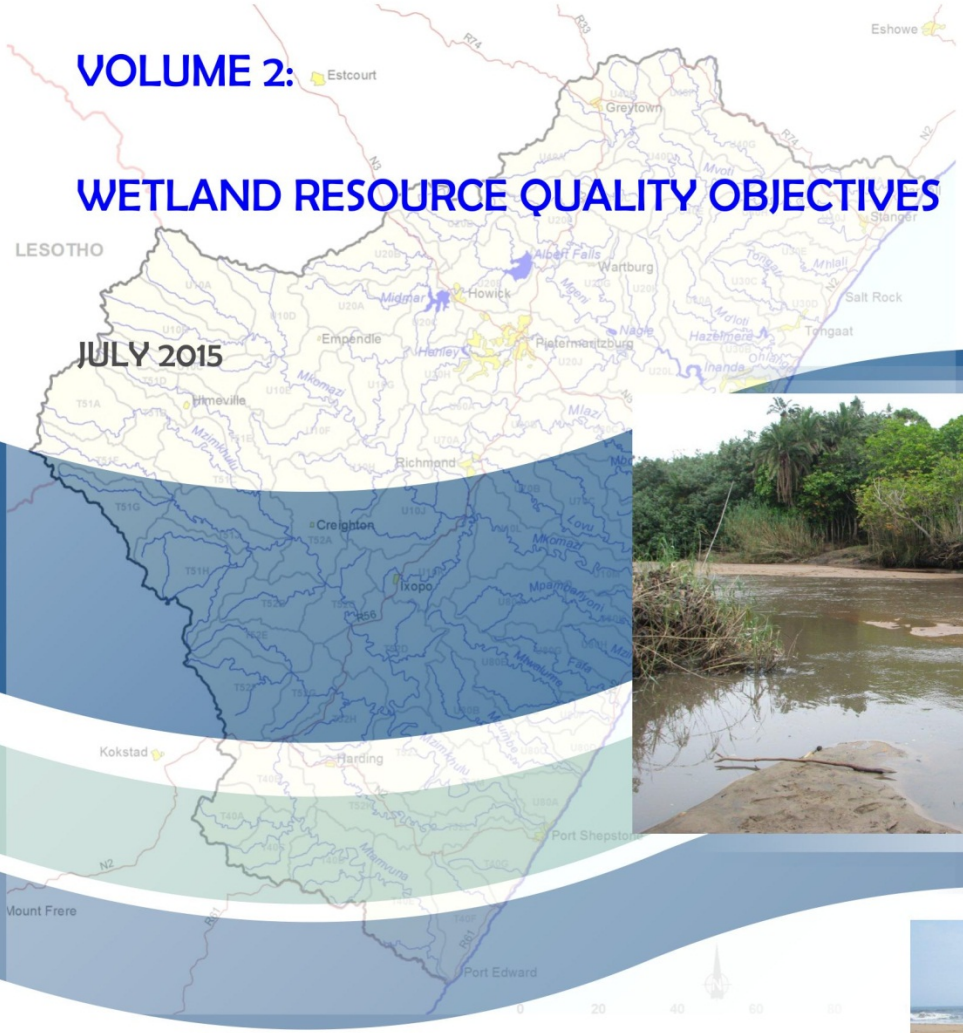
REPORT NO: RDM/WMA11/00/CON/CLA/0415

CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF THE COMPREHENSIVE RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT AREA

PROJECT NUMBER: WP 10679

VOLUME 2:

WETLAND RESOURCE QUALITY OBJECTIVES



JULY 2015

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

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CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF THE COMPREHENSIVE RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT AREA

VOLUME 2: WETLAND RESOURCE QUALITY OBJECTIVES

Report Number: RDM/WMA11/00/CON/CLA/0415

JULY 2015

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1	*Report Number: RDM/WMA11/00/CON/CLA/0112*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Inception Report**
2	*Report Number: RDM/WMA11/00/CON/CLA/0113*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Status Quo assessment, IUA delineation and Biophysical Node identification**
3	*Report Number: RDM/WMA11/00/CON/CLA/0213*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **River Resource Units and EWR sites**
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5.2	*Report Number: RDM/WMA11/00/CON/CLA/0214*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 2: EcoClassification and EWR assessment on the Mtamvuna, Lovu, uMngeni, Karkloof and uMnsunduze Rivers**
5.3	*Report Number: RDM/WMA11/00/CON/CLA/0314*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 3: EcoClassification and EWR assessment on the Mkomazi, uMngeni and Mvoti Rivers**
6	*Report Number: RDM/WMA11/00/CON/CLA/0212*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **BHNR**
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	Report Number: RDM/WMA11/00/CON/CLA/0115	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 2d: Supporting Information on the Determination of Water Resource Classes –Ecological Consequences of Estuaries in T4, U2, U3, U5, U6, U7 and U8 Operational Scenarios**
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	Report Number: RDM/WMA11/00/CON/CLA/0215	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 7b: Recommended Water Resource Classes for the T4, T5, U2, U3, U5, U6, U7 and U8 secondary catchments**
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9.1	*Report Number: RDM/WMA11/00/CON/CLA/0315*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management*

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		Area: **Volume 1: River RQOs**
9.2	**Report Number: RDM/WMA11/00/CON/CLA/0415**	**Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area: Volume 2: Wetland RQOs**
9.3	*Report Number: RDM/WMA11/00/CON/CLA/0515*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 3: Groundwater RQOs**
9.4	*Report Number: RDM/WMA11/00/CON/CLA/0615*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 4: Estuary RQOs**
10	*Report Number: RDM/WMA11/00/CON/CLA/0715*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Implementation report**
11	*Report Number: RDM/WMA11/00/CON/CLA/0815*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Main Report**
12	*Report Number: RDM/WMA11/00/CON/CLA/0116*	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Closing Report**

DEPARTMENT OF WATER AND SANITATION

CHIEF DIRECTORATE: WATER ECOSYSTEMS

CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF THE COMPREHENSIVE RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT AREA

VOLUME 2: WETLAND RESOURCE QUALITY OBJECTIVES

Approved for RFA by:

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Delana Louw
Project Manager

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Date

DEPARTMENT OF WATER AND SANITATION (DWS)
Approved for DWS by:

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Chief Director: Water Ecosystems

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Date

AUTHOR

This report was compiled by Mr Mark Rountree and edited by Ms. Shael Koekemoer.

REPORT SCHEDULE

Version	Date
First draft	*March 2015*
Final draft	*July 2015*

EXECUTIVE SUMMARY

BACKGROUND

The purpose of this document is to provide a summary of the narrative and numerical RQOs for the wetlands situated in the Mvoti to Umzimkulu Water Management Area (WMA).

APPROACH

There are thousands of wetlands within the Mvoti Water Management Area (Nel et al., 2011), but it is unrealistic to try to implement and monitor Resource Quality Objectives (RQOs) for each individual wetland. Following the recommendations of DWA (2012), where data are available, specific RQOs were set for priority wetlands of very high importance. Monitoring data for four priority KwaZulu-Natal wetlands (including two RAMSAR sites) located within the Mvoti WMA were sourced from the Mondi Wetlands Programme, World Wide Fund for Nature (WWF) and Ezemvelo KZN wildlife. For the remaining wetlands, catchment-level RQOs for wetlands have been determined for catchments with a moderate or higher wetland Ecological Importance and Sensitivity (EIS).

Two levels of draft RQOs have thus been determined for the wetlands of the Mvoti to Umzimkulu WMA:

- *RQOs for priority individual wetlands: Developed for very high priority (RAMSAR or Ezemvelo KZN priority wetlands) where existing baseline monitoring data are available; and*
- *Catchment-level RQOs: Applicable to wetlands within catchments with moderate or higher EIS. Baseline EcoStatus data at the quaternary catchment level was developed for these RQOs.*

Available information for the wetlands of the catchment was sourced during the Status Quo assessment of the WMA (DWA, 2013b), including monitoring reports from the WWF and Mondi Wetlands Programme (Mondi Wetlands Programme, 2011). Detailed data of individual wetlands are however limited, especially in the southwest of the KZN province (Goodman, 2002), but detailed monitoring and Present Ecological State (PES) data of four priority (including the two RAMSAR site) wetlands was available for the WMA.

These baseline data, together with the National Freshwater Ecosystem Priority Areas (NFEPA) guidelines (Driver et al., 2011) and approach for RQO determination (DWA, 2011b) have been used to formulate some of the draft RQOs for wetlands outlined in this report.

DETAILED RQOs FOR HIGH PRIORITY INDIVIDUAL WETLANDS

Of the large wetlands identified in the WMA, four were selected as priorities for the determination of detailed RQOs based on their importance and availability of monitoring and detailed baseline data. These four wetland systems are:

- *The Ntsikeni wetland, a RAMSAR site within -quaternary catchment T51H-04846.*
- *The uMngeni sponge, a RAMSAR site within -quaternary catchment U20A-04253.*
- *The Swamp, a priority KZN Ezemvelo wetland monitoring site located on the Pholela River within sub-quaternary catchment T51E-04478; and*
- *The Mvoti Vlei, a priority KZN Ezemvelo wetland monitoring site located on the Mvoti River within sub-quaternary catchment U40A- 03869.*

These wetlands have baseline EcoStatus and other monitoring data available which enabled detailed, specific numeric RQOs to be determined for these systems.

CATCHMENT LEVEL RQOs FOR WETLANDS

Catchment-level RQOs are set to maintain PES in priority quaternary catchments where estimated average wetland EIS is moderate or higher, and to maintain wetland area in all other catchments. These objectives attempt to address the National Water Resource Strategy (NWRS) (DWA, 2013a) and meet the objectives proposed by the DWS National Wetland Position Paper.

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ACRONYMS AND ABBREVIATIONS

CD: WE	*Chief Directorate: Water Ecosystems*
DWA	*Department Water Affairs (Name change from DWAF applicable after April 2009)*
DWAF	*Department Water Affairs and Forestry*
DWS	*Department Water and Sanitation (Name change from DWA applicable after May 2014)*
EC	*Ecological Category*
EIS	*Ecological Importance and Sensitivity*
EWR	*Ecological Water Requirement*
FEPA	*Freshwater Ecosystem Priority Areas*
IBA	*Important Birding Area*
KZN	*KwaZulu-Natal*
NFEPA	*National Freshwater Ecosystem Priority Areas*
NWRS	*National Water Resource Strategy*
PES	*Present Ecological State*
REC	*Recommended Ecological Category*
RQO	*Resource Quality Objective*
WMA	*Water Management Area*
WWF	*World Wide Fund for Nature*

1 INTRODUCTION

1.1 BACKGROUND

There is an urgency to ensure that water resources in the Mvoti to Umzimkulu Water Management Area (WMA) are able to sustain their level of uses and be maintained at their desired states. The determination of the Water Resource Classes of the significant water resources in Mvoti to Umzimkulu WMA will ensure that the desired condition of the water resources, and conversely, the degree to which they can be utilised, is maintained and adequately managed within the economic, social and ecological goals of the water users (DWA, 2011). The Chief Directorate: Water Ecosystems (CD: WE) of the Department of Water and Sanitation (DWS) initiated a study during 2012 for the provision of professional services to undertake the Comprehensive Reserve, classify all significant water resources and determine the Resource Quality Objectives (RQOs) in the Mvoti to Umzimkulu WMA.

1.2 STUDY AREA

The Mvoti to Umzimkulu WMA encompasses a total catchment area of approximately 27,000 km^2 and occurs largely within KwaZulu-Natal (KZN). A small portion of the Mtamvuna River and the upper and lower segments of the Umzimkulu River straddle the Eastern Cape, close to the Mzimvubu and Keiskamma WMA in the south (DWA, 2011).

The WMA extends from the town of Zinkwazi, in the north to Port Edward and on the south along the KwaZulu-Natal coastline and envelopes the inland towns of Underberg and Greytown up until the Drakensberg escarpment. The WMA spans across the primary catchment "U" and incorporates the secondary drainage areas of T40 (Mtamvuna River in Port Shepstone) and T52 (Umzimkulu River). Ninety quaternary catchments constitute the water management area and the major rivers draining this WMA include the Mvoti, uMngeni, Mkomazi, Umzimkulu and Mtamvuna (DWA, 2011).

Two large river systems, the Umzimkulu and Mkomazi rise in the Drakensberg. Two medium-sized river systems the uMngeni and Mvoti rise in the Natal Midlands and have been largely modified by human activities, mainly intensive agriculture, forestry and urban settlements. Several smaller river systems (e.g. Mzumbe, uMdloti, uThongati, Fafa, and Lovu Rivers) also exist within the WMA (DWAF, 2004). Several parallel rivers arise in the escarpment and discharges into the Indian Ocean and the water courses in the study area display a prominent southeasterly flow direction (DWA, 2011).

The WMA is very rugged and very steep slopes characterise the river valleys in the inland areas for all rivers and moderate slopes are found but comprise only 3% of the area of the WMA (DWAF, 2004).

1.3 INTEGRATED STEPS APPLIED IN THIS STUDY

The integrated steps for the National Water Classification System, the Reserve and RQOs are supplied in Table 1.1.

Table 1.1 Integrated study steps

Step	Description
1	*Delineate the units of analysis and Resource Units, and describe the status quo of the water resource(s) (completed).*
2	*Initiation of stakeholder process and catchment visioning (on-going).*
3	*Quantify the Ecological Water Requirements and changes in non-water quality ecosystem goods, services and attributes*
4	*Identification and evaluation of scenarios within the integrated water resource management process.*
5	*Develop draft Water Resource Classes and test with stakeholders.*
6	**Develop draft RQOs and numerical limits.**
7	*Gazette and implement the class configuration and RQOs.*

*This report forms **part** of the outcomes of Step 6 (red above) within the integrated approach (DWA, 2012). The objective of this task (Task D6.2) was to provide the Resource Quality Objectives of wetlands under Task D6: The development of draft RQOs and numerical limits. The RQOs for all water resources are provided as four report volumes under Report 10 (Table 1.2).*

Table 1.2 The different report volumes which document the Resource Quality Objectives for the various components

Index no	Resource Quality Objectives report volumes Report title
9.1	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 1: Rivers RQOs**
9.2	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 2: Wetland RQOs**
9.3	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 3: Groundwater RQOs**
9.4	*Classification of Water Resources and Determination of the Comprehensive Reserve and Resource Quality Objectives in the Mvoti to Umzimkulu Water Management Area:* **Volume 4: Estuary RQOs**

The purpose of this document is to provide a summary of the narrative and numerical RQOs for the wetlands situated in the Mvoti to Umzimkulu WMA.

1.4 OUTLINE OF REPORT

The report structure is outlined below.

Chapter 1: Introduction
This Chapter provides general background to the project Task.

Chapter 2: Approach
This Chapter outlines the general approach to determining the RQOs for wetlands.

Chapter 3: Wetland RQOs

This chapter outlines the wetland RQOs.

Chapter 4: References

Chapter 5: Appendix A: Report Comments

2 APPROACH

There are many thousands of wetlands of a variety of types in the Mvoti WMA (Nel et al., 2011), but it is unrealistic to try to implement and monitor RQOs for each individual wetland. Following the recommendations of DWA (2012), where data are available, specific RQOs were set for priority wetlands of very high importance. Monitoring data for four priority KwaZulu-Natal wetlands (including two RAMSAR sites) located within the Mvoti WMA were sourced from the Mondi Wetlands Programme, World Wide Fund for Nature (WWF) and Ezemvelo KZN wildlife. For the remaining wetlands, catchment-level RQOs for wetlands have been determined for catchments with a moderate or higher wetland EIS.

Two levels of draft RQOs have thus been determined for the wetlands of the Mvoti to Umzimkulu WMA:

- *RQOs for priority individual wetlands: Developed for very high priority (RAMSAR or Ezemvelo KZN priority wetlands) where existing baseline monitoring data are available; and*
- *Catchment-level RQOs: Applicable to wetlands within catchments with moderate or higher EIS. Baseline EcoStatus data at the quaternary catchment level was developed for these RQOs.*

2.1 BACKGROUND

The National Water Resource Strategy (NWRS) (DWA, 2013a) provides for two key aspects related to the management of wetlands, namely to:

1. *Address proactively, as well as remedially, the loss and degradation of wetlands; and*
2. *maintain healthy, functional ecosystems.*

In addition to the NWRS, the Department of Water Affairs and Sanitation (DWS) National Wetland Position Paper (in prep), a document which outlines the National DWS strategy for managing wetlands, has proposed an objective that there be no net loss of wetland ecosystem functions in South Africa. RQOs are a set of narrative and/or numerical management objectives defined for any particular resource. The draft RQOs for the Mvoti WMA attempt, wherever practicable, to adhere to the objectives for wetlands proposed by these two documents.

2.2 PRIORITY RIVER-LINKED WETLANDS IN THE MVOTI WMA

Volumetric Ecological Water Requirements (EWRs) for wetlands within the Mvoti WMA have not been determined, but input to the identification of hotspots and subsequent selection of river EWR sites in this study was given during the status quo assessment. During that phase of the study, twenty four sub-quaternary catchments which had large Freshwater Ecosystem Priority Areas (FEPA) wetlands that are dependent on the mainstem rivers or large tributaries (Table 2.1) were identified within the Mvoti Water Management Area (DWA, 2013b). The inclusion of large wetlands which are dependent on river flows provided input and motivation for some EWR sites to be located within these catchments, and ultimately for ecological water requirements to be determined for the rivers here.

Table 2.1 Sub-quaternary catchments which have FEPA wetlands with a very high, high or moderate dependence on direct river-flows

Sub Quaternary	Name	IBAs[1] or high priority conservation area	NFEPA[2] wetlands present	River-linked dependence
T51D-04460	Pholelana		Large valley bottom wetlands in headwater area.	VERY HIGH
U40J-03998	Mvoti		Large valley bottom wetlands.	VERY HIGH
U10K-04899	Xobho	Partial IBA.	Many narrow valley bottom wetlands.	VERY HIGH
T51E-04478*	Pholela	Priority KZN Ezemvelo wetland monitoring site ("the Swamp").	Large valley bottom wetlands.	VERY HIGH
T51H-04846	Lubhukwini	RAMSAR site (Ntsikeni wetland and nature reserve) and priority KZN Ezemvelo wetland monitoring site.	Fairly extensive valley bottom (mainstem and tributary) wetlands.	HIGH
U40A- 03869	Mvoti vlei	Priority KZN Ezemvelo monitoring site.	Large wetland complex.	HIGH
U20A-04253	uMngeni sponge	RAMSAR site, Priority KZN Ezemvelo monitoring site.	Pockets of valley bottom and tributary wetlands.	HIGH
T52D-04948	Umzimkulu		Fairly extensive valley bottom (mainstem) wetlands.	HIGH
U10M-04746	uMkhomazi		Small valley bottom pockets and estuary.	HIGH
U20J-04364	Msunduze		Small valley bottom pockets and estuary.	HIGH
U20J-04391	Msunduze		Very narrow valley bottom wetlands.	HIGH
U20J-04461	Slang Spruit		Extensive narrow valley bottom wetlands.	HIGH
U30B-04475	uMdloti		Extensive narrow valley bottom wetlands.	HIGH
U30B-04498	Ohlanga		Some mainstem valley bottom, a few isolated wetlands.	HIGH
U20D-04098	Kusane		Isolated patches and tributary valley bottom wetlands.	MODERATE
U20E-04221	uMngeni		Some tributary, some mainstem, valley bottom wetlands.	MODERATE
U20E-04243	uMngeni		Very small pockets in a narrow valley.	MODERATE
U20G-04259	uMngeni		Few very small wetland pockets	MODERATE
U20J-04401	Msunduze		Some tributary, some mainstem, valley bottom wetlands.	MODERATE
U20J-04452	Mpushini		Very small floodplain pockets.	MODERATE
U20K-04411	Mqeku		Numerous, primarily tributary valley bottom wetlands.	MODERATE
U40E-03985	Mvoti			MODERATE
U60A-04533	uMlaza	IBA	Isolated small wetlands and some valley bottom (narrow) wetlands.	MODERATE
U60C-04556	Sterkspruit		Pockets of valley bottom and tributary wetlands.	MODERATE

1 Important Birding Areas *2 National Freshwater Ecosystem Priority Areas*

** Highlighted cells denote the very high priority wetlands of the WMA for which baseline data are available.*

2.3 AVAILABLE DATA FOR DETERMINING RQOs

Available information for the wetlands of the catchment was sourced during the Status Quo assessment of the WMA (DWA, 2013b), including monitoring reports kindly provided by Dr Stephen Holness and Nikara Mahadeo on behalf of WWF and Damian Walters on behalf of Mondi Wetlands Programme (Mondi Wetlands Programme, 2011). Detailed data of individual wetlands are however limited, especially in the southwest of the KZN province (Goodman, 2002), but detailed monitoring and PES data of four priority (including the two RAMSAR site) wetlands was available for the WMA.

Baseline information for wetlands at the quaternary catchment scale was generated as part of the Status Quo assessment (DWA, 2013b). This included Ecological Importance and Sensitivity (EIS) (Figure 2.1) and, for all catchments with moderate or higher EIS, Present Ecological State (PES) (Figure 2.2). The average importance of wetlands per quaternary catchment was determined using a desktop assessment method. In catchments with limited information on wetlands (i.e. where wetlands are few, small and cryptic), no importance criteria could be determined and a low/marginal importance has been ascribed to these catchments. The average PES of wetlands per quaternary catchment was determined using a desktop assessment method. Average wetland PES could not be determined for catchments where wetland EIS is low to marginal as wetlands here are few, small and cryptic.

These baseline data, together with the National Freshwater Ecosystem Priority Areas (NFEPA) guidelines (Driver et al., 2011) and approach for RQO determination (DWA, 2011b) have been used to formulate some of the draft RQOs for wetlands outlined below.

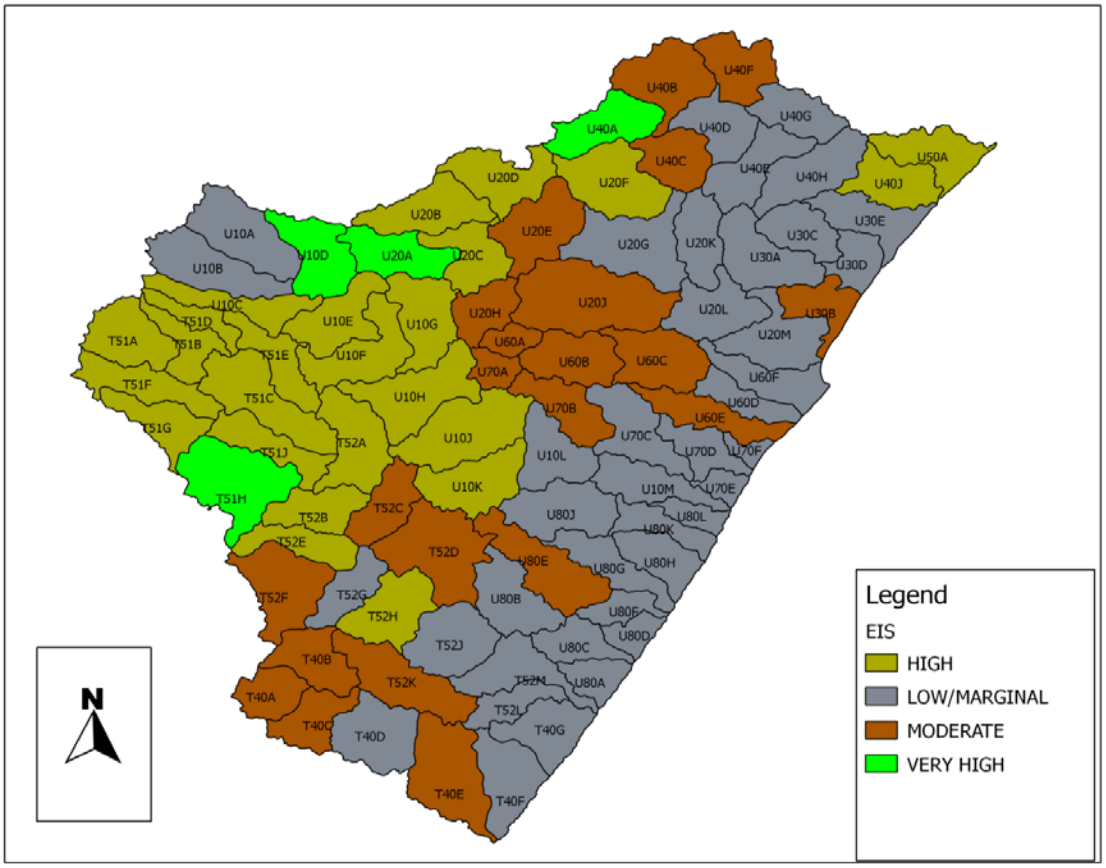

Figure 2.1 Wetland EIS in the Mvoti to Umzimkulu WMA

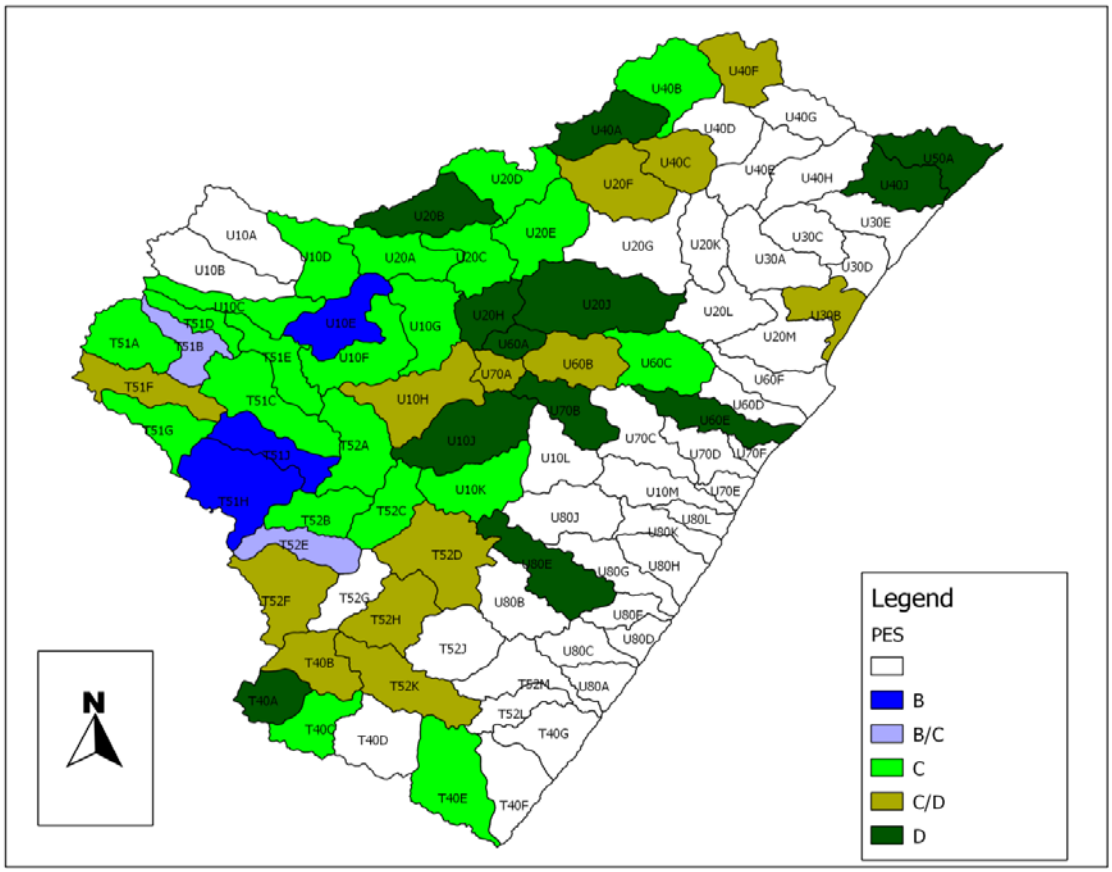

Figure 2.2 Wetland PES in the Mvoti to Umzimkulu WMA

Two types of RQOs have been proposed based on the available baseline data. Detailed RQOs for the four high priority wetlands have been developed from available EcoStatus and monitoring data of these key wetlands, which include the two RAMSAR sites within the WMA. Coarser catchment-level RQOs have been developed for the remaining portions of the catchment which have moderate or higher EIS scores at the quaternary catchment level.

2.4 DETAILED RQOs FOR HIGH PRIORITY INDIVIDUAL WETLANDS

There are many thousands of wetlands within the Mvoti WMA and RQOs cannot be determined individually for all wetlands. Moreover, even for many key wetlands, the development of RQOs for is constrained by available baseline monitoring data. Of the large wetlands identified in the WMA (Table 2.1), four were selected as priorities for the determination of detailed RQOs based on their importance and availability of monitoring and detailed baseline data. These four wetland systems are:

- *The Ntsikeni wetland, a RAMSAR site within -quaternary catchment T51H-04846.*
- *The uMngeni sponge, a RAMSAR site within -quaternary catchment U20A-04253.*
- *The Swamp, a priority KZN Ezemvelo wetland monitoring site located on the Pholela River within sub-quaternary catchment T51E-04478; and*
- *The Mvoti Vlei, a priority KZN Ezemvelo wetland monitoring site located on the Mvoti River within sub-quaternary catchment U40A- 03869.*

These wetlands have baseline EcoStatus and other monitoring data available which enabled detailed, specific numeric RQOs to be determined for these systems.

2.5 CATCHMENT LEVEL RQOs FOR WETLANDS

Quaternary-level EcoStatus data were generated to provide some baseline data for the remaining thousands of wetlands. These desktop data estimated the average EIS of wetlands at the quaternary scale (Figure 2.1) and PES was determined (Figure 2.2) for all quaternary catchments with moderate or higher wetland EIS (DWA, 2013b).

Where the estimated average wetland EIS is marginal to low, most of these catchments are located in the undulating coastal belt where wetlands are likely to be small - confined to narrow valley floors or occurring as small seeps on the short hillslopes (Figure 2.1). Average PES scores were not determined for low to marginal EIS catchments (Figure 2.2) as the wetlands tend to be cryptic, and no verified baseline data regarding the condition of these wetlands are at present available. Catchment-level RQOs are set to maintain PES in priority quaternary catchments where estimated average wetland EIS is moderate or higher, and to maintain wetland area in all other catchments. These objectives attempt to address the NWRS (DWA, 2013a) and meet the objectives proposed by the DWS National Wetland Position Paper.

3 WETLAND RQOs

For quaternary catchments with moderate or higher EIS, the average wetland EIS and PES scores are provided in Table 3.1 and Table 3.2 respectively.

Table 3.1 Average wetland EIS (estimated at the quaternary catchment scale) for quaternary catchments in the Mvoti WMA

Average EIS	Quaternary Catchments
Marginal to low	*U40G, U40D, U40E, U40H, U10A, U20K, U20G, U30E, U30C, U30A, U10B, U30D, U20L, U20M, U60F, U60D, U70C, U10L, U70D, U70F, U10M, U70E, U80J, U80K, U80L, U80G, U80H, U80B, T52G, U80F, T52J, U80D, U80C, T52M, U80A, T52L, T40D, T40G, T40F.*
Moderate	*U40F,U40B, U40C, U20E, U20J, U30B, U20H, U60A, U60C, U60B, U70A, U70B, U60E, T52C, T52D, U80E, T52F, T40B, T52K, T40A, T40C, T40E.*
High	*U50A, U20F, U40J, U20D, U20B, U20C, U10E, U10C, U10G, T51D, U10F, T51B, T51A, T51E, U10H, T51F, T51C, T52A, T51G, U10J, T51J, U10K, T52B, T52E, T52H*
Very High	*U40A, U10D, U20A, T51H*

Table 3.2 Average wetland PES (estimated at the quaternary catchment scale) for quaternary catchments in the Mvoti WMA

Average PES (baseline EC)	Quaternary Catchments
B	*U10E, T51H, T51J,*
B/C	*T51B, T52E,*
C	*T40C, T40E, T51A, T51C, T51D, T51E, T51G, T52A, T52B, T52C, U10K, U10C, U10D, U10F, U10G, U20A, U20E, U20F, U20D, U20C, U40B, U60C*
C/D	*U10H, U30B, U40C, U40F, U60B, U70A, T40B, T51F, T52D, T52H, T52F, T52K*
D	*U10J, U20B, U20H, U20J, U40A, U40J, U50A, U60A, U60E, U70B, U80E, T40A*

3.1 CATCHMENT LEVEL RQOs FOR WETLANDS

Regional RQOs were determined aimed at the quaternary catchment scale of analysis which was undertaken in the baseline assessment (DWA, 2013b) and provided in Table 3.3.

3.2 DETAILED RQOs FOR HIGH PRIORITY INDIVIDUAL WETLANDS

Due to limited available data, RQOs were developed for four of the priority wetlands identified in Table 3.4.

Table 3.3 Catchment level RQOs for wetlands

RU	Applicable wetland/s	Component	Sub-component	RQO		Indicator/measure	Reference/Motivation
				Descriptive	Numerical		
All	*All wetlands within quaternary catchments which have moderate, high or very high EIS*	*Habitat*		*The average PES of the wetlands in a catchment must be maintained.*	*The PES must be within or above the baseline Ecological Category (see Table 3.2).*	*The average PES of the quaternary catchment (see Table 3.2).*	*The NWRS (DWA, 2013a) aims to address the loss of wetlands and to maintain healthy, functional ecosystems.*
All	*All wetlands within the WMA*	*Ecosystem Services*	*Area*	*The ecosystem services of wetlands in a catchment must be maintained.*		*Hectare equivalents (area x PES) is the ideal indicator. The available estimates of average PES of wetlands, multiplied by wetland area, can be taken as a coarse indicator of ecosystem services. This can be assessed at 5 year intervals.*	*The National Wetland Position Paper (in prep), has proposed an objective that there be no net loss of wetland ecosystem*
All RUs with validated level 1 FEPAs	*Validated wetland FEPAs in a good condition (A – B EC)*	*Water Quantity*	*Flow or inundation regime*	*Water quantity (i.e. flow and inundation regime) must maintain wetland FEPAs in good condition.*	*FEPA wetlands have not been verified, and EWRs and PES for all these wetlands have yet to be determined.*	*Flow (water quantity) or inundation regime is sufficient to maintain the current PES.*	*For wetland FEPAs currently in a good condition, changes in flow or inundation regime that will lead to a deterioration in current condition are unacceptable (Driver et al., 2011).*
	Validated wetland FEPAs in a modified condition (C - F EC)					*Flow (water quantity) or inundation regime is sufficient to achieve the REC[2] (or best attainable condition).*	*For wetland FEPAs that are not currently in good condition, changes in flow or inundation regime that will prevent achievement of the best attainable condition through rehabilitation are unacceptable (Driver et al., 2011).*
All RUs with validated level 1 FEPAs	*Validated wetland FEPAs in a good condition (A - B EC)*	*Water Quality*		*Water quality must maintain wetland FEPAs in good condition.*	*FEPA wetlands have not been verified, and water quality EWRs and PES for these wetlands have yet to be determined.*	*Water quality is sufficient to maintain the current PES.*	*For wetland FEPAs currently in a good condition, changes in water quality that will lead to deterioration in current condition are unacceptable (Driver et al., 2011).*
	Validated wetland FEPAs in a modified condition (C - F EC)					*Water quality is sufficient to achieve the REC (or best attainable condition).*	*For wetland FEPAs that are not currently in good condition, changes in water quality that will make rehabilitation of a wetland FEPA difficult or*

RU	Applicable wetland/s	Component	Sub-component	RQO		Indicator/measure	Reference/Motivation
				Descriptive	Numerical		
							impossible are unacceptable (Driver et al., 2011).
All RUs with validated level 1 FEPAs	*Validated wetland FEPAs in a good condition (A - B EC)*	*Habitat and biota*	*Habitat*	*Species diversity and health of biotic communities supported by wetland FEPAs should be maintained. This includes the feeding, breeding and movement of fauna and flora.*	*PES of all the wetlands is unknown. An assessment of the current condition and presence/count of significant biota is required to develop numerical targets. The numerical criteria should equate to the current condition of the wetlands and/or presence (or counts) of key species within them.*	*Habitat condition is sufficient to maintain the current PES.*	*For wetland FEPAs currently in a good condition, loss of habitat availability and/or condition that leads to deterioration in the current condition is unacceptable (Driver et al., 2011).*
	Validated wetland FEPAs in a modified condition (C - F EC)					*Habitat condition is sufficient to achieve the REC (or best attainable condition).*	*For wetlands FEPAs that are not currently in good condition, loss of habitat availability and/or condition that will make rehabilitation of a wetland FEPA difficult or impossible is unacceptable (Driver et al., 2011).*

1 Ecological Category *2 Recommended Ecological Category*

Table 3.4 Detailed RQOs for high priority individual wetlands.

IUA	SQ	Component	Subcomponent	RQO		Indicator/measure	Source of numerical baseline
				Descriptive	Numerical		
The Mvoti vlei (priority KZN Ezemvelo monitoring site)							
MRU Mvoti A	*U40A- 03869*	*Water quantity*	*Water inputs*	*The quantity and timing of inputs, and the distribution and retention patterns within the wetland must be maintained to avoid the loss of wetland hydrological function.*	*Present condition is an E. The numerical criteria should equate to improve the present condition through improved water inundation patterns and flows.*	*Wetland hydrology score. Detailed assessment of wetland hydrology using a PES tool at 3 - 5 years intervals.*	*MacFarlane et al., 2012.*
		Habitat	*Geomorphology*	*The wetland geomorphology must be maintained to ensure that the ecosystem structure and function are maintained.*	*Present condition is an A. The numerical criteria should equate to the same EC.*	*Wetland geomorphology score. Geomorphology module of a wetland PES tool at 3 - 5 year intervals.*	
		Habitat	*General vegetation*	*The wetland vegetation must be maintained to ensure that the ecosystem structure and function are maintained.*	*Present condition is a D. The numerical criteria should equate to the same or greater EC.*	*Wetland vegetation score: assessment of vegetation using a wetland PES tool at 3 - 5 year intervals.*	
		Habitat	*PES overall*	*The overall wetland PES must be maintained.*	*Present condition is a D. The numerical criteria should equate to the same or greater EC.*	*Wetland PES assessment tool at 3 - 5 year intervals.*	
		Biota	*Wattled cranes*	*Water quantity, vegetation and landuse practices must be maintained at levels that do not cause the population of wattled cranes to decline.*	*Presence of at least six breeding pairs of wattled crane (baseline of 2014).*	*The number of breeding pairs of wattled crane.*	*The number of breeding pairs of wattled crane has increased from none known in 1998 to six pairs in 2014 (www.birdlife.org.za).*
		Water quality	*Detailed data of water quality indicators for this wetland are not available and no detailed RQOs related to water quality have been determined.*				
The Swamp (priority KZN Ezemvelo wetland monitoring site)							
RU Mz4	*T51E-04478*	*Water availability*	*Water inputs*	*The quantity and timing of inputs, and the distribution and retention patterns within the wetland must be maintained to avoid the loss of wetland hydrological function.*	*Present condition is a D. The numerical criteria should equate to the same or greater EC.*	*Wetland hydrology score. Detailed assessment of wetland hydrology using a PES tool at 3 - 5 years intervals.*	*MacFarlane et al., 2012.*
		Habitat	*Geomorphology*	*The wetland geomorphology must be maintained to ensure that the ecosystem structure*	*Present condition is a C. The numerical criteria should equate to the same*	*Wetland geomorphology score. Geomorphology module of a wetland PES tool at 3-5 year*	

IUA	SQ	Component	Subcomponent	RQO		Indicator/measure	Source of numerical baseline
				Descriptive	Numerical		
				and function are maintained.	*or greater EC.*	*intervals.*	
		Habitat	*General vegetation*	*The wetland vegetation must be maintained to ensure that the ecosystem structure and function are maintained.*	*Present condition is a C. The numerical criteria should equate to the same or greater EC.*	*Wetland vegetation score: assessment of vegetation using a wetland PES tool at 3 -5 year intervals.*	
		Habitat	*Cyperus marginatus vegetation*	*The extent and availability of C. marginatus will be maintained.*	*Current areas is not known, but should not reduce more than 20% below baseline..*	*Area of vegetation type at 3 - 5 year intervals*	*C. marginatus growing in the wetland-used as a fibre source for weaving a variety of traditional and new products (KZN Provincial Planning Commission, 2011).*
		Habitat	*PES overall*	*The overall wetland PES must be maintained.*	*Present condition is a C. The numerical criteria should equate to the same or greater EC.*	*Wetland PES assessment tool at 3 - 5 year intervals.*	*MacFarlane et al., 2012.*
		Biota	*Except for the important C. marginatus, no species specific RQOs have been set for this wetland.*				
		Water quality	*Detailed data of water quality indicators for this wetland are not available and no detailed RQOs related to water quality have been determined.*				
Ntsikeni wetland (a Ramsar wetland)							
Ru Mz8	*T51H-04846*	*Water availability*	*Hydrology*	*The quantity and timing of inputs, and the distribution and retention patterns within the wetland must be maintained to avoid the loss of wetland hydrological function.*	*Present condition is an A. The numerical criteria should equate to maintain the present condition.*	*Wetland hydrology score. Detailed assessment of wetland hydrology using a PES tool at 3 - 5 years intervals.*	*MacFarlane et al., 2012.*
		Habitat	*Geomorphology*	*The wetland geomorphology must be maintained to ensure that the ecosystem structure and function are maintained.*	*Present condition is an A. The numerical criteria should equate to maintain the present EC.*	*Wetland geomorphology score. Geomorphology module of a wetland PES tool at 3 - 5 year intervals.*	
		Habitat	*General vegetation*	*The wetland vegetation must be maintained to ensure that the ecosystem structure and function are maintained.*	*Present condition is a B. The numerical criteria should equate to the same or greater B.*	*Wetland vegetation score: assessment of vegetation using a wetland PES tool at 3 - 5 year intervals.*	
		Habitat	*PES overall*	*The overall wetland PES must be maintained.*	*Present condition is an A. The numerical criteria should equate to maintain the EC.*	*Wetland PES assessment tool at 3 - 5 year intervals.*	

IUA	SQ	Component	Subcomponent	RQO		Indicator/measure	Source of numerical baseline
				Descriptive	Numerical		
		Biota	*Wattled cranes*	*Water quantity, vegetation and landuse practices must be maintained at levels that do not cause the population of wattled cranes to decline.*	*Presence of at least three breeding pairs of wattled crane and breeding success (baseline of 2014).*	*The number of breeding pairs of wattled crane.*	*The wetlands are an important breeding site for a number of highly sought after species (Africa: Birds and Birding, 2006).*
		Biota	*European Bittern*	*Water quantity, vegetation and landuse practices must be maintained at levels that do not cause the population of European Bitterns to decline.*		*Annual presence of European Bitterns (sighted or indicated from call).*	
		Water quality	*Detailed data of water quality indicators for this wetland are not available and no detailed RQOs related to water quality have been determined.*				
Mgeni sponge (Ramsar site)							
MRU uMnA	*U20A-04253*	*Water availability*	*Hydrology*	*The quantity and timing of inputs, and the distribution and retention patterns within the wetland must be maintained to avoid the loss of wetland hydrological function.*	*Present condition is a C. The numerical criteria should equate to maintain or improve the present condition.*	*Wetland hydrology score. Detailed assessment of wetland hydrology using a PES tool at 3 - 5 years intervals.*	*MacFarlane et al., 2012.*
		Habitat	*Geomorphology*	*The wetland geomorphology must be maintained to ensure that the ecosystem structure and function are maintained.*	*Present condition is an A. The numerical criteria should equate to the same EC.*	*Wetland geomorphology score. Geomorphology module of a wetland PES tool at 3 - 5 year intervals.*	
		Habitat	*General vegetation*	*The wetland vegetation must be maintained to ensure that the ecosystem structure and function are maintained.*	*Present condition is a C. The numerical criteria should equate to the same or greater EC..*	*Wetland vegetation score: assessment of vegetation using a wetland PES tool at 3 - 5 year intervals*	
		Habitat	*PES overall*	*The overall wetland PES must be maintained.*	*Present condition is a C. The numerical criteria should equate to the same or greater EC.*	*Wetland PES assessment tool at 3 - 5 year intervals.*	
		Biota	*Wattled cranes*	*Water quantity, vegetation and landuse practices must be maintained at levels that do not cause the population of wattled cranes to decline.*	*Presence of at least 5 breeding pairs of wattled crane and breeding success.*	*The number of breeding pairs of wattled crane.*	*Although up to 10 pairs of wattled cranes can nest in the Mgeni Vlei reserve, typically only 5 to 6 pairs usually nest here[1].*

1 http://www.birdlife.org.za/support-us/leave-a-legacy/item/216-sa075-umgeni-vlei-nature-reserve

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5 APPENDIX A: REPORT COMMENTS

Page / Section	Comments	Changes made?	Author comment
Comments from Ms. Mmaphefo Thwala: 5 May 2015			
	Include a cover page.	*Yes*	
Section 1	*Sentence incomplete, initial parts missing.*	*Yes*	*The omission has been corrected.*
	What did this task entail?	*Yes*	*The description of the task and sub-task has been included in the text.*
RQO tables	*Provide a table summarising the numbers in terms of Habitat and biota characteristics that should be maintained to satisfy these baseline ECs. In other words this RQO should indicate what the characteristics are of a wetland with a B EC in terms of habitat i.e. the minimum number of certain species.*	*Yes*	*Reference to the average PES (baseline EC) scores have now been provided in the RQO table.* *These scores relate to average condition of all wetlands across a catchment, as determined at the desktop level. Detailed site-specific habitat and biota characteristics are only available for select high priority wetlands where existing monitoring data are available (as provided in Table 3.4 of this report: RQOs for high priority individual wetlands).* *For the vast majority of wetlands in the WMA however, neither the DWS nor any other organisation has the detailed baseline information relating to species numbers per wetland that is being requested by this reviewer. Such data do not exist and an extensive, prohibitively expensive monitoring programme would be necessary to generate such information. It should be noted that the second reviewer has passionately highlighted the dearth of current information and highlighted the need to update RQOs when additional research and information becomes available.*
	Biota and Water Quality RQOs? Where not available indicate in the text and state the reasons.	*Yes*	*Rows for Biota and Water Quality are now reflected for all priority wetlands. Where data are not available, and therefore no RQOs could be set for these components, this is reflected in the RQO table.*
	How?	*Yes*	*The RQO states that the wetland hydrology score (currently in an E EC) should be improved. This has been expanded to include improving "the present condition through improved water inundation patterns and flows."*
	Same comment as above, what does this A entail for Habitat? *This comment applies to all the numerical RQOs.*	*Yes*	*For physical habitat of this wetland, an A condition score for this wetland (MacFarlane et al., 2012) implies that the physical habitat (morphology) of the wetland is near pristine. The PES scores of key components (hydrology, vegetation and geomorphology) are listed in the numerical RQO tables. The detailed scores and measurements used to derive these scores are available in the cited baseline monitoring data sources.*
Comment from UKZN, reviewer - Dr Sabine Stuart-Hill: 25 May 2015			
	This report clearly shows how little knowledge we actually have on our wetlands. In the current status of poor management they play a		*We agree with the important role that wetlands can play in many catchments and this is the reason that the National Water Act, and the DWS as implementer of that Act, aims to ensure sustainable utilisation of water resources, including wetlands. We also agree that*

Page / Section	Comments	Changes made?	Author comment
	significant role in rehabilitation/buffering of the massive abuse done on all levels of our catchments. This includes quantity, but especially quality aspects!		*available knowledge is very limited. The RQOs developed in this study have had to be developed using the limited available data, together with desktop assessments of wetlands across the entire study area which were used to further increase our baseline knowledge of the WMA. The RQOs determined in this study set out to maintain (or improve where necessary) the condition of high priority significant wetlands, and to ensure the maintenance of the average condition of wetlands in key catchments in an effort to ensure sustainable function and ecosystem condition.*
	The RQOs we set need not only to maintain what we have (this is the utter minimum), but need to ensure the improvement of these key wetlands!		*The RQOs which have been proposed are aimed at achieving exactly these aims. Generically, the RQOs aim to at least maintain the current condition of most wetlands (aiming to achieve maintenance of average conditions); whilst for a few select priority wetlands where sufficient baseline data are available, to have more conditions for the continued maintenance and/or improvement of specific biotic, hydrology and/or vegetation aspects of these high priority wetlands.*
	It has to be noted here that the majority of small wetlands in all these catchment are not even listed, and many of them functioning as significant 'improvers' in our catchments (e.g. Lions river).		*It is widely acknowledged that even the best available information regarding wetland extent does not accurately reflect the true presence, number or extent of wetlands in the country. To account for the limitations in available data, RQOs have been set for key catchments (and are applicable to all wetlands within that catchment) to ensure adequate protection measures are in place, irrespective of whether the wetlands are identified on the available national or regional wetland maps, or only become acknowledged through site-based EIA or Water Use Licence applications at a later date.*
	Also lots of research in the definition of wetlands and their functioning are currently undertaken. This work shows how we easily oversee and miss out on crucial areas based on the past abuse and draining of such wetlands. Our current definition is by far too narrow.		*We adhere to the National Water Act's definition of a wetland. I believe that it is the available information of wetland presence and extent, rather than the legal definition, which is the key limitation to more effective wetland monitoring and management. The RQOs have been developed based on the limited available information, and structured in such a way so as to remain applicable as new improved information becomes available.*
	Thus, there is an urgent need to specifically review this section of the RQO process within the next 5 to 10 years – then the very latest!		