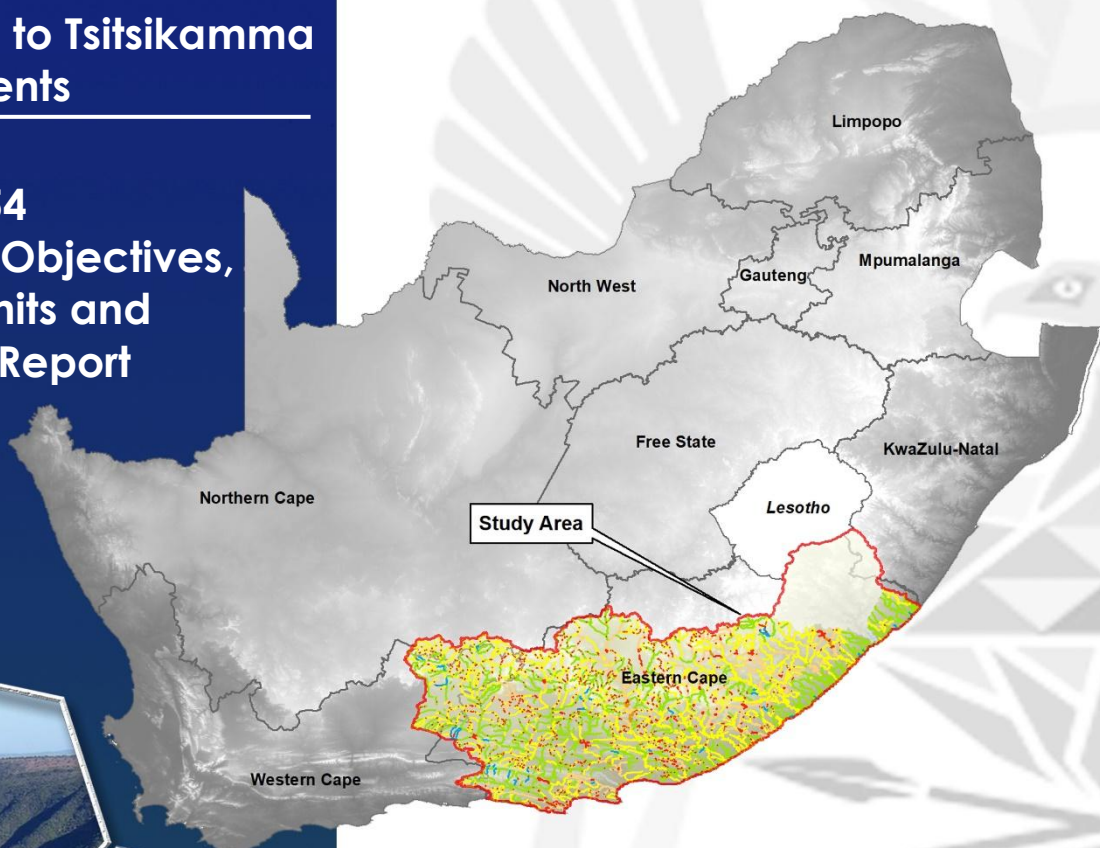


DEPARTMENT OF WATER AND SANITATION

Determination of Water Resource Classes, Reserve and the Resource Quality Objectives in the Keiskamma and Fish to Tsitsikamma Catchments

WP11354 Resource Quality Objectives, Numerical Limits and Confidence Report



REPORT NO.:
WEM/WMA7/00/CON/RDM/2825

January 2026



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Published by

Department of Water and Sanitation
Private Bag X313
Pretoria, 0001
Republic of South Africa

Tel: (012) 336 7500/ +27 12 336 7500
Fax: (012) 336 6731/ +27 12 336 6731

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This report is to be cited as:

Department of Water and Sanitation, South Africa. January 2026. Determination of Water Resource Classes, Reserve and RQOs in the Keiskamma and Fish to Tsitsikamma catchment: Resource Quality Objectives, Numerical Limits and Confidence Report No: WEM/WMA7/00/CON/RDM/2825.

Prepared by:

GroundTruth



Title: *Resource Quality Objectives, Numerical Limits and Confidence Report*

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Project Name: *Determination of Water Resource Classes, Reserve and RQOs in the Keiskamma and Fish to Tsitsikamma catchment: WP11354*

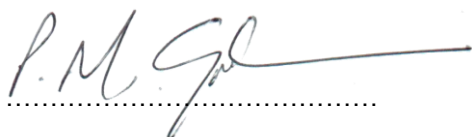
DWS Report No.: WEM/WMA7/00/CON/RDM/2825

Status of Report *Final*

First Issue: *18 November 2025*

Final Issue: *23 January 2026*

Approved for GroundTruth: Environment and Engineering



27 February 2025

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Project Manager



Scientific Manager

Approved for the Department of Water and Sanitation by:



Lebogang Betty Matlala

Director: Water Resource Classification

Date: 7 March 2025

DOCUMENT INDEX

Reports as part of this project:

Bold type indicates this report

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3.0	WEM/WMA7/00/CON/RDM/0322	Status quo and delineation of Integrated Units of Analysis Report
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25.0	WEM/WMA7/00/CON/RDM/2525	Final Socio-economic Report
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27.0	WEM/WMA7/00/CON/RDM/2725	Water Resources Classes Report
28.0	WEM/WMA7/00/CON/RDM/2825	Resource Quality Objectives, Numerical Limits and Confidence Report

LIST OF ACRONYMS

ASPT	Average Score Per Taxon
BHN	Basic Human Needs
CMA	Catchment Management Agencies
CD: WEM	Chief Directorate: Water Ecosystems Management
COC	Compounds of Concern
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EC	Ecological Category
EC	Electrical Conductivity
EWR	Ecological Water Requirements
FRAI	Fish Response Assessment Index
GAI	Geomorphological Driver Assessment Index
GW_RU	Groundwater Resource Unit
IHI	Instream Habitat Integrity
IUA	Integrated Unit of Analysis
IWRM	Integrated Water Resource Management
MCB	Macro Channel Bank
MIRAI	Macroinvertebrate Response Assessment Index
NWA	National Water Act
PES	Present Ecological State
PSC	Project Steering Committee
RHAM	Rapid Habitat Assessment Method
RDM	Resource Directed Measures
REC	Recommended Ecological Category
REMP	River Eco-status Monitoring Programme
RQO	Resource Quality Objectives
RU	Resource Unit
SASS5	South African Scoring System Version 5
SPI	Specific Pollution Index
SSD	Species Sensitivity Distribution
SQ	Sub-quaternary
TEC	Target Ecological Category
TIN	Total Inorganic Nitrogen
TPC	Threshold for Potential Concern
TSS	Total Suspended Solids

TTG	Technical Task Group
TWQR	Target Water Quality Resource
WQGDSS	Water Quality Guidelines Decision Support System
WMA	Water Management Area
WRU	Wetland Resource Unit
WRYM	Water Resource Yield Models
WRCS	Water Resource Classification System

EXECUTIVE SUMMARY

Background

This phase forms part of the following study: Determination of Water Resource Classes, Reserve and the Resource Quality Objectives in the Keiskamma and Fish to Tsitsikamma Catchments. The purpose of this study is to determine appropriate Water Resource Classes, the Reserve and associated Resource Quality Objectives (RQOs) for all significant water resources in the study area to facilitate sustainable use of the water resources while maintaining ecological integrity. The aim is to implement the Water Resource Classification System (WRCS) (as per Regulation 810, 2010) to determine the Water Resource Classes, following the integrated framework (DWS, 2017), undertake the 7-step process to determine and set RQOs, and determine the Reserve for the water resources of the study area. This will ultimately assist the DWS in the management of the water resources in the study area and making informed decisions regarding the authorisation of future water use and the magnitude of the impacts of proposed developments.

Study Area

The study area consists of the water resources of the Keiskamma, Fish to Tsitsikamma catchments and include large drainage areas as well as some smaller coastal systems, including:

- Mbashe River (part of drainage region T which includes T11, T12 and T13),
- Great Kei River (drainage region S),
- Great Fish (drainage region Q),
- Sundays (drainage region N),
- Gamtoos River (drainage region L),
- Mthatha River (drainage region T20),
- Small coastal rivers in the Pondoland area (drainage regions T60 to T90),
- Keiskamma, Buffalo, Nahoon and Gqunube Rivers (drainage region R),
- Kowie, Kariega and Boesmans Rivers (drainage region P),
- Koega and Swartkops Rivers (drainage region M),
- Krom and Seekoei Rivers (drainage region K90), and
- Tsitsikamma and small coastal rivers (drainage region K80).

Where we are in the study

The study's first step involved identifying 19 Integrated Units of Analysis (IUAs) and prioritised Resource Units (RUs) for rivers, dams, estuaries, groundwater, and wetlands. The EWR quantification phase for rivers and estuaries has been completed, and various water resource scenarios have been defined and evaluated for each IUA, including assessments of the ecological and socio-economic consequences of each scenario. Additionally, each IUA has been classified, with the study area primarily dominated by Class III, except for two IUAs classified as Class II and one as Class I. This report presents the determined RQOs for all prioritised RUs across significant water resources.

Purpose of this Report

Resource Quality Objectives (RQOs) are protection-based measures that make up Resource Directed Measures (RDM), the protection principles contained in Chapter 3 of the National Water Act (Act No. 36 of 1998). Classification of significant water resources and determination of the Reserve are intended to ensure comprehensive protection of all water resources. An important consideration in the determination of RDM is that they should be technically sound, scientifically credible, practical, and affordable. As the water resources class and the Reserve have been completed for this study, RQOs have now been established to give effect to the determined water resources classes and are defined by the National Water Act as “clear goals relating to the quality of the relevant water resources” (DWAF, 2006).

Resource Quality Objectives

The RQOs are descriptive or quantitative goals defined to protect the water resource and align with the catchment vision and the resource class. It is important to recognise that different water resources require different levels of protection.

The determination of the RQOs have considered the requirements of meeting the Water Resource Class, the desired protection level, current and future water use and the needs of water users. The RQO process has also taken account of land-based activities and considered anticipated potential impacts that these activities may have on water resources within the WMA. The study has been primarily of a technical nature being guided by stakeholder and specialists’ involvement.

Through this study, various RU for the water resources in the Keiskamma, Fish to Tsitsikamma catchment areas have been delineated and prioritised. Following on from RU prioritisation, as part of Step four of the RQO development process, selection of components and the identification of sub-components and indicators were finalised. The selected sub-components and indicators prioritised per RU form the basis for development of RQOs and associated numerical limits, which formed part of Step five of the RQO development process. Throughout this process, a key component of this process has been stakeholder consultation.

The final step will be for the draft RQOs proposed, to be taken through various stakeholder consultation processes to obtain comments, guidance, and inputs

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1. INTRODUCTION

1.1 Background

The National Water Act, 1998 (No. 36 of 1998) (NWA) is founded on the principle that National Government has overall responsibility for and authority over water resource management for the benefit of the public without affecting the functioning of water resource systems. To achieve this objective, Chapter 3 of the NWA provides for the protection of water resources through the implementation of Resource Directed Measures (RDM). These measures are protection-based and include Water Resource Classification, determination of the Reserve and setting the associated Resource Quality Objectives (RQOs). These measures collectively aim to ensure that a balance is reached between the need to protect and sustain water resources, while allowing socio-economic development.

The provision of water required for the maintenance of the natural functionality of the ecosystem and provision of Basic Human Needs (BHN) is the only right to water in the National Water Act (No. 36 of 1998) (NWA). The other water users from a strategic use who are second in line to other water users are subject to formal gazetted General Authorization and water use authorisation as per Section 21 of the NWA.

The Department of Water and Sanitation, through the Chief Directorate: Water Ecosystems Management (CD: WEM), has initiated a study for the determination of Water Resource Classes, Reserve and associated Resource Quality Objectives for the identified significant water resources in the Keiskamma and Fish to Tsitsikamma catchments. The water resource components included for this study are rivers, dams, estuaries, wetlands and groundwater. The Reserve determination include both the water quantity and quality of the Ecological Water Requirements (EWR) and Basic Human Needs (BHN). This will ensure the availability of water required to protect aquatic systems (i.e. the EWR) and that the essential needs of individuals that are directly dependent on these water resources (i.e. BHN) are met.

1.2 Purpose of this study

The Keiskamma and Fish to Tsitsikamma catchments within the Mzimvubu to Tsitsikamma Water Management Area 7 (WMA 7) are amongst many waters stressed catchments in South Africa. These areas are important for conservation and have recognisable protected areas, natural heritage, cultural and historical sites that require protection. However, water use from surface as well as groundwater for agricultural and domestic purposes are high, especially in the more arid catchments, impacting on the availability of water resources for the protection of the aquatic ecosystems. Industrial practices and domestic water use are on the rise in some of these catchments, especially around the major towns and cities. Water transfers into the study area from adjacent WMAs and within the study area and numerous storage dams changes the natural flow patterns, impacting on the aquatic biota.

Thus, the main purpose of the study is to determine, appropriate Water Resource Classes, the Reserve and set associated RQOs for all significant water resources in the study area to facilitate sustainable use of the water resources while maintaining ecological integrity.

The aim is to:

- implement the Water Resource Classification System (WRCS) (Regulation 810, 2010) to determine the Water Resource Classes (classes ranging from 1 – 3);
- follow the integrated framework (DWS, 2017);
- undertake the 7-step process to determine and set RQOs; and
- determine the Reserve for the significant water resources in the study area.

This will ultimately assist the DWS in the management of the water resources in the study area and aid in the making of informed decisions regarding the authorisation of future water use and the magnitude of the impacts of proposed developments. It must be noted that the protection and management of water resources should be done in an integrated manner, hence from source to sea. This illustrates the importance of realising that IWRM requires the co-operation and buy-in of stakeholders in the catchment and hence the forming of partnerships is essential i.e. water forums, catchment management agencies (CMA), Integrated Development Management Plans, Estuarine Management plans etc. The Integrated Water Resources Management (IWRM) also relies heavily on co-operative governance. Representative participation on the platforms that the Department creates through studies such as this, is in the form of Project Steering Committees, but the latter is but one example, of inviting integrated participation.

1.3 Purpose of this report

Building on the prioritised components and sub-components for rivers, dams, estuaries, groundwater, and wetlands, this report presents the proposed draft RQOs and numerical limits for priority Resource Units (RUs) within the Keiskamma and Fish-to-Tsitsikamma catchment areas.

RQOs, primarily narrative statements, occasionally incorporate broad quantitative descriptions of the water resource. These RQOs are aligned with the components, sub-components, and selected indicators of each priority RU within the catchment area and have been established for rivers, dams, wetlands, estuaries and groundwater. To operationalise the RQOs, numerical limits have been developed where applicable. These limits translate narrative objectives into measurable values that can be monitored and assessed for compliance. The report also includes supporting information detailing the approach, context, and rationale underlying the proposed RQOs and their corresponding numerical limits.

This report is organised into dedicated chapters for each water resource type—rivers, dams, estuaries, groundwater, and wetlands. This structure ensures clarity and facilitates ease of use, allowing readers to focus on specific water resources within each IUA, if applicable.

1.4 Overall approach to the RQO process

This report forms part of step 6 of the integrated steps for Classification, Reserve and RQOs which is guided by the “Development of Procedures to operationalise Resource Directed Measures (DWS, 2017).

In addition, the DWS procedure for determining RQOs, as adapted from DWA (2011), outlines a structured, stakeholder-driven process to safeguard water resources across various ecosystems—rivers, dams, wetlands, estuaries, and groundwater. The process began with delineating the Integrated Units of Analysis (IUAs) (further detailed in **Chapter 3**) and Resource Units (RUs) (**Chapter 5** and **Chapter 6**), followed by establishing a catchment vision informed by ecological classification outcomes (**Chapter 4**). Priority RUs were then selected through retrieved data, expert input, stakeholder engagement and using the RU evaluation tool. The next step involved refining sub-components (quantity, quality, habitat, biota), selecting indicators, and defining the desired direction of change through specialist workshops.

Draft RQOs and numerical limits were subsequently developed and shared during Technical Task Group (TTG) and Project Steering Committee (PSC) meetings to gain consensus. Once agreed upon, the finalised RQOs, RUs, and associated limits will be gazetted in the National Gazette, becoming legally binding on all institutions and authorities, ensuring protection and sustainable management of the water resources within the Keiskamma, Fish to Tsitsikamma catchment areas. These steps are illustrated graphically in the adjacent **Figure 1-1**.

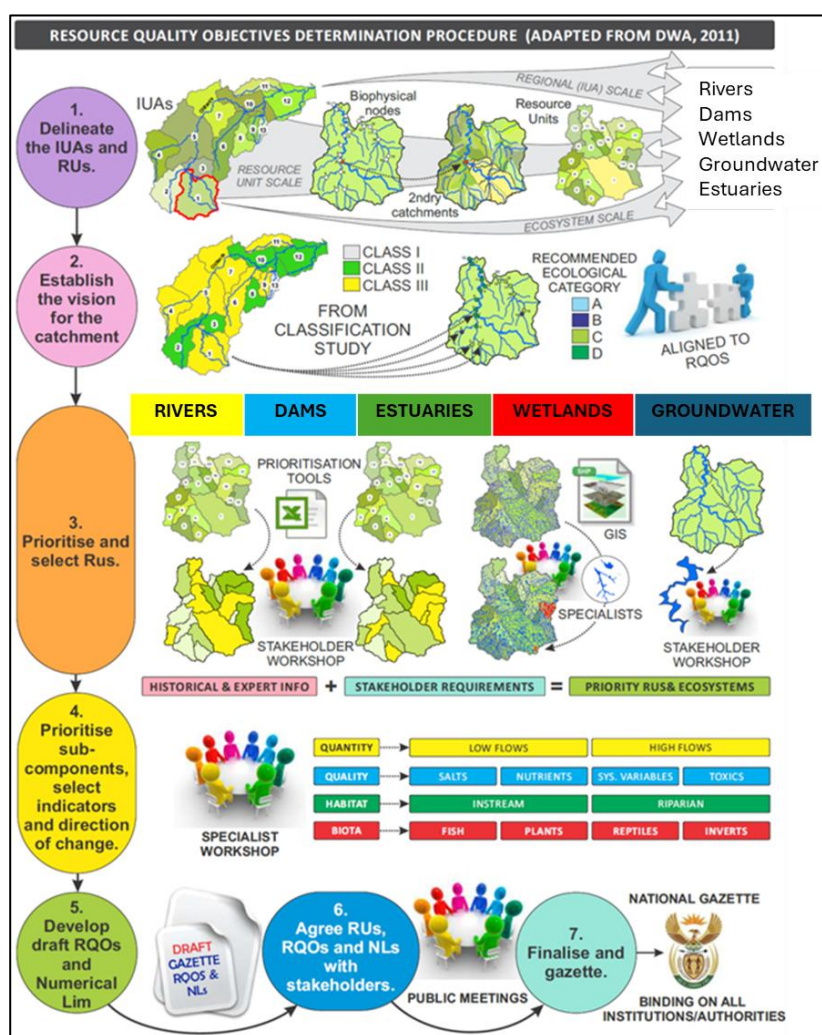


Figure 1-1: Resource quality objective determination procedure (adapted from DWA, 2011)

2. OVERVIEW OF STUDY AREA

The study area forms part of the Mzimvubu to Tsitsikamma WMA7 as indicated in **Table 2-1**, **Figure 2-1** to **Figure 2-3**. The water resources of the Mzimvubu catchment (T31 – T36) are not included as part of the study as those water resources have been classified and gazetted in 2017. Secondary catchments T40 (Mtamvuna) and T50 (Mzimkhulu) form part of the Pongola_Mtamvuna Water Management Area (WMA4). A detailed overview and status quo of the study area in terms of the rivers, wetlands, estuaries and groundwater, water resource infrastructure and socio-economics has been presented in the delineation of IUAs Report (Report Number: WEM/WMA7/00/CON/RDM/0322).

Table 2-1: Main catchments and rivers in the study area

Primary catchment	Sub-catchment	Main River	Associated Rivers	Main Estuaries	Catchment Area ⁽¹⁾ (km ²)
K	K80A-F	Tsitsikamma	Elandsbos, Kleinbos, Storms, Elands, Groot, Klasies, Klipdrift	Tsitsikamma, Elandsbos, Storms, Elands, Groot	1 206
	K90A-G	Krom	Seekoei, Kabeljous	Krom, Seekoei, Kabeljous	1 558
L	L11, L12, L21, L22, L23, L30, L40, L50, L60, L70, L81, L82, L90	Gamtoos	Sout, Buffels, Kariga, Plessis, Heuningklip, Groot, Baviaanskloof, Kouga	Gamtoos, Buffels, Groot	34 816
M	M10, M ² 0, M30	Swartkops	Van Stadens, Maitland, Bakens, Papkuils, Coega	Swartkops, Van Stadens, Maitland, Coega	2 630
N	N11, N12, N13, N14, N21, N22, N23, N24, N30, N40	Sundays	Kamdeboo, Gats, Melk, Bul, Voel, Kariega	Sundays	21 248
P	P10, P20, P30, P40	Boesmans	Diepkloof, Boknes, Kariega, Kowie, Kasouga, Riet, Wes-Kleinemonde, Oos-Kleinemonde	Boesmans, Boknes, Kariega, Kowie, Kasouga, Riet, Wes-Kleinemonde, Oos-Kleinemonde	5 322
Q	Q11, Q12, Q13, Q14, Q21, Q22, Q30, Q41, Q42, Q43, Q44, Q50, Q60, Q70, Q80, Q91, Q92, Q93, Q94	Great Fish	Groot-Brak, Pauls, Tarka, Baviaans, Koonap, Little Fish, Kat	Great Fish	30 243
R	R10, R20, R30, R40, R50	Keiskamma	Tyume, Buffalo, Nahoon, Qinira, Gqunube, Kwelera, Kwenxura, Quko, Tyolomnqa, Gxulu, Bhirha, Mgwalana	Keiskamma, Buffalo, Nahoon, Qinira, Gqunube, Kwelera, Kwenxura, Quko, Tyolomnqa, Gxulu, Bhirha, Mgwalana	7 936

Primary catchment	Sub-catchment	Main River	Associated Rivers	Main Estuaries	Catchment Area ⁽¹⁾ (km ²)
S	S10, S20, S31, S32, S40, S50, S60, S70	Great Kei	White-Kei, Indwe, Klipplaat, Klaas Smit, Black-Kei, Tsomo, Kubusi, Gcuwa	Great Kei	20 485
T	T11, T12, T13, T20, T60, T70, T80, T90	Mbashe, Mthatha	Xuka, Mgwali, Mthatha, Mzamba, Mtentu, Msikaba, Mzintlava, Mntafufu, Mngazi, Mngazana, Mtakatye, Mdumbi, Nenga, Mncwasa, Xora, Nqabarha, Shixini, Qhorha, Kobonqaba	Mbashe, Mgwali, Mthatha, Mzamba, Mtentu, Msikaba, Mzintlava, Mntafufu, Mngazi, Mngazana, Mtakatye, Mdumbi, Nenga, Mncwasa, Xora, Nqabarha, Shixini, Qhorha, Kobonqaba	17 938
			Total catchment area		143 382

¹WR2012 Data

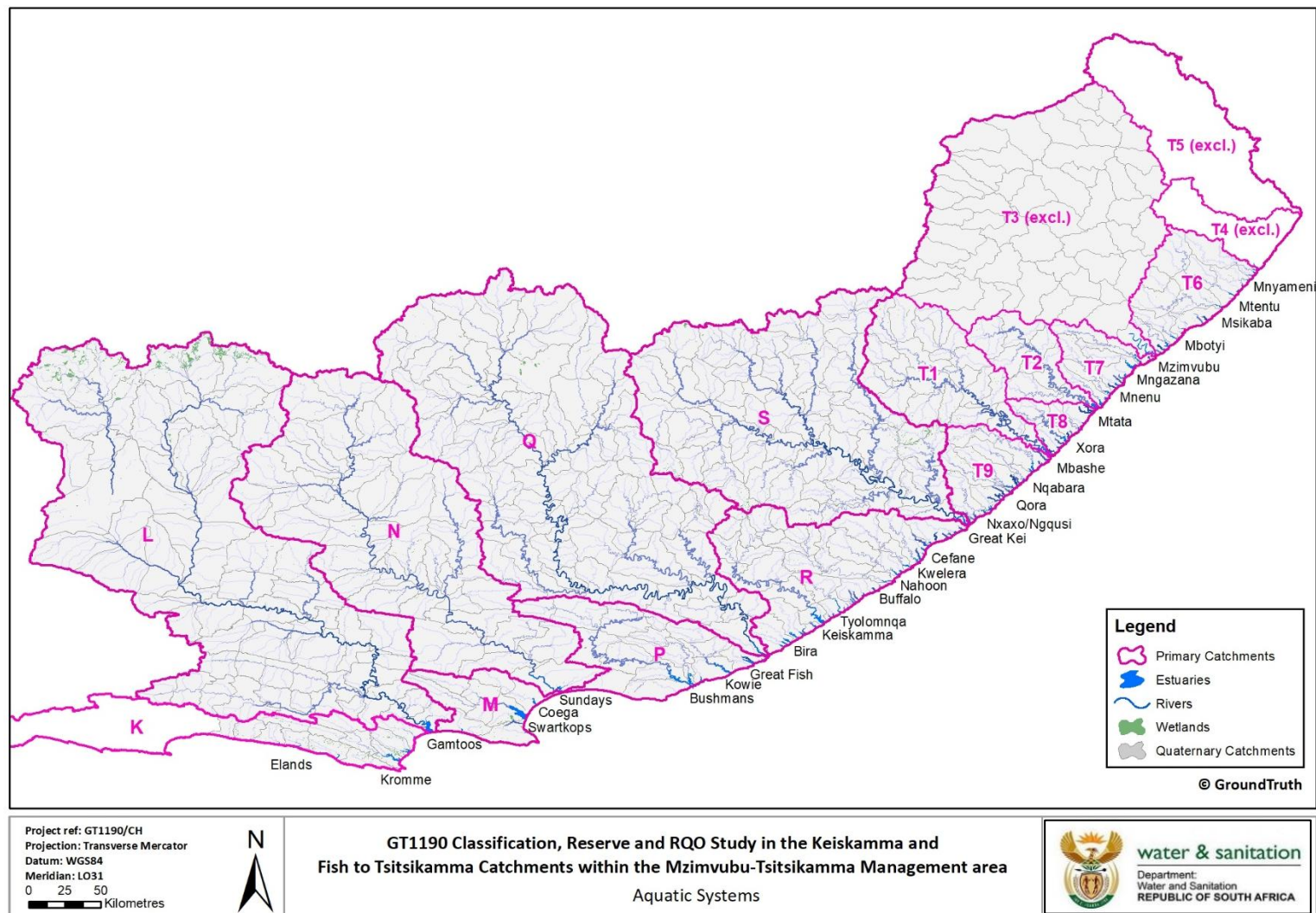


Figure 2-1: Map illustrating the study area for the Keiskamma, Fish to Tsitsikamma

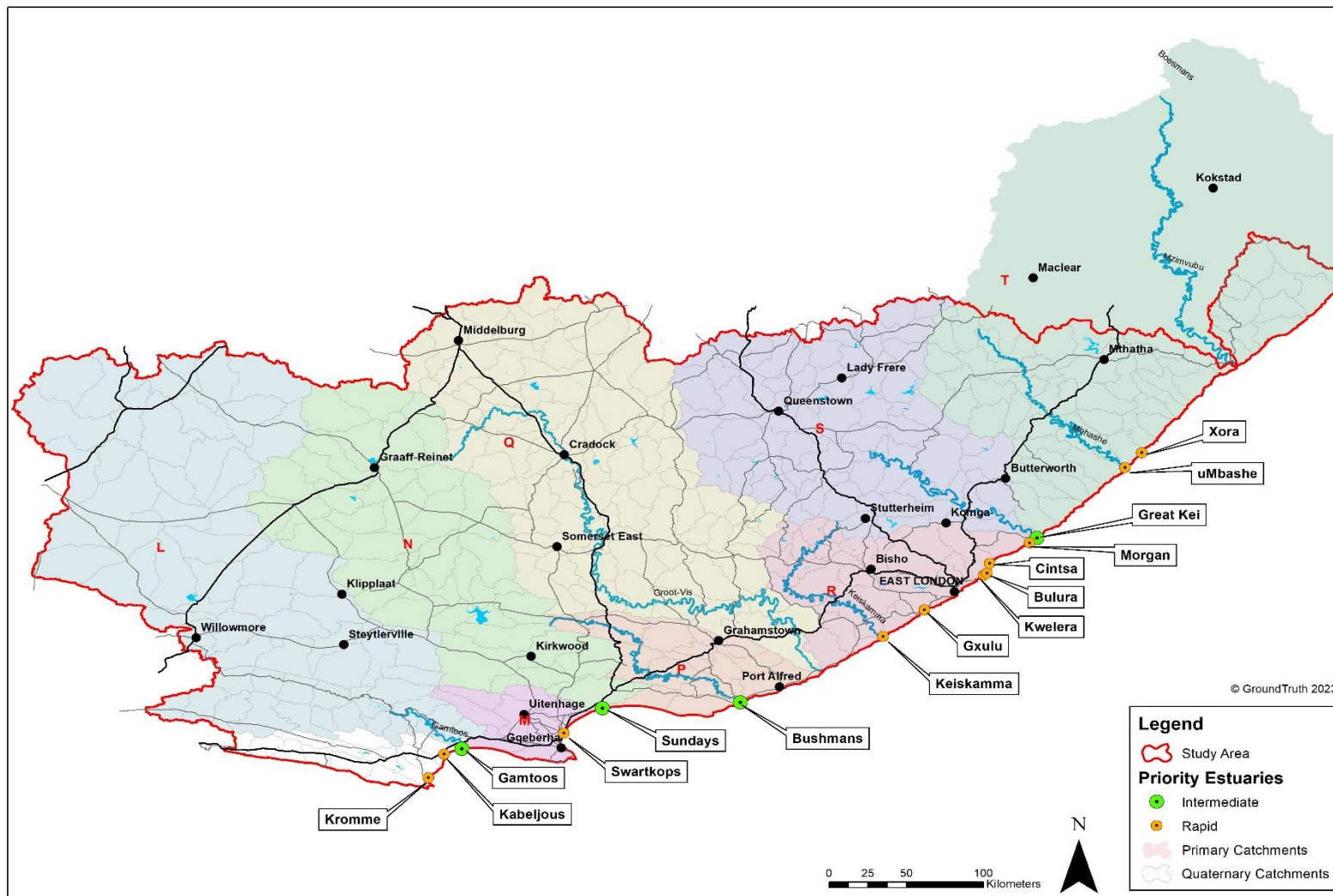


Figure 2-2: Overview of the greater study area (primary catchments)

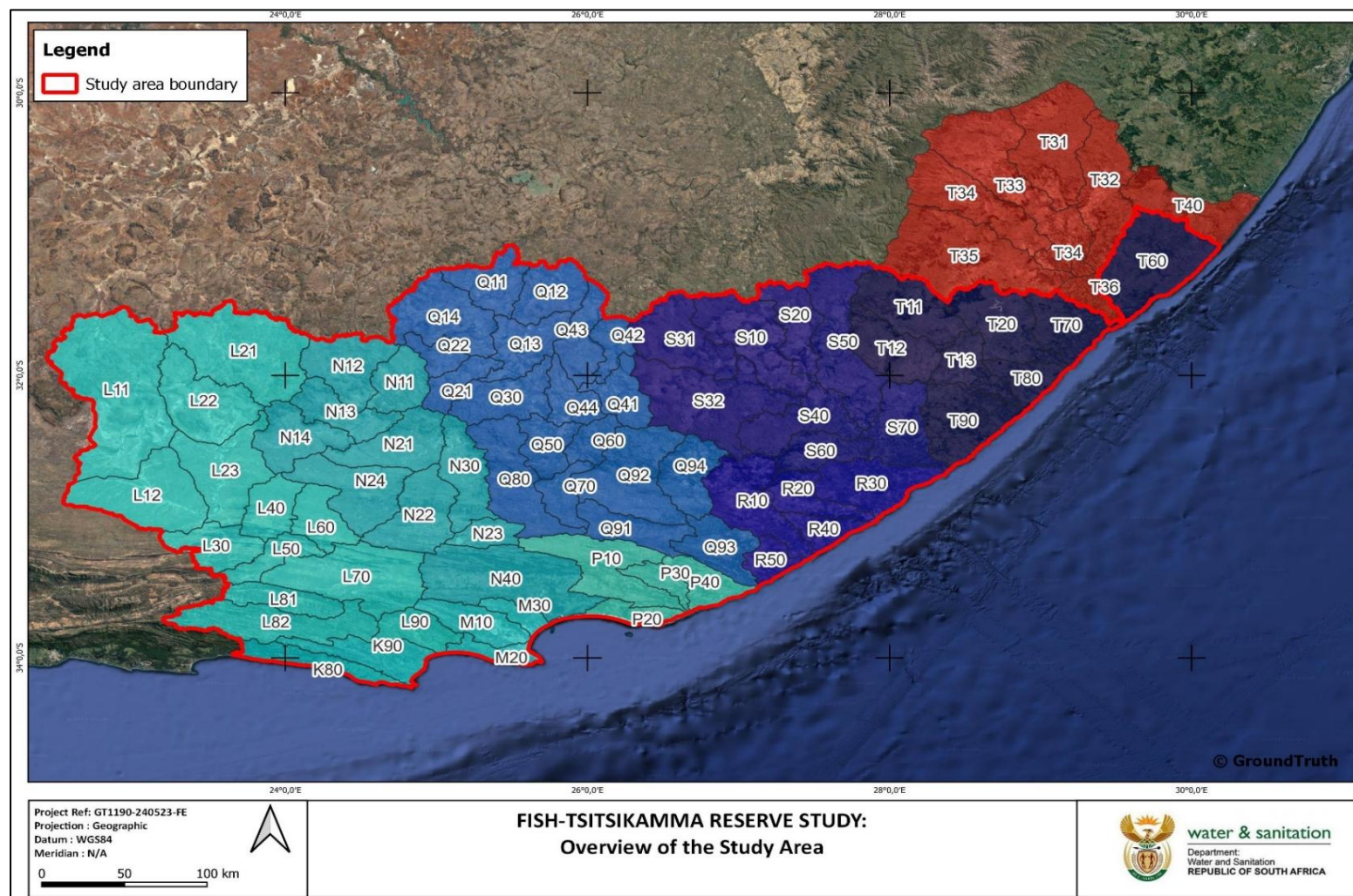


Figure 2-3: Overview of the greater study area (tertiary catchments)

3. OVERVIEW OF THE INTEGRATED UNITS OF ANALYSIS AND PRIORITY RIVERS AND ESTUARIES

3.1 Integrated Units of Analysis

Integrated Units of Analysis (IUAs) are spatial units of distinct uniqueness relatively defined by complex socially, economically, culturally and ecologically systems and their interactions and consisting of significant water resources for which Water Resource Classes are determined. The delineation of the various catchment areas was done primarily according to several socio-economic criteria and the boundaries of water resource components or catchments, taking into consideration ecological information and biophysical characteristics. These IUAs for this study were used for the assessment of the ecological and socio-economic implications and/ or consequences of the different scenarios with the ultimate objective to determine Water Resource Classes per IUA.

Due to the large number of catchments and the diversity in the water resources (aquatic ecosystems, groundwater systems, estuaries, wetlands, water infrastructure) and socio/ cultural and economic aspects, 19 IUAs were identified for the study area. These are illustrated in **Figure 3-1** and listed in **Table 3-1**, along with the IUAs description.

Table 3-1: Description of the delineated Units of Analysis for the study area

IUA	IUA code	Description	Quaternary Catchments
1	IUA_K01	Tsitsikamma and headwaters of Kromme to Churchill Dam	K80A-F, K90A-B
2	IUA_KL01	Kromme from Churchill Dam to estuary and Gamtoos	K90C-G, L90A-C
3	IUA_L01	Kouga to Kouga Dam, Baviaanskloof	L81A-D, L82A-J
4	IUA_M01	M primary catchment	M10A-D, M20A-B, M30A-B
5	IUA_LN01	Groot to Kouga confluence, Upper Sundays to Darlington Dam	L11A-G, L12A-D, L21A-F, L22A-D, L23A-D, L30A-D, L40A-B, L50A-B, L60A-B, L70A-G, N11A-B, N12A-C, N13A-C, N14A-D, N21A-D, N22A-E, N23A-B, N24A-D, N30A-C
6	IUA_N01	Sundays downstream Darlington Dam	N40A-F

IUA	IUA code	Description	Quaternary Catchments
7	IUA_P01	P primary catchment	P10A-G, P20A-B, P30A-C, P40A-D
8	IUA_Q01	Fish	Q11A-D, Q14A-E, Q21A-B, Q22A-B, Q30A-B, Q80A-C
9	IUA_Q02	Great Fish	Q12A-C, Q13A-C, Q30C-E, Q41A-D, Q42A-B, Q43A-B, Q44A-C, Q50A-C, Q60A-C, Q70A-C, Q80D-G, Q91A-C, Q93A-D
10	IUA_Q03	Koonap and Kat	Q92A-G, Q94A-F
11	IUA_R01	Keiskamma	R10A-M, R40A-C, R50A-B
12	IUA_R02	Buffalo/ Nahoon	R20A-G, R30A-F
13	IUA_S01	Upper Great Kei	S10A-J, S20A-D, S40A-F, S50A-J
14	IUA_S02	Black Kei	S31A-G, S32A-M
15	IUA_S03	Lower Great Kei	S60A-E, S70A-F
16	IUA_T01	Upper Mbashe, Upper Mthatha	T11A-H, T12A-G, T20A
17	IUA_T02	Lower Mbashe	T13A-E
18	IUA_T03	Lower Mthatha	T20B-G
19	IUA_T04	Pondoland coastal	T60A-K, T70A-G, T80A-D, T90A-G

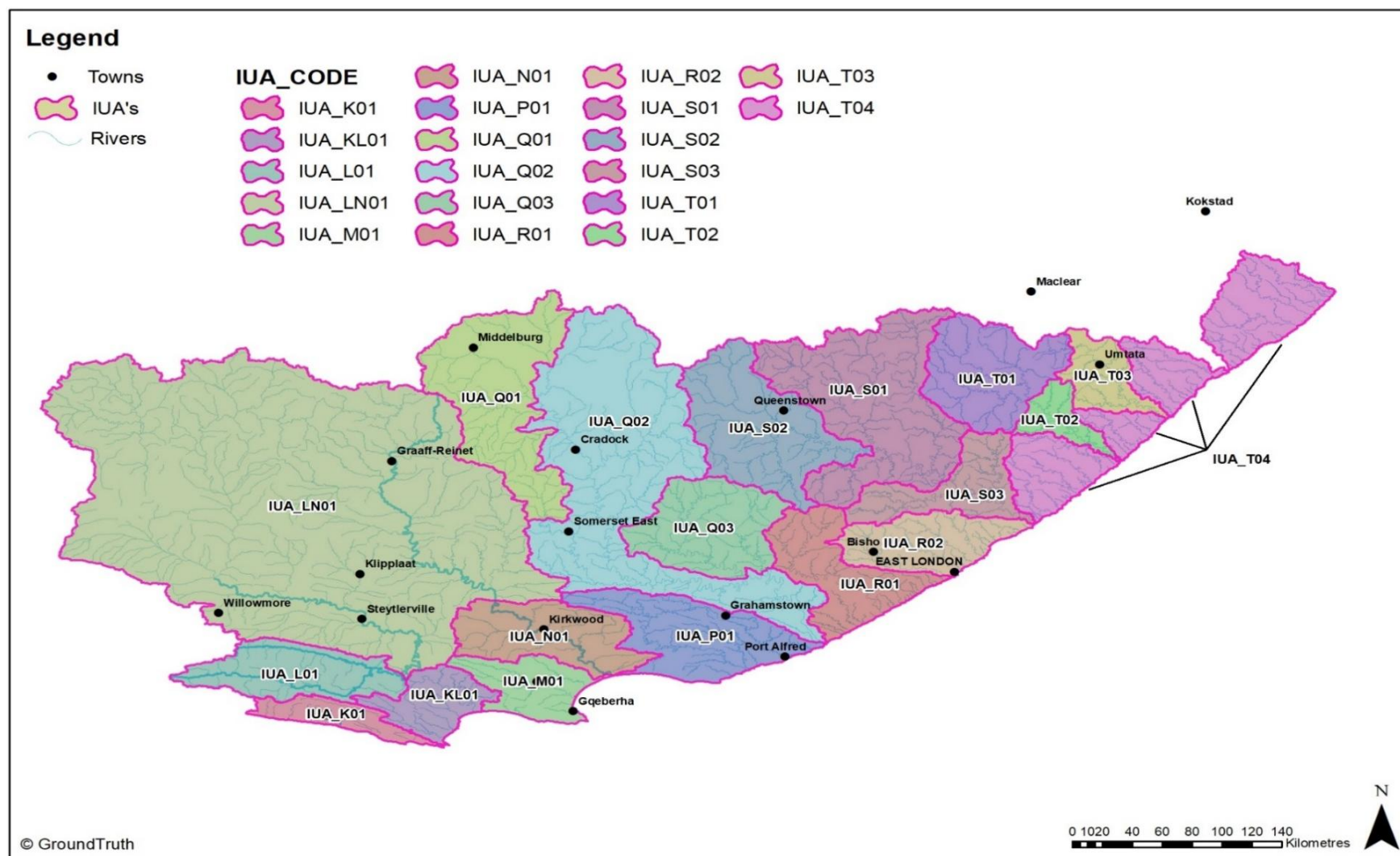


Figure 3-1: Integrated Units of Analysis

4. WATER RESOURCE CLASSES

The water resource classes have been finalised for the study area and which are illustrated in **Figure 4-1** below. Further information can be drawn from the Water Resource Classes Report (Report No. WEM/WMA7/00/CON/RDM/2725).

Important to note that Class I IUAs are where the water resources are minimally altered from their pre-development conditions, while Class II areas exhibit moderate ecological sensitivity and developmental pressure, permitting limited use while maintaining ecological functions. Class III areas face high developmental demand or ecological significance, requiring stricter management measures. Flagging these resources ensures their protection and sustainability within the IUAs.

Of the IUAs assessed, only IUA_T04 (Pondoland) was classified as Class I. The majority of the study area falls under Class II, while IUA_T03 (Mthatha), M01 (Swartkops), and IUA_KL01 (Gamtoos) were classified as Class III. Thus, RQOs have been established based on the classification. For prioritised water resources within Class III that need additional protection, more stringent RQOs have been determined to ensure their preservation and long-term sustainability.

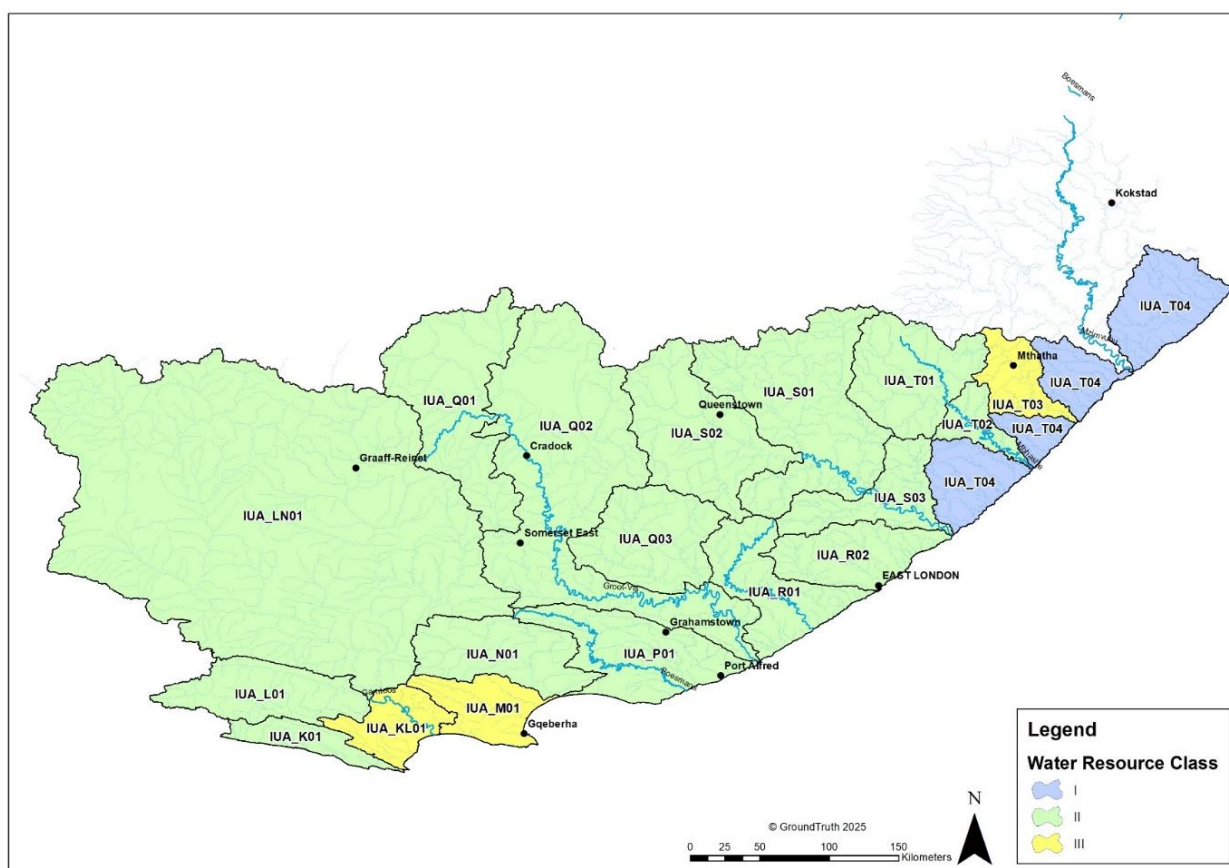


Figure 4-1: Water Resource Classes per IUA throughout the Keiskamma, Fish to Tsitsikamma study area

5. RESOURCE UNITS' PRIORITISATION

Delineation and prioritisation of RUs are essential as it would not be appropriate to apply the same RQOs to all water resources within a catchment. The initial RUs delineated were presented in the Resource Unit Prioritisation Report (Report Number: WEM/WMA7/00/CON/RDM/0422) and which were aligned with the boundaries of the IUAs to prevent overlap between neighbouring IUAs.

While the RQO determination procedure aims to establish RQOs for each RU, it is often impractical to address every RU due to the potentially large number of RUs within a catchment. To manage this challenge, a rationalisation process outlined in the RQO Determination Procedure (DWA, 2011) was applied. Using the RU Prioritisation Tool, which incorporates a multi-criteria decision analysis approach, priority RUs were identified based on a series of criteria, including:

- The position of RUs within an IUA;
- Importance to water users;
- Threats to water quality for both users and the environment;
- Ecological considerations;
- Practical constraints; and
- Management considerations.

Priority ratings generated through this tool guided the selection of RUs for RQO determination. These selections were further refined through stakeholder consultations to confirm their importance.

These initial RUs delineated for all water resources were presented in the above-mentioned report in July 2022. Since then, each specialist team for rivers, dams, estuaries, groundwater, and wetlands conducted a thorough review and refinement of the prioritised RUs as part of the RQO determination process. This re-evaluation incorporated updated data, improved methodologies, and stakeholder feedback to ensure that the RUs accurately reflected their ecological, hydrological, and socio-economic significance. Where necessary, additional RUs were identified to address gaps or emerging priorities.

This iterative process enhanced the precision of RU delineation, ensuring that the prioritisation supports the formulation of RQOs effectively. By addressing the unique characteristics and challenges of each water resource system, the re-evaluation aligned the study outcomes with the overarching goals of sustainable resource management and protection.

As a result of this process, 145 RUs for rivers, 24 for dams, 24 for estuaries (although many others have been prioritised owing to their high ecological categories and included within **Appendix B**), 17 for groundwater, and 17 for wetlands were delineated within the Keiskamma, Fish to Tsitsikamma catchment areas. These delineations were informed by the priority ratings, specialist inputs, redefined RUs, and stakeholder engagements.

5.1 Prioritised Rivers

A total of 145 river RUs were prioritised, which are summarised in **Table 5-1**.

It is important to note that by applying the RU Evaluation Tool to each RU, the team gained a comprehensive understanding of the user group types (e.g., alien vegetation, afforestation, industrial areas, agriculture) and their impacts on the associated water resources. This analysis also highlighted the dependency of these water resources on the identified activities. With a clear understanding of the drivers influencing the prioritised RUs, the team was able to make informed and pragmatic decisions regarding the selection of indicators for each sub-component to guide the determination of RQOs. To maintain a practical and implementable approach, RQOs were not established for all components across all prioritised RUs. This selective and focused methodology will ensure the feasibility of the proposed RQOs and supports their successful implementation by the DWS.

Table 5-1: Prioritised Resource Units for rivers in the Keiskamma, Fish to Tsitsikamma catchment area per IUA

IUA		RU	SQ Reach	Quat*	River	EWR Site within RU	Co-ordinates	
No	Code						Latitude	Longitude
1	IUA_K01	1.1	K90A-09040	K90A	Kromme	KROM01_R	-33.937095	24.269058
		1.2	K80A-09053	K80A	Elandsbos	-	-	-
		1.3	K80D-09124	K80D	Groot	GROO01_FV	-34.032134	24.195684
		1.4	K80E-09175	K80E	Klasies	-	-	-
		1.5	K80E-09152	K80E	Tsitsikamma	-	-	-
		1.6	K80F-09201	K80F	Klipdrift	-	-	-
		1.7	K80F-09262	K80F	Slang	-	-	-
2	IUA_KL01	2.1	K90D-09127	K90D	Kromme (reach downstream of Mpofu Dam)	-	-	-
		2.2	K90D-09127	K90D	Kromme	-	-	-
		2.3	K90E-09147	K90E	Geelhoutboom	-	-	-
		2.4	K90F-09116	K90F	Swart	-	-	-
		2.5	K90F-09132	K90F	Seekoei	-	-	-
		2.6	K90G-09096	K90G	Kabeljous	-	-	-
		2.7	L90A-08877	L90A	Gamtoos	GAMT01_I	-33.760976	24.6938401
		2.8	L90A-08951	L90A	Kouga	-	-	-
		2.9	L90B-09024	L90B	Gamtoos	-	-	-
3	IUA_L01	3.1	L81B-08697	L81B	Baviaanskloof	-	-	-
		3.2	L82D-08977	L82D	Kouga	KOUG01_R	-33.788449	24.025821
		3.3	L82D-08998	L82D	Twee Riviere	TWEE-1_FV	-33.830390	23.898230
		3.4	L82D-08981	L82D	Nabooms	-	-	-
		3.5	L81D-08774	L81D	Baviaanskloof	-	-	-
4	IUA_M01	4.1	M10B-08921	M10B	Elands	-	-	-
		4.2	M10C-08897	M10C	Swartkops	SWAR01_I	-33.722164	25.300873

IUA		RU	SQ Reach	Quat*	River	EWR Site within RU	Co-ordinates	
No	Code						Latitude	Longitude
5	IUA_LN01	4.3	M10C-08879	M10C	Swartkops	-	-	-
		5.1	L22B-07261	L22B	Kariega	-	-	-
		5.2	L22B-07534	L22B	Kariega	-	-	-
		5.3	L23A-07632	L23A	Kariega	-	-	-
		5.4	L23A-07637	L23A	Kariega	-	-	-
		5.5	L23B-07680	L23B	Kariega	-	-	-
		5.6	L23C-07735	L23C	Kariega	-	-	-
		5.7	L23C-07777	L23C	Kariega	-	-	-
		5.8	L23C-07791	L23C	Kariega	-	-	-
		5.9	L23C-07795	L23C	Kariega	-	-	-
		5.1	L23D-07928	L23D	Kariega	-	-	-
		5.11	L23D-08053	L23D	Kariega	-	-	-
		5.12	L23D-08114	L23D	Kariega	-	-	-
		5.13	L30C-08207	L30C	Groot	-	-	-
		5.14	L50B-08289	L50B	Groot	-	-	-
		5.15	L50B-08375	L50B	Groot	-	-	-
		5.16	L50B-08394	L50B	Groot	-	-	-
		5.17	L70C-08510	L70C	Groot	-	-	-
		5.18	L70C-08562	L70C	Groot	-	-	-
		5.19	L70C-08580	L70C	Groot	-	-	-
		5.2	L70D-08594	L70D	Groot	-	-	-
		5.21	L70G-08902	L70G	Groot	-	-	-
		5.22	N13C-07374	N13C	Sundays	-	-	-
		5.23	N21D-07510	N21D	Sundays	-	-	-
		5.24	N21D-07707	N21D	Sundays	-	-	-
		5.25	N22C-08085	N22C	Sundays	-	-	-
		5.26	N22C-08016	N22C	Sundays	-	-	-
		5.27	N23B-08290	N23B	Sundays	-	-	-
		5.28	N23B-08306	N23B	Sundays	-	-	-
		5.29	N24B-07715	N24B	Sundays	-	-	-
		5.3	N24B-07708	N24B	Sundays	-	-	-
		5.31	N24C-07977	N24C	Sundays	-	-	-
		5.32	N22C-08199	N22C	Sundays	SUND01_FV	-33.078120	25.015480
6	IUA_N01	6.1	N40F-08707	N40F	Sondags	-	-	-
		6.2	N40A-08313	N40A	Sondags	-	-	-
		6.3	N40B-08540	N40B	Sondags	-	-	-
		6.4	N40C-08566	N40C	Sondags	SUND02_R	-33.404384	25.407919
		6.5	N40C-08565	N40C	Sondags	-	-	-
		6.6	N40E-08613	N40E	Sondags	-	-	-
		6.7	N40E-08640	N40E	Sondags	-	-	-
		6.8	N40E-08682	N40E	Sondags	-	-	-

IUA		RU	SQ Reach	Quat*	River	EWR Site within RU	Co-ordinates	
No	Code						Latitude	Longitude
7	IUA_P01	6.9	N40F-08707	N40F	Sondags	-	-	-
		7.1	P30A-08518	P30A	Kariega	-	-	-
		7.2	P30B-08734	P30B	Kariega	-	-	-
		7.3	P30C-08778	P30C	Kariega	-	-	-
		7.4	P10D-08406	P10D	Boesmans	-	-	-
		7.5	P10D-08482	P10D	Boesmans	-	-	-
		7.6	P10G-08793	P10G	Bushmans	-	-	-
		7.7	P40A-8472	P40A	Bloukrans	-	-	-
		7.8	P40C-08731	P40C	Kowie	-	-	-
8	IUA_Q01	8.1	Q30B-07056	Q30B	Pauls	-	-	-
		8.2	Q30B-07051	Q30B	Pauls	-	-	-
		8.3	Q30E-07122	Q30E	Great Fish	-	-	-
		8.4	Q21B-06831	Q21B	Great Fish	-	-	-
		8.5	Q21B-06817	Q21B	Great Fish	-	-	-
		8.6	Q80B-7553	Q80B	Little Fish (upper)	-	-	-
		8.7	Q13B-06763	Q13B	Great Brak	-	-	-
9	IUA_Q02	9.1	Q41A-07351	Q41A	Tarka	-	-	-
		9.2	Q44A-07225	Q44A	Tarka	-	-	-
		9.3	Q70A-07747	Q70A	Great Fish	-	-	-
		9.4	Q70C-08084	Q70C	Great Fish	-	-	-
		9.5	Q91B-08144	Q91B	Great Fish (Lower)	FISH03_I	33.083733 2	26.2252736
		9.6	Q80G-08143	Q80G	Little Fish (Lower)	-	-	-
		9.7	Q44C-07276	Q44C	Tarka	TARK01_FV	-32.283315	25.75928
		9.8	Q50C-07657	Q50C	Great Fish (Middle)	-	-	-
		9.9	Q50B-07569	Q50B	Great Fish	-	-	-
10	IUA_Q03	10.1	Q94A-07526	Q94A	Kat	-	-	-
		10.2	Q94B-07623	Q94B	Kat	KAT01_I	32.569645 2	26.7218523
		10.3	Q92G-08203	Q92G	Koonap	KOON01_R	-33.042856	26.658506
		10.4	Q94F-07911	Q94F	Kat (Lower)	KAT02_R	-32.890965	26.68407
11	IUA_R01	11.1	R10B-07640	R10B	Cata	-	-	-
		11.2	R10B-07769	R10B	Keiskamma	-	-	-
		11.3	R10D-07807	R10D	Keiskamma	-	-	-
		11.4	R10G-07651	R10G	Tyume	-	-	-
		11.5	R10E-07844	R10E	Keiskamma (Upper)	KEIS01_I	-32.802333	27.024309
		11.6	R10L-08173	R10L	Keiskamma (Lower)	KEIS02_R	-33.075316	27.218534
		11.7	R10H-07938	R10H	Tyume	TYUM01_R	-32.910291	26.932242
12	IUA_R02	12.1	R20A-07788	R20A	Buffalo	-	-	-

IUA		RU	SQ Reach	Quat*	River	EWR Site within RU	Co-ordinates	
No	Code						Latitude	Longitude
		12.2	R20E-07775	R20E	Yellowwoods	-	-	-
		12.3	Not digitised (sub-set of above RU)	R20E	KwaNkwebu	-	-	-
		12.4	R20F-08045	R20F	Buffalo	BUFF01_I	-32.991518	27.640572
		12.5	R20B-07915	R20B	Buffalo	BUFF03_FV	-32.803470	27.370560
13	IUA_S01	13.1	S50E-06704	S50E	Tsomo	-	-	-
		13.2	S50E-06741	S50E	Tsomo	-	-	-
		13.3	S50J-07114	S50J	Tsomo	-	-	-
		13.4	S50J-07011	S50J	Tsomo	TSOMO01_I	-32.043976	27.821052
		13.5	S20D-06813	S20D	Indwe	INDW01_R	-31.897077	27.409825
		13.6	S10J-06985	S10J	White-Kei	WKEI01_R	-32.003057	27.351052
		13.7	S10E-06699	S10E	White-Kei	-	-	-
		13.8	S10F-06448	S10F	Cacadu	-	-	-
14	IUA_S02	14.1	S32K-07057	S32K	Black Kei	BKEI01_I	-32.118195	27.068842
		14.2	S32G-07224	S32G	Klipplaat	KLIP01_FV	-32.259687	26.856693
		14.3	S31G-06899	S31G	Klaas Smits	KSMI01_FV	-31.998450	26.894270
		14.4	S31F-06731	S31F	Komani	-	-	-
15	IUA_S03	15.1	S60A-07662	S60A	Gubu	-	-	-
		15.2	S60A-07606	S60A	Kubusi	-	-	-
		15.3	S60B-07635	S60B	Kubusi	-	-	-
		15.4	S70A-07524	S70A	Great Kei	GKEI01_I	-32.508118	27.9662946
		15.5	S70D-07307	S70D	Gcuwa	GCUW01_R	-32.319770	28.1360940
		15.6	S70D-07307	S70D	Gcuwa	GCUW01_FV	-32.319770	28.1360940
		15.7	S60E-07531	S60E	Kubusi	KUBU03_R	-32.507220	27.7313480
16	IUA_T01	16.1	T11A-06296	T11A	Slang	-	-	-
		16.2	T11A-06376	T11A	KuKowa	-	-	-
		16.3	T11A-06467	T11A	Ntungwana	-	-	-
		16.4	T11H-06654	T11H	Mbhashe	MBHA02_R	31.807857 0	28.3469940
		16.5	T20A-06339	T20A	Mthatha	-	-	-
17	IUA_T02	17.1	T13C-06941	T13C	Mbhashe	MBAS01_I	-31.958098	28.4722381
18	IUA_T03	18.1	T20C-06527	T20C	Mthatha	-	-	-
		18.2	T20G-06794	T20G	Mthatha	MTHA01_I	-31.926220	29.1364733
19*	IUA_T04	19.1	T70E-06459	T70E	Mtakatye	-	-	-
		19.2	T80D-06960	T80D	Xora	-	-	-
		19.3	T90A-07092	T90A	Nqabarha	NQAB01_R	-32.091927	28.400234
		19.4	T90D-07329	T90D	Qhorha	-	-	-
		19.5	T90F-07544	T90F	Sihlontlweni	-	-	-

IUA		RU	SQ Reach	Quat*	River	EWR Site within RU	Co-ordinates	
No	Code						Latitude	Longitude
		19.6	T70B-06498	T70B	Mngazi	MNGA01_R	-31.608958	29.405132
		19.7	T60C-05942	T60C	Mtentu	MTEN01_R	-31.130483	29.757179
		19.8	T60G-06145	T60G	Mzikaba	-	-	-

* Quaternary catchment

5.2 Prioritised Dams

Due to the large number of dams within the catchment area, only the key dams with significant roles in the landscape were selected and prioritised. The prioritisation process considered dams that were heavily influenced by surrounding activities, demonstrated a dependency on these activities, or were associated with critical water quality concerns. A total of 24 dam RUs were prioritised and which are summarised in **Table 5-2**.

Table 5-2: Prioritised Resource Units for dams in the Keiskamma, Fish to Tsitsikamma catchment area per IUA

IUA	RU No.	Dams	DWS Dam No.
IUA_K01	1.8	Churchill Dam	K9R001
IUA_KL01	2.1	Mpofu Dam	K9R002
IUA_L01	3.6	Kouga Dam	L8R001
IUA_M01	4.4	Groendal Dam	M1R001
IUA_LN01	5.33	Nqweba Dam	N1R001
	5.34	Darlington Dam	N2R001
IUA_N01	6.10	Korhaansdrift Weir	N4H001
IUA_Q03	10.5	Kat River Dam	Q9R001
IUA_R01	11.8	Sandile Dam	R1R001
	11.9	Cata Dam	R1R002
	11.10	Binfield Dam	R1R003
IUA_R02	12.6	Laing Dam	R2R001
	12.7	Rooikrantz Dam	R2R002
	12.8	Bridledrift Dam	R2R003
	12.9	Nahoon Dam	R3R001
	12.10	Maden Dam	-
IUA_S01	13.9	Xonxa Dam	S1R001
	13.10	Lubisi Dam	S2R001
	13.11	Ncora Dam	S5R001
IUA_S02	14.5	Waterdown Dam	S3R001
	14.6	Oxkraal Dam	S3R003
IUA_S03	15.8	Gcuwa Dam	S7R001
	15.9	Xilinx Dam	S7R002
IUA_T03	18.3	Mthatha Dam	T2R001

5.3 Prioritised Estuaries

A total of 26 estuary RUs were prioritised for which high confidence RQOs and have been developed (owing to existing and available data) and are bolded in **Table 5-3**. Furthermore, refer to **Table 5-4** for the co-ordinates of the seven estuaries (Mngazi, Mbashe, Great Kei, Keiskamma, Kariega, Gamtoos and Kabeljous) which were thoroughly evaluated during this study, along with the other bolded prioritised estuaries. For the remaining priority estuaries (not bolded), broad RQOs were determined based on specific criteria, including:

- High Ecological Category being either an A, A/B or B (High EC);
- Critically endangered fish species;
- Critically endangered grass species;
- Mangrove species covering >5ha; and
- Saltmarsh (intertidal and supratidal) cover >20ha combined.

These are listed in **Appendix B, Appendix C and Appendix D**. This is to ensure protection of these systems within those IUAs assigned a Class II or Class III.

Table 5-3: Prioritised Resource Units for estuaries in the Keiskamma, Fish to Tsitsikamma catchment area per IUA

IUA No.	IUA Code	Estuaries
1	IUA_K01	Klipdrift, Slang , Lottering, Elandsbos, Storms, Elands, Groot (Oos), Tsitsikamma
2	IUA_KL01	Kromme, Seekoei, Kabeljous, Gamtoos
4	IUA_M01	Van Stadens, Swartkops
6	IUA_N01	Sundays
7	IUA_P01	Kariega, Bushmans, Kowie , Kasouga, Riet, West Kleinemonde, East Kleinemonde
9	IUA_Q02	Great Fish
11	IUA_R01	Keiskamma , Mpekweni, Mtati (Mthathi), Mgwala, Bira (Bhirha), Gqutywa, Ngculura (Ngculurha), Mtana, Nqinisa, Kiwane (Khiwane), Lilyvale, Ross' Creek, Ncera (Ncerha), Goda, Hlozi
12	IUA_R02	Nahoon, Tyolomnqa , Qinira (Quinirha), Kwelera (Kwelerha), Bulura (Bulurha), Cunge, Cintsa, Cefane, Kwenxura (Kwenxurha), Nyara (Nyarha), Imtwendwe (Mtwendwe), Haga-Haga, Mtendwe, Quko, Morgan, Cwili
15	IUA_S03	Great Kei
17	IUA_T02	Mbashe
18	IUA_T03	Mthatha
19	IUA_T04	Mngazi , Gxara (Gxarha), Ngogwane, Qolora (Qolorha), Chulumna, Ncizele, Timba, Kobongaba (Khobongaba), Nxaxo/Ngqusi, Cebe, Gqunqe, Zalu, Ngqwara (Ngqwarha), Sihlontweni, Nebelele, Qora (Qhorha), Xora , Kobongaba, Jujura (Jujurha), Ngadla,

IUA No.	IUA Code	Estuaries
		Shixini, Beechamwood, Kwazlelitsha (Kwazwedala), Kwa-Goqo, Ku-Nocekedwa, Nqabara/Nqabarana, Ngomane (East), Ngoma/Kobule, Mendu, Mendwana, Ku-Mpenzu, Ku-Bhula (Mbhanyana), KwaSuku, Ntlonyane, Nkanya, Sundwana, Bulungula, Ku-Amanzimuzama, Nqakanqa, Mdikana, Mncwasa, Mpako, Mapuzi, Thsani, Mdumbi, Lwandilana, Lwandile, Mtakatye, Hluleka, Mnenu, Mpande, Sinangwana, Mngazana , Gxwaleni, Bulolo, Mtumbane, Ntlupeni, Nkodusweni, Mntafufu, Ingo, Mzintlava , Mzimpunzi, Kwanyambalala, Mbotyi, Mkozi, Sikatsha, Lupatana, Mkwani, Msikaba , Mgwegwe, Mgwetyana, Mtentu , Sikombe, Kwanyana, Mtolane, Mnyameni, Mpahlanya, Mpahlane, Mzamba

Detailed RQOs provided for estuaries in bold within **Chapter 10**. Broad RQOs for the remaining priority estuaries are included in **Appendix B, Appendix C and Appendix D**.

Table 5-4: Priority estuary co-ordinates

IUA Code	Estuaries	Co-ordinates	
		Latitude	Longitude
IUA_K01	Klipdrift	-34.172367	24.637049
	Slang	-34.174129	24.653702
	Tsitsikamma	-34.135593	24.438326
IUA_KL01	Kromme	-34.142967	24.842728
	Seekoei	-34.086670	24.910743
	Kabeljous	-34.008807	24.932503
	Gamtoos	-33.970425	25.034714
IUA_M01	Swartkops	-33.866245	25.633045
IUA_N01	Sundays	-33.721836	25.853725
IUA_P01	Kariega	-33.682771	26.686399
	Bushmans	-33.694916	26.663622
	Kowie	-33.603626	26.901634
	West Kleinemonde	-33.541346	27.046152
	East Kleinemonde	-33.539026	27.049325
IUA_Q02	Great Fish	-33.495228	27.140684
IUA_R01	Keiskamma	-33.281480	27.491233
IUA_R02	Nahoon	-32.986438	27.951704
	Tyolomnqa	-33.225772	27.583421
IUA_S03	Great Kei	-32.679887	28.385964
IUA_T02	Mbashe	-32.249985	28.901901
IUA_T03	Mthatha	-31.952963	29.183758
IUA_T04	Mngazi	-31.677184	29.463134
	Xora	-32.158634	28.995585
	Mngazana	-31.692177	29.422861
	Mzintlava	-31.522644	29.689791
	Msikaba	-31.319222	29.967706
	Mtentu	-31.248857	30.046265

5.4 Prioritised Groundwater Areas

Groundwater RU prioritisation was based on the following criteria:

- RUs where aquifer sustainability due to recharge and saturation levels (viz. water level trends) are a concern due to over abstraction and/or insignificant replenishment may occur;
- RUs where the groundwater contributed significantly to baseflows to surface water resources;
- RUs where groundwater quality is a concern due to natural elevated dissolved ionic concentrations – mainly sodium-chloride and fluoride which is the result of the paleo-environmental conditions during sedimentation in the Karoo Basin; and
- RUs where groundwater quality is a concern due to induced deterioration as the result of production/storage of concentrated waste material (i.e., mining/ industrial/ agricultural/ sewage processes).

A total of 17 groundwater RUs were prioritised. The rating of the above criteria per these groundwater RUs is listed in **Appendix A. Table 5-5** below provides a summary of them, together with their quaternary catchments and the reason for prioritisation.

The most critical aspects of these RUs are;

- (i) over exploitation and/or over allocation due to groundwater use, and
- (ii) pollution risk of aquifer systems through listed and/or development activities.

Table 5-5: Prioritised Resource Units for groundwater in the Keiskamma, Fish to Tsitsikamma catchment area per IUA

IUA	Quaternary Catchment	Groundwater Resource Unit (GW_RU)	Reason Prioritised
IUA_K01	K80A, K80B, K80C, K80D, K80E, K80F, K90A, K90B	GW_RU01	• Four quaternaries rank medium to high for groundwater use based on density • One quaternary ranks medium to high for percentage coverage of strategic GW areas • Two quaternaries rank moderate to high for stress (allocation) • All quaternaries rank medium to high for ecological reliance on baseflow
IUA_KL01	K90E, K90F, K90G	GW_RU02	• All quaternaries rank high for groundwater use based on density • All quaternaries rank high for stress (allocation)
IUA_L01	L82B, L82D	GW_RU03	• Both quaternaries rank moderate to high for groundwater use based on density

IUA	Quaternary Catchment	Groundwater Resource Unit (GW_RU)	Reason Prioritised
IUA_LN01	N12A, N12C N12B,	GW_RU12	- One quaternary ranks medium to high for groundwater use based on density - All quaternaries rank high for percentage coverage of strategic GW areas - One quaternary ranks high for stress (allocation)
	N13A, N13C N13B,	GW_RU13	- Two quaternaries rank medium to high for groundwater use based on density - One quaternary ranks high for percentage coverage of strategic GW areas - Two quaternaries rank moderate to high for stress (allocation)
	N14A, N14C N14B,	GW_RU14	- Two quaternaries rank medium to high for groundwater use based on density - Two quaternaries rank high for stress (allocation)
IUA_M01	M10A, M10B	GW_RU04	- One quaternary ranks high for percentage coverage of strategic GW areas - One quaternary ranks moderate to high as a Government Control Area
	M10C, M10D	GW_RU05	- One quaternary ranks high for groundwater use based on density - Two quaternaries rank high for percentage coverage of strategic GW areas - One quaternary ranks high for stress (allocation) - Both quaternaries rank high as Government Control Areas
	M20A, M20B, M30A, M30B	GW_RU06	- All quaternaries rank medium to high for groundwater use based on density - Two quaternaries rank medium to high for percentage coverage of strategic GW areas - All quaternaries high for stress (allocation)
IUA_Q01	Q14A, Q14B, Q14C, Q14D	GW_RU20	- Three quaternaries rank medium to high for groundwater use based on density - Two quaternaries rank high for percentage coverage of strategic GW areas - Three quaternaries rank high for stress (allocation)
IUA_S01	S20C, S20D	GW_RU35	One quaternary ranks medium to high for groundwater use based on density

IUA	Quaternary Catchment	Groundwater Resource Unit (GW_RU)	Reason Prioritised
IUA_T01	T11A, T11C, T11D, T11E, T11F, T11G, T11H	GW_RU40	- Two quaternaries rank high for percentage coverage of strategic GW areas - Four quaternaries rank medium to high for ecological reliance on baseflow
	T20A	GW_RU42	- The quaternary ranks high for percentage coverage of strategic GW areas - The quaternary ranks high for ecological reliance on baseflow
IUA_T03	T20B, T20C, T20D, T20E, T20F, T20G	GW_RU44	- One quaternary ranks medium to high for percentage coverage of strategic GW areas - All quaternaries rank medium to high for ecological reliance on baseflow
IUA_T04	T60A, T60B, T60C, T60D, T60E, T60F, T60G, T60H, T60J, T60K	GW_RU45	- Two quaternaries rank medium to high for percentage coverage of strategic GW areas - All quaternaries rank medium to high for ecological reliance on baseflow
	T70A, T70B, T70C, T70D, T70E, T70F, T70G	GW_RU46	Groundwater Resource Unit upgraded to a priority due to: - One quaternary ranks medium to high for percentage coverage of strategic GW areas - All quaternaries rank medium to high for ecological reliance on baseflow
	T90A, T90D, T90G, T90F	GW_RU48	- One quaternary ranks high for percentage coverage of strategic GW areas - Two quaternaries rank medium to high for ecological reliance on baseflow

5.5 Prioritised Wetlands

There are a substantial number of important wetlands within the Keiskamma and Fish to Tsitsikamma catchments. This study identified a subset of these wetlands, and 17 wetland resource units (WRUs) were delineated and assessed in the wetland report (Report No. WEM/WMA7/00/CON/RDM/1623). This is a substantial number of wetlands to monitor in detail, however, most of them were deemed important enough to have individual RQOs set for them. It should be noted that one set of wetlands were excluded from the RQO process, namely the degraded seep wetlands in WRU13 (Hogsback Wetland Complex). These seeps have relatively low ecological importance and sensitivity ratings and are in the process of

becoming dominated by *Leucosidea sericea*. In terms of practical management of these wetlands, it is best to allow these wetlands to transition to woodland and then to forest from their naturally herbaceous vegetation assemblage. Therefore, no RQOs were set for these specific wetlands in WRU13.

Refer to **Table 5-6** below which provides an overview of the priority RUs for wetlands in the study area. Refer to the Final Wetland PES Report (Report No. WEM/WMA7/00/CON/RDM/1623) for the rationale of each prioritised wetland

Table 5-6: Prioritised Resource Units for wetlands in the Keiskamma, Fish to Tsitsikamma catchment area per IUA

IUA No.	IUA Code	RU	Quats*	Wetlands	HGM Unit Type(s)	Threat Status	Strategic Water Source Area
1	IUA_K01	WRU01	K80A	Tsitsikamma Plains Wetland Complex (Lottering and Slang)	Hillslope seepage, Channelled and Unchanneled valley-bottom wetlands	Unchanneled valley-bottom: critically endangered, channelled valley-bottom: critically endangered, seep: endangered	Yes (Tsitsikamma)
		WRU02	K90A	Kromme Wetland	Channelled and Unchanneled valley-bottom wetlands	Unchanneled valley-bottom: critically endangered	Partially (Tsitsikamma)
3	IUA_L01	WRU03	L82D	Krakeel Wetland Complex	Channelled and Unchanneled Valley-bottom Wetlands	Unchanneled valley-bottom: critically endangered, channelled valley-bottom: endangered	Yes (Tsitsikamma and Upper Keurbooms)
4	IUA_M01	WRU04	M10B	Longmore Wetland Complex	Channelled and Unchanneled Valley-bottom Wetlands	Unchanneled valley-bottom: critically endangered, channelled valley-bottom: endangered	Yes (Tsitsikamma)
		WRU05	M10D	Chatty River Wetland Complex	Floodplain and Channelled Valley-bottom Wetlands	Floodplain: critically endangered channelled valley-bottom: critically endangered	Yes (Coega TMG Aquifer)
5	IUA_LN01	WRU06	L21D	Sneeuberg West	Hillslope seeps, Channelled and Unchanneled Valley-bottom Wetlands	Seep: critically endangered, channelled valley-bottom: endangered, unchanneled valley-bottom: vulnerable	No
8	IUA_Q01	WRU27	Q22A	Loodsberg	Valley-bottom and seepage wetlands	Valley-bottom: endangered seep: critically endangered	Yes (Upper Eastern Karoo)
9	IUA_Q02	WRU10	Q43A	Dagbreek	Unchanneled valley-bottom wetlands (artificially created)	Unchanneled valley-bottom: vulnerable	No

IUA No.	IUA Code	RU	Quats*	Wetlands	HGM Unit Type(s)	Threat Status	Strategic Water Source Area
12	IUA_R02	WRU15	R20E	eDrayini Floodplain Wetland	Floodplain	Floodplain: critically endangered	No
		WRU26	R20D	KwaMasele Wetland Complex	Hillslope seep, unchanneled and channelled valley-bottom wetlands	Seep: endangered, unchanneled valley-bottom: critically endangered, channelled valley-bottom: endangered	No
13	IUA_S01	WRU18	S50E	Cala wetland complex	Hillslope seepage and discontinuously channelled valley-bottom wetlands	Valley-bottom: endangered, seep: least threatened	Yes (Eastern Cape Drakensberg)
		WRU21	S50C	Mbokotwa floodplain	Floodplain	Floodplain: critically endangered	No
14	IUA_S02	WRU12	S32E	Cairns Wetland Complex	Unchanneled Valley-bottom and Hillslope Seep Wetlands	Unchanneled valley-bottom: critically endangered, channelled valley-bottom: least threatened, seep: least threatened	Yes (Amathole)
		WRU13	S32D	Hogsback Wetland Complex	Hillslope Seeps, Floodplain and Channelled Valley-Bottom Wetlands	Seep: least threatened, floodplain: critically endangered, channelled valley-bottom: least threatened, unchanneled valley-bottom: least threatened	Yes (Amathole)
16	IUA_T01	WRU22	T11A	Elliot/Howa wetland complex	Hillslope seepage wetlands, channelled valley-bottom, floodplain	Floodplain: critically endangered, channelled valley-bottom: endangered, unchanneled valley-bottom: endangered, seep: least threatened	No
19*	IUA_T04	WRU24	T60D	Sikombe and Xolobeni	Channelled Valley-bottom Wetlands	Channelled valley-bottom: least threatened	No

IUA No.	IUA Code	RU	Quats*	Wetlands	HGM Unit Type(s)	Threat Status	Strategic Water Source Area
		WRU25	T60B	Ludeke Halt	Hillslope seepage and channelled valley-bottom wetlands	Seep: critical, channelled valley-bottom: critical	No

* Quaternary catchment

6. PRIORITISATION OF SUB-COMPONENTS AND SELECTION OF INDICATORS

Step 4 of the RQO development process, required the selection of components and the identification of proposed sub-components and indicators for which RQOs should be formulated for water resources within the prioritised RU of the Keiskamma, Fish to Tsitsikamma catchment areas.

The selection of components and the identification of proposed sub-components and indicators for which RQOs are set, has two key objectives:

- To identify and prioritise sub-components including habitat, quantity, quality, and biota that may be important to users or the environment; and
- To select those sub-components and associated indicators such as flow, salinity, fish, and macroinvertebrates, for which RQOs and numerical limits should be developed.

The RU evaluation was undertaken for the water resources in the Keiskamma, Fish to Tsitsikamma catchment areas using desktop information, local expert knowledge, previous studies, specialist studies undertaken as part of this study and a detailed understanding of the catchment. The assessment was undertaken in a workshop environment with technical specialists and then presented and discussed with catchment managers and key stakeholders. The overall priorities identified through the evaluation process were used to guide the selection of sub-components for RQO determination. Once the sub-components were selected, suitable indicators for monitoring were then identified. Sub-components for wetlands and groundwater were also selected through independent approaches based on assessment and evaluation of relevant aspects. These were then presented to stakeholders to obtain agreement on the proposed components and the identification of proposed sub-components and indicators.

As part of this study, RQOs for rivers, dams, estuaries, groundwater and wetland resources have been determined. While there are a wide range of sub-components and indicators for which RQOs can be set, it is not practical or necessary to set RQOs for all sub-components in a resource unit. A rationalisation process was therefore required to evaluate and prioritise the sub-components for RQO determination.

Sub-components that may be important to either the users or the environment were prioritised. This step also required consideration of the impacts of land-based activities on the water resource. Components and sub-components reviewed for rivers, dams and estuaries for which RQOs have been set are illustrated in **Table 6-1**.

For all prioritised wetlands the sub-components quality, quantity and habitat were selected for RQO development. Biota was included as a sub-component where species data was available to support RQO development.

The components (and sub-components) identified for groundwater RQOs include quantity and aquifer protection (abstraction rates, stressed units and water levels), quality (compounds of concern (COC) and ecological commitment (protection zones along river/stream required).

Table 6-1: Components and sub-components selected for rivers, dams and estuaries respectively

Rivers	
Component	Sub-component
Quantity	Low Flows
	High Flows
Quality	Nutrients
	Salts
	System variables
	Toxics
	Pathogens
Habitat	Geomorphology
	Riparian vegetation
	Integrated Habitat (instream and riparian)
Biota	Fish
	Macroinvertebrates
	Diatoms

Dams	
Quantity	Dam level
	Dam operating rules
	Reduction in live storage
Quality	Clarity/ Secchi Disk Indication
	Cyanobacteria
Vegetation	Alien aquatic plant species
	In-channel <i>Phragmites</i> sp./reeds

Estuaries	
Component	Sub-component
Hydrodynamics	Mouth condition
	Abiotic states
Quality	Salinity
	Dissolved inorganic nitrogen
	Dissolved inorganic phosphate
	Water clarity
	Dissolved oxygen
	Toxic substances
	Pathogens
Habitat	Intertidal
	Subtidal
	Substrate type
Biota	Microalgae
	Macrophytes
	Macroinvertebrates
	Fish
	Birds

7. APPROACH TO SETTING RQOs AND NUMERICAL LIMITS

Based on the prioritisation of sub-components undertaken in Step 4, RQOs have now been developed for rivers, dams, estuaries, groundwater and wetlands in the Keiskamma, Fish to Tsitsikamma catchment areas. Numerical limits are proposed where applicable for the RQOs recommended for the water resources. Numerical limits translate the narrative RQOs into numerical values which can be monitored and assessed for compliance.

The basic approaches to the drafting of RQOs for rivers, dams, estuaries, groundwater and wetlands are briefly outlined below.

7.1 Rivers and Dams

The drafting of the RQOs for rivers and dams have been based on and included the following aspects which were applied accordingly in the context of each RU:

- Understanding of the catchment context and priorities;
- Collation and assessment of available data and information (present state and historic);
- Assessment of ecological classification and river health information;
- Assessment of water quality information (although significantly limited within this catchment area – refer for a further detailed approach to how water quality RQOs were determined below);
- Incorporation of the requirements of the Water Resource Classification – Water Resource Classes and Target Ecological Categories;
- Present Ecological State;
- Incorporation of flow specifications (summaries of drought, low and high flow requirements per month);
- Incorporation of any direction of change required for any sub-components;
- Consideration of land-based impacts;
- Stakeholder requirements;
- Feasibility of achievement of desired state (Target Ecological Category - TEC);
- Alignment between RUs; and
- Specification of quantifiable numerical limits in line with the draft RQOs.

Determination of appropriate measures, sampling methods and sampling frequency form part of the next step for this study.

The RQOs were determined using data gathered from all in-field assessments conducted for this study. These included:

- Intermediate EWR sites located along prioritised RUs: RQOs for all indicators were determined with high confidence;
- Rapid 3 EWR sites located along prioritised RUs: RQOs for all indicators were determined with high confidence, except for geomorphology and riparian vegetation.

However, instream and riparian results were supported using the Instream Habitat Integrity (IHI) tool as a surrogate; and

- All other prioritised RUs, including those with a field verification site located within the priority RU: these were assessed using the RQO evaluation tool. This process identified sub-components and indicators necessary to define the RQOs. Additional data from DWS REMP sites (focused on the biotic component) and findings from previous EWR studies were incorporated to refine and support the development of low confidence RQOs of the selected sub-components and indicators.

This comprehensive approach ensured robust and credible RQOs, tailored to the unique characteristics and priorities of each RU.

The determined RQOs related to the following:

7.1.1 *Quantity*

The instream flows are prescribed as specified at EWR sites and biophysical nodes:

- Flows were determined as part of Water Resource Classification process and included ecological water requirements also considering strategic/user demands which are high in the catchment area;
- High Flows (freshets/ annual flood) or Low Flows (Maintenance and Drought Flows) or both were selected based on prioritisation in the specific RU;
- RQO flow specifications are those prescribed in terms of the Water Resource Classification component of this study and is based on the final TEC; and
- RQOs are specified in terms of flow requirements at nodes and EWR sites (meeting ecological requirements and user specifications).

Refer to **Table 7-1**, which summarises the quantified EWR expressed as a percentage of the natural Mean Annual Runoff (nMAR), as well as the associated percentages for maintenance low flows, drought flows, and flood flows for each of the EWR sites.

Table 7-1: Summary of Quantified EWR as a percentage of the nMAR, including maintenance low, drought, and floodflows per EWR Site

IUA	RU no	EWR site code	River	Quat*	PES	REC	TEC	MLow (%)	Drought (%)	Floods (%)	Total EWR as %nMAR for TEC	nMAR (10 ⁶ m ³)
IUA_K01	RU 1.1	KROM01_R	Kromme	K90A	D	C	C/D	20.84	2.11	16.25	37.10	24.58
	RU 1.3	GROO01_FV	Groot (Coastal)	K80D	C	B/C	B/C	19.88	7.53	9.20	29.09	47.6
IUA_KL01	RU 2.7	GAMT01_I	Gamtoos	L90A	D	D	D	6.00	3.50	2.22	8.22	343.9
	RU 2.3	GEEL01_D	Geelhoutboom	K90E	C/D	C/D	C/D	5.76	1.02	11.38	17.14	3.61
IUA_L01	RU 3.2	KOUG01_R	Kouga	L82D	C	B/C	B/C	7.35	3.29	6.80	14.15	148.8
IUA_M01	RU 4.2	SWAR01_I	KwaZungu/ Swartkops	M10C	C	B/C	B/C	13.26	1.48	20.20	33.46	32.6
IUA_LN01	No river EWR sites, groundwater driven catchments											
IUA_N01	RU 6.4	SUND02_R	Sundays (Lower)	N40C	D	D	D	2.95	1.95	2.47	5.42	214
IUA_P01	No river EWR sites, estuaries main drivers											
IUA_Q01	RU 8.5	FISH01_FV	Great Fish (Upper)	Q21B	D	D	D	2.87	2.65	9.48	12.35	18.0
IUA_Q02	RU 9.5	FISH03_I	Great Fish (Lower)	Q91B	C	C	C	14.02	4.84	15.70	29.73	331.8
	RU 9.7	TARK01_FV	Tarka	Q44C	D	D	D	2.63	2.53	9.57	12.21	63.3
IUA_Q03	RU10.2	KAT01_I	Kat (Upper)	Q94B	C	B/C	C	23.38	4.49	20.15	43.53	23.9
	RU10.3	KOON01_R	Koonap	Q92G	D	D	D	8.93	3.09	7.34	16.27	76.9
	RU10.4	KAT02_R	Kat (Lower)	Q94F	C/D	C/D	C/D	7.90	1.92	5.91	13.81	61.8
IUA_R01	RU11.5	KEIS01_I	Keiskamma (Upper)	R10E	D	D	D	12.11	10.19	20.91	33.02	58.8
	RU11.6	KEIS02_R	Keiskamma (Lower)	R10L	C	B/C	B/C	20.92	8.42	6.93	27.85	107.8
	RU11.7	TYUM01_R	Tyume	R10H	C	B/C	B/C	25.09	8.41	9.06	34.15	32.6
IUA_R02	RU12.4	BUFF01_I	Buffalo (Middle)	R20F	D	D	C/D	16.14	5.89	14.01	30.3	78.4
IUA_S01	RU13.4	TSOM01_I	Tsomo	S50G	D	C/D	C/D	10.11	4.24	27.38	37.48	196.7
	RU13.5	INDW01_R	Indwe	S20D	C/D	C/D	C/D	15.65	4.55	9.03	24.69	61.9

IUA	RU no	EWR site code	River	Quat*	PES	REC	TEC	MLow (%)	Drought (%)	Floods (%)	Total EWR as %nMAR for TEC	nMAR (10 ⁶ m ³)
	RU13.6	WKEI01_R	White Kei	S10J	C/D	C	C	20.87	4.47	5.30	26.16	155.7
IUA_S02	RU14.1	BKEI01_I	Black Kei	S32K	D/E	D	D	16.70	11.11	15.33	32.03	187.9
IUA_S03	RU15.4	GKEI01_I	Great Kei	S70A	C/D	C	C	14.70	4.94	10.27	24.97	897.2
	RU15.5	GCUW01_R	Gcuwa	S70D	D	D	D	14.86	2.83	1.15	16.01	67.6
	RU15.7	KUBU03_R	Kubusi (Lower)	S60B	C	B/C	C	14.11	5.07	6.27	20.38	98.1
IUA_T01	RU16.4	MBHA02_R	Mbhashe (Upper)	T11H	B/C	B/C	B/C	13.97	7.79	8.08	22.05	373.4
IUA_T02	RU17.1	MBAS01_I	Mbhashe (Middle)	T13C	C/D	C/D	C/D	20.24	7.00	17.78	38.02	673.8
IUA_T03	RU18.2	MTHA01_I	Mthatha (Lower)	T20G	C	B/C	C	23.11	13.19	4.20	27.3	389.2
IUA_T04	RU19.3	NQAB01_R	Nqabarha	T90A	D	C	C	12.69	5.14	21.82	34.51	9.8
	RU19.6	MNGA01_R	Mngazi	T70B	C	B/C	B/C	19.29	9.06	6.65	25.94	78.2
	RU19.7	MTEN01_R	Mtentu	T60C	C	B/C	B/C	34.39	6.15	9.94	44.33	89.6
	RU19.8	MSIK02_D	Msikaba	T60G	B/C	B/C	B/C	18.37	9.96	12.98	31.31	128.9

* Quaternary catchment

Dam levels and operating rules were integral components of the RQO determination process for the catchment area. Specific RQOs were established for prioritised and key dams, reflecting their unique hydrological, ecological, and operational contexts. These objectives aim to balance water resource management with ecological and socio-economic needs, ensuring sustainable operation and resilience against changing environmental conditions.

For dams identified as having significant concerns related to high sedimentation loads, additional considerations were incorporated into the RQO framework. A dedicated sub-component addressing the reduction of live storage capacity was included to account for sediment accumulation impacts. This approach involved assessing the current dam volume and tracking sedimentation trends through bathymetric surveys. These surveys provide critical data on the extent of sediment deposition, enabling accurate evaluations of the dam's storage capacity and its ability to meet water supply and ecological demands over time.

By integrating sedimentation assessments and operational considerations into the RQO framework, the study addressed both the functional and environmental dimensions of dam management. This ensures that RQOs not only support the effective operation of dams but also mitigate risks associated with sediment build-up, such as reduced water storage, altered flow regimes, and impacts on downstream ecosystems and users.

7.1.2 **Quality**

Effective RQOs for water quality management must be both aspirational and achievable, grounded in the realities of current environmental conditions and resource limitations. Establishing realistic and scientifically sound RQOs ensures the Department avoids setting itself up for failure due to unattainable goals or data inaccuracies.

The process of setting water quality RQOs involved balancing ideal environmental outcomes with the data limitations and porosity of the data at the various water quality monitoring stations throughout the catchment, along with significant gaps in temporal and spatial coverage. Recognising these challenges, the team adopted a pragmatic approach using the following tools and methodologies to set the water quality RQOs:

1. **Ecological Category and Diatom/Aquatic Macroinvertebrate Community Assessment:** The ecological categorisation of the diatom and/or aquatic macroinvertebrate communities served as a central metric for inferring water quality conditions in our study. Diatoms and aquatic macroinvertebrates are reliable bioindicators, reflecting the cumulative impacts of various water quality factors. By analysing the PES of the diatom communities within the selected RUs, the team inferred:
 - Key water quality issues; and
 - Variations in the ecological response to anthropogenic and natural influences.

In the absence of diatom data, the PES of the aquatic macroinvertebrate community has been used.

2. **Guidance Manual:** The DWS (2008) manual for determining the water quality RQOs for ecological Reserves, provided a structured framework. This manual offered practical guidelines for:

- Identifying critical ecological and water quality parameters; and
- Establishing acceptable thresholds for water quality variables and corresponding numerical RQO values, aligned with the PES of the diatom community for the specific RU. This ensured the reflection of current water quality conditions, sets achievable targets for improving or maintaining water quality, and ensures compliance with national standards and international best practices (**Table 7-2** and **Table 7-3**).

Table 7-2: Criteria for water quality RQOs based on the ecological categories for salts, nutrients and system variables (DWS, 2008)

**Ecological categories (EC) for the water quality were inferred from the diatom community EC for that particular priority RU (if available data)*

(a) SALTS: ELECTRICAL CONDUCTIVITY		
Electrical Conductivity	Numerical classification	mS/m
Natural	A	≤30
Good	B	30.1 - ≤55
Upper Fair	C	55.1 - ≤85
Lower Fair	D	>85
Poor	E/F	-

(b) NUTRIENTS: Total Inorganic Nitrogen (TIN)		
TIN	Numerical classification	Upper boundary value per category (mg/L)
Natural: ≤0.25 mg/L	A	≤0.25
Upper Good	A/B	0.50
Good: 0.251 - 1.0 mg/L	B	0.75
Lower Good	B/C	1.00
Upper Fair	C	2.00
Fair: 1.01 – 4.0 mg/L	C/D	3.00
Lower Fair	D	4.00
Poor: >4.0 mg/L	E/F	>4.00

(c) NUTRIENTS: PO ₄ -P			
Rating	Deviation from reference condition	Environmental clues about the periphyton and phytoplankton response to nutrient enrichment	PO ₄ -P (mg/L)
A	No change	Natural (Oligotrophic) - pristine river and catchment, no known man-made changes to the nutrient regime, oligotrophic conditions, no visible presence of phytoplankton, thin periphyton mats (<0.5 mm thick), water clear.	<0.005
B	Small change	Oligo – mesotrophic – minor modifications to the catchment affecting the nutrient status, phytoplankton barely evident, thin periphyton mats (<0.5 mm thick), water is largely clear. Less than 10% cover with filamentous algae.	0.005 – 0.015

(c) NUTRIENTS: PO ₄ -P			
Rating	Deviation from reference condition	Environmental clues about the periphyton and phytoplankton response to nutrient enrichment	PO ₄ -P (mg/L)
C	Moderate change	Mesotrophic moderate modifications to the catchment affecting the nutrient status, some evidence of phytoplankton, medium periphyton mats 0.5-3mm thick), short filamentous algae (<2cm long). 10 - 20% cover with filamentous algae.	0.015-0.025
D	Large change	Eutrophic –visible evidence of phytoplankton and the water appears green, thick periphyton mats (>3 mm thick), long filamentous algae (>2cm long). 20 - 50% cover with filamentous algae.	0.025-0.125
E	Serious change	Eutrophic conditions, visible evidence of algal phytoplankton blooms, thick periphyton mats (>3 mm thick), long filamentous algae (>5 cm long), periphyton rarely washed away. 50 - 80% cover with filamentous algae.	>0.125
F	Extreme change	Hyper-eutrophic conditions are present, low DO and noxious odours, visible evidence of algal scums accumulating in embayments, toxic blue-green algae present or suspected to be present, periphyton <80% cover present most of the time, or long strands of filamentous algae visible. 80 95% cover with filamentous algae.	-

(d) SYSTEM VARIABLES	
Variable	Methodology
	Present Ecological State (PES)
Inorganic Salts	95th percentile of most recent data from the last 3-5 years.
Nutrients (PO ₄ and TIN)	Calculate 50th percentile or median
pH	Comparing 5th & 95th percentiles to pH table or recalibrated table.
Toxic substances (e.g., metals, pesticides)	95th percentiles

(e) SYSTEM VARIABLES: Dissolved Oxygen concentration			
Rating	Deviation from reference condition	Environmental clues about the dissolved oxygen status	Dissolved oxygen concentration (mg/L)
A	No change	Known to be a pristine river, no known problems or concerns about dissolved oxygen; all oxygen sensitive species are present.	>8
B	Small change	Some man-made modifications in the catchment but no known problems or concerns about DO, most oxygen sensitive species are present.	7-8
C	Moderate change	Some concerns about dissolved oxygen, some oxygen sensitive species are present but mostly oxygen tolerant species.	6-7
D	Large change	Known problems with reduced dissolve oxygen, mostly low DO tolerant species are present.	4-6

(e) SYSTEM VARIABLES: Dissolved Oxygen concentration			
Rating	Deviation from reference condition	Environmental clues about the dissolved oxygen status	Dissolved oxygen concentration (mg/L)
E	Serious change	Major know problems with low dissolved oxygen, anoxic odours sometimes present, only very low DO tolerant species present.	2-4
F	Extreme change	Extreme concerns about low DO, anoxic odours present most of the time, colour of the water often dark with organic material, benthic algae replaced by grey/black bacterial films and sewage fungus, no biota present most of the time.	0-2
(f) SYSTEM VARIABLES: pH			
pH		Numerical classification	Upper boundary value per category
Natural: 6.5 – 8.00		A	6.50-8.00
Upper Good		A/B	5th Percentile: 5.75 – 6.00 95th Percentile:8.05 – 8.37
Good: 5.75 – 8.05 and 6.46 – 9.00		B	5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69
Lower Good		B/C	5th Percentile: 6.24 – 6.46
			95th Percentile:8.69 – 9.00
Upper Fair		C	5th Percentile: 5.00 – 5.23 95th Percentile:9.05 – 9.36
Fair: 5.00 -5.7 and 9.05 – 10.00		C/D	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
Lower Fair		D	5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00
Poor: <5.00 or >10.0		E/F	<5.00

With regards to Total Suspended Solids (TSS), the South African Water Quality Guidelines for Freshwater Ecosystems - Version 2 and the Water Quality Guidelines Decision Support System (WQGDSS) (Version 1.0.0.47) (revised version) were derived from the 1996 Water Quality Guidelines for Aquatic Ecosystems. The revised Guideline follows a multi-tier approach, Tiers 1- 3:

- Tier 1 – Generic guidelines are developed using toxicological data via species sensitivity distribution (SSD) curves;
- Tier 2 – Ecoregion-level II guidelines address spatial variability, considering factors like climate, geology, soils, and altitude; and
- Tier 3 – Site-specific assessments are conducted when Tiers 1 and 2 indicate potential risks, focusing on detailed, scenario-based evaluations.

According to DWAF (2008), the Target Water Quality Resource (TWQR) for TSS should be limited to less than 10% of the background TSS concentration at a given site and time. However, due to a lack of data to establish background concentrations/baseline or define a

threshold for potential concern (TPC), the WQGDSS tool was used instead. Since the RU sites fall within specific ecoregions, Tier 2 of the tool was used to identify ecological category limits for suspended solids. Based on the diatom and/or macroinvertebrate ecological category assigned to each RU, the TPC for suspended solids was set accordingly for each reach.

Table 7-3: Criteria for water quality RQOs based on the ecological categories for toxins (DWS, 2008)

Toxic substance (mg/L)	Rating					
	A	B	C	D	E	F
Al	≤0.02	≤0.0625	≤0.105	≤0.15	≤0.1925	>0.1925
Ammonia	≤0.015	≤0.04375	≤0.0725	≤0.1	≤0.12875	>0.12875
As	≤0.02	≤0.0575	≤0.095	≤0.13	≤0.1675	>0.1675
Atrazine	≤0.019	≤0.04875	≤0.0785	≤0.1	≤0.12975	>0.12975
Cd soft*	≤0.0002	≤0.0007	≤0.0012	≤0.0018	≤0.0023	>0.0023
Cd mod**	≤0.0002	≤0.00095	≤0.0017	≤0.0028	≤0.00355	>0.00355
Cd hard***	≤0.0003	≤0.001625	≤0.00295	≤0.005	≤0.006325	>0.006325
Chlorine (free)	≤0.0004	≤0.00175	≤0.0031	≤0.005	≤0.00635	>0.00635
Cr (III)	≤0.024	≤0.115	≤0.206	≤0.34	≤0.431	>0.431
Cr (VI)	≤0.014	≤0.0675	≤0.121	≤0.2	≤0.2535	>0.2535
Cu soft*	≤0.0005	≤0.001025	≤0.00155	≤0.0016	≤0.002125	>0.002125
Cu mod**	≤0.0015	≤0.003025	≤0.00455	≤0.0046	≤0.006125	>0.006125
Cu hard***	≤0.0024	≤0.004875	≤0.00735	≤0.0075	≤0.009975	>0.009975
Endosulfan	≤0.00002	≤0.000075	≤0.00013	≤0.0002	≤0.000255	>0.000255
Fluoride	≤1.5	≤2.51	≤3.52	≤2.54	≤3.55	>3.55
Pb soft*	≤0.0005	≤0.001625	≤0.00275	≤0.004	≤0.005125	>0.005125
Pb mod**	≤0.001	≤0.003	≤0.005	≤0.007	≤0.009	>0.009
Pb hard***	≤0.002	≤0.00575	≤0.0095	≤0.013	≤0.01675	>0.01675
Hg	≤0.00008	≤0.000525	≤0.00097	≤0.0017	≤0.002145	>0.002145
Phenol	≤0.06	≤0.2	≤0.34	≤0.5	≤0.64	>0.64

*For use in soft water (Hardness less than 60mg CaCO₃/l)

**For use in moderately hard water (Hardness between 60 – 119 mg CaCO₃/l)

***For use in hard water (Hardness greater than 120 mg CaCO₃/l)

3. **Large pollution sources include point sources (e.g., wastewater treatment works (WWTWs)) and diffuse sources (e.g., general pollution from settlements or towns and poorly maintained sewage reticulation networks and irrigation return flows).** These issues result in significant volumes of return flows entering freshwater systems. Using the 2023 Green Drop Progress Report (DWS, 2023a) and Green Drop Watch Report (DWS, 2023b), along with conducting a spatial analysis of the priority river RUs in relation to WWTWs, specific RQOs for pathogens such as *Escherichia coli* were established. This assessment applied health risk guidelines or RQOs for faecal coliforms/*E. coli*, as outlined in the National Microbial Monitoring Programme (NMMP) of South Africa (DWA, 2002) (**Table 7-4**). Stricter RQOs were implemented for the priority RUs located downstream or in close proximity to WWTWs, especially those

located on the same sub-quaternary reach as the RU. Additionally, more restrictive risk categories were applied to priority RUs with higher numbers of users, recognising the increased potential for human exposure to contaminated water. Overall, these measures aimed to mitigate the health risks associated with faecal contamination in freshwater systems, ensuring safer water quality for communities and ecosystems reliant on these resources.

Table 7-4: Health risk guidelines for RQOs for faecal coliforms/*Escherichia coli* (as used by the National Microbial Monitoring Programme (NMMP) of South Africa (DWAF, 2002))

Water use attribute	Potential Health Risk			IMPORTANT NOTE
	Low	Medium	High	
	RAW RIVER WATER QUALITY			
	Faecal coliform or <i>E. coli</i> counts/100 ml			
1. Drinking untreated water	0	1 - 10	>10	
2. Drinking water after limited treatment	<2 000	2 000 – 20 000	>20 000	The guideline value refers to raw water; although water should only be used for drinking only AFTER limited treatment has taken place, so the <i>E. coli</i> counts shown on the table are BEFORE treatment. Limited treatment refers to treatment such as boiling and does not refer to more conventional and formal treatment such as flocculation, sedimentation, filtration and disinfection.
3. Full or partial contact	<600	600 – 2 000	>2 000	Full contact refers to full-body immersion activities such as swimming or baptism, whereas partial contact refers to activities such as canoeing, where water may be splashed on to the body.
4. Irrigation of crops to be eaten raw	<1 000	1 000 – 4 000	>4 000	

Stricter RQOs and risk categories were applied to priority RUs near WWTWs or with high user exposure to reduce health risks from faecal contamination and ensure safer water quality.

For those prioritised RUs in the absence of water quality data necessary to establish practical and effective RQOs, it was strongly recommended that the Department initiate the collection of baseline water quality data (more detail to be provided during the next step of the study for monitoring and implementation). This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU. It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D. Therefore, the numeric RQOs for those RUs ensured that the established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.

Thus, setting the water quality RQOs, underpinned by the DWS (2008) framework and ecological categorisation of diatom communities, offered a robust pathway for managing this study area's water resources sustainably. By grounding objectives in reality and leveraging

available tools and knowledge, DWS can foster measurable improvements in water quality while safeguarding ecological integrity and societal needs.

Regarding dam water quality, two critical sub-components—clarity and eutrophication—were incorporated into the RQOs framework. These parameters were selected to address key concerns related to water quality and ecosystem health, ensuring that systems are maintained or improved over time.

Clarity can be evaluated using Secchi disk measurements, a widely recognised method for assessing water transparency. Water clarity serves as a broad indicator of overall water quality and is closely linked to the level of eutrophication. Reduced clarity often signals elevated nutrient levels, sedimentation, or algal growth, all of which can disrupt aquatic ecosystems. By including clarity in the RQOs, the objective is to establish and maintain baseline transparency levels that reflect a balanced aquatic environment. Secondly, RQOs for eutrophication levels have been included and can be assessed using cyanobacteria indicators, a critical metric for understanding nutrient enrichment in water bodies. The presence and concentration of cyanobacteria serve as a proxy for nutrient overloads, particularly nitrogen and phosphorus, which drive algal blooms and degrade water quality. Remote sensing techniques can be employed to monitor cyanobacteria levels across the dams, providing a scalable and efficient method for ongoing assessment.

To ensure water quality remains within acceptable thresholds, the RQOs specify that cyanobacteria concentrations must be managed to maintain mesotrophic conditions. Mesotrophic levels are indicative of moderate nutrient concentrations, balancing productivity without causing adverse effects such as hypoxia or biodiversity loss.

By integrating these sub-components into the RQO framework, a comprehensive approach was established to monitor and manage dam water quality. This proactive strategy supports not only the ecological integrity of dam ecosystems but also their ability to meet human and environmental demands sustainably.

7.1.3 *Habitat*

Geomorphology

The ecosystem services and biological diversity of the river systems are largely dependent on diverse physical habitat and morphological structure that are available and accessible across a wide range of flows. The habitat RQOs took the geomorphological drivers, physical habitat template and disturbance to the habitat into account. The RQOs were influenced by previous geomorphological RQOs for the Inkomati River by Mark Rountree (DWA, 2010) and the Umzimvubu River by Kate Rowntree (DWS, 2018), and the Rapid Habitat Assessment Method (RHAM) (DWA, 2009).

The first habitat indicator is the Geomorphological Driver Assessment Index (GAI) that integrates subjective scores to the alterations of the geomorphic drivers (flow and sediment), the reach geomorphology (landscape connectivity, sediment dynamics, reach type) and the site geomorphology (disturbance to bed, banks and benches) (Rowntree, 2013). The remaining indicators include more quantitative observations on changes to the extent of bank erosion (channel width and dominance of erosional processes), the dominant size of riffle

sediment (indicates sedimentation or armouring), the level to which the riffle sediment is embedded by fine sediment (excess fine sediment that smothers larger clasts and makes the cobbles inaccessible as shelter), the extent to which pools are filled in by sediment (loss of deep slow-flowing habitats) and the presence and width of marginal depositional features such as flood benches that are important growth medium for riparian vegetation and refuge during high flows. Tracking these indicators over time will allow thresholds of concern to be observed and flagged for further investigation.

The general lack of existing geomorphic and habitat data for these rivers and their variability lowers the confidence of these RQOs. The RQOs were set on a single observation at the intermediate EWR sites only, which is a limitation. The RQOs need to be reviewed in the future after several field observations have been conducted.

Riparian vegetation

The approach to setting RQOs for riparian vegetation was via the generation of EcoSpecs and TPCs in relation to the general riparian character of each intermediate EWR site. The following vegetation components, assessed in the field for higher confidence, and when considered together, describe the overall state of the riparian zone:

- Dominant vegetation cover within the riparian zone and sub-zones;
- Invasion by perennial alien species;
- Terrestrialisation (the disproportionate abundance of terrestrial species within the riparian zone);
- General vegetation structure as shown by proportions of riparian woody species, reeds and non-woody species (grasses, sedges and dicotyledonous forbs) expressed by measures such as aerial cover (% of sub-zone);
- General vegetation composition as shown by taxon richness, rarity and endemism and key species (usually obligate riparian species); and
- Threatened or protected riparian plant species.

Different types of riparian ecosystems are characterised by different dominant riparian vegetation e.g., grass-dominated Highveld / mountainous streams, tree and shrub-dominated Lowveld / lowland rivers flowing through Bushveld, tall tree-dominated (forest) streams through forested / kloof areas, or mixed vegetation e.g., reed and tree / shrub dominated rivers which are common in the Keiskamma, Fish to Tsitsikamma catchment areas. The dominant vegetation type (riparian) is a key component of the structure and function of the riparian zone as a whole, but also to sub-zone for example: the marginal zone may frequently be dominated by reeds or grasses while the Macro Channel Bank (MCB) may be dominated by tall, dense woody vegetation. General vegetation structure is characterised by relative proportions of riparian and terrestrial woody species, reeds and non woody species, including grasses, sedges and dicotyledonous forbs, as well as open unvegetated areas. The exact relative proportions characterise the site, usually expressed by measures such as aerial cover, density, abundance (numbers of individuals) or population structure (diversity of cohorts / age). This measure is based on a dynamic whereby riparian vegetation in infrequently flooded zones or along banks will usually tend towards increased woody cover with diminishing non-woody cover (including reeds), this being "reset" by large flood events. "Reset" here refers to the

removal of woody plants by floods, the resulting open space being available for quick colonising non-woody species (including reeds). The RQO assumes that if woody cover increases beyond a given value and remains high, that the flooding regime has been changed so that large floods are smaller or less frequent or both.

Terrestrialisation is the disproportionate abundance, density or occurrence of terrestrial species within the riparian zone. Under reference conditions woody terrestrial species are not expected in the marginal or lower zones; are expected to be transient (if any) along flood features in the upper zone due to frequent flooding disturbance; and are expected to occur on the MCB in numbers concurrent with natural flooding frequency, magnitude and duration for the reach (i.e. hydrologically controlled abundance). In cases where RQOs were set for the riparian obligate/terrestrial species mix, it was always for flood features along the upper zone since this is the area where terrestrialisation first manifests.

Habitat: Instream and riparian habitat through the Index of Habitat Integrity

For those priority RUs whereby detailed riparian vegetation information was not available, RQOs were established using the data gathered from various other monitoring sites whereby the IHI framework developed by Kleynhans et al. (2008) was used.

The IHI evaluates the degree of alteration in aquatic habitats by assessing factors such as flow modification, water quality, and physical habitat degradation. The RQOs were then set using the ecological category for both instream and riparian vegetation, keeping cognisant of meeting the TEC.

Habitat: Dam vegetation

RQOs for alien aquatic plant species and in-channel *Phragmites sp* within and downstream dams have been established to manage their impact on water quantity, quality, ecosystem health, and dam functionality. Alien aquatic plant species, often invasive, can significantly alter water quality by increasing nutrient loads, or responding to high nutrient loads within the dam, reduced oxygen levels, and obstructing water flow.

Thus, the RQOs aim to limit their proliferation by maintaining regular monitoring and implementing control measures. For *Phragmites sp.*, the focus will be on managing their density and distribution within in-channel zones downstream dams, as excessive growth can lead to siltation, reduced storage capacity, and disrupted aquatic habitats downstream.

7.1.4 Biota

The characteristics and distribution of aquatic and semi-aquatic biota (maintenance or improvement of ecological state):

- Sub-components were selected for a RU if Biota was prioritised as a component. Fish, macroinvertebrates, and diatoms were selected based on relevance to a specific RU;
- Ecological Categories per component, Ecostatus and habitat integrity, land use activities present, and relevant, available data were considered;

- Maintenance or improvement of the biotic sub-component was recommended based on PES and TEC. Any important species as well as potential threats were also considered; and
- RQOs were specified in terms of meeting the TEC (and Water Resource Class); recommended condition and monitoring.

Fish

- Available information – data obtained from the two surveys undertaken (Intermediate EWR sites) and a single survey (for Rapid Level 3 EWR sites) that formed part of the Reserve determination was used as a key source of information, and data obtained through the River EcoStatus Monitoring Programme (REMP). Aerial footage (Google Earth), and all relevant information were used to determine the expected present suitability of each reach for each species. This was transferred to the Fish Response Assessment Index (FRAI) and refined based on expert judgement and additional information. The FRAI results were then used to describe narrative RQOs and numerical limits for each sub-component indicator. It is important to note that to ensure the FRAI scores remains within the range of the specified RQO categories, the user must be using the same reference data used in the EWR study (DWS, 2023 Report No. WEM/WMA7/00/CON/RDM/1723 and WEM/WMA7/00/CON/RDM/1823); and
- Species diversity and key species and overall fish health was further included.

Macroinvertebrates

- Similar to the fish, available information – data obtained from the two surveys undertaken (Intermediate EWR sites) and a single survey (for Rapid Level 3 EWR sites) that formed part of the Reserve determination was used as a key source of information, and data obtained through the REMP. Narrative RQOs were set according to the specific Ecological Category as determined by the Macroinvertebrate Response Assessment Index (MIRAI) for a specific site representative of the resource unit or area considered. Numerical limits were then set for the specific MIRAI Ecological Category, and for the SASS5 (South African Scoring System Version 5) total score and ASPT (Average Score Per Taxon). It is important to note that to ensure the MIRAI scores remains within the range of the specified RQO categories, the user must be using the same reference data used in the EWR study (DWS, 2023 Report No. WEM/WMA7/00/CON/RDM/1723 and WEM/WMA7/00/CON/RDM/1823); and
- Key taxa abundance and taxon dominance was further included as RQOs.

Diatoms:

- The Specific Pollution Sensitivity Index (SPI) was used as the numerical RQO which determines the river “health status”.

7.2 Estuaries

RQOs are set for the short- to medium term (5 to 10-year period) for the following components:

- Quantity, pattern and timing of instream flow (hydrology);
- Hydrodynamics (e.g., mouth state);
- Water quality;
- Characteristics and condition of primary producers (e.g., microalgae and macrophytes); and
- Characteristics and condition of biota (e.g., fish, invertebrates and birds).

Hydrological RQOs are provided as a flow regime (described using a flow duration table) associated with the TEC for the priority estuaries within the IUA. For the other systems, the output is based on a hydrological time series generated for the PES with an indication that the various components of the flow regime (baseflows and floods) meet the EWR requirement.

Water quality RQOs were set for all estuaries based on environmental requirements and national guidelines or standards. The water quality component is discussed in **Section 7.2.3**.

Habitat and biota are described as the habitat and biota associated with the TEC. The format of the RQOs is as follows:

- PES for each component;
- Overall TEC; and
- Ecological objectives for components.

Detailed RQOs were developed for the priority estuaries of the study area for the TEC. Where the RQOs do not meet the TEC a “↑” was used to indicate which individual components should improve to achieve the TEC. “X → Y” indicates the expected trajectory of change from the short-term RQO to meet the long-term TEC. A negative trajectory of change is indicated by a “↓”, while “↓↑” indicates that the trajectory of change is not stable.

7.2.1 Hydrodynamics

Where a detailed study was conducted and the mouth state information matches the observed information, RQOs are based on the selected scenario. If an estuary is very sensitive to flow modification (e.g., very small or shallow), in a protected area and/or in an A or B Category, a ±5% variation was allowed over a 5-year period. However, if an estuary was deemed to be more robust (e.g., large size, mouth protected) from a flow perspective and/or in a C to F Category, a 10 - 20% variance from the current data set was allowed for over a 5-year period. Where more information was available it was incorporated into the RQOs.

7.2.2 Salinity

Salinity RQOs were derived from measured data, published information, extrapolated for similar systems or derived from the modelled condition in the EWR assessment. Key determining estuarine features used in setting the salinity RQOs were estuary size, estuary depth, % mouth open and mouth position (i.e. perched/not perched). Historical data sets used include unpublished CSIR Harrison observations, NMU field observations and DWS data sets.

7.2.3 General Water Quality

For estuaries, unlike rivers, there are no official, numerical water quality RQOs specified for various health categories because of the diverse and site-specific nature of many of these variables in estuaries. However, for this study, where water quality RQOs had to be proposed for a large number of estuaries at a desktop level, it was necessary to develop a generic approach to derive such RQOs. Based on a general understanding of water quality characteristics in estuaries along this part of the Eastern Cape coast, as well as expert knowledge, target ranges were proposed for various water quality health categories as listed in **Table 7-5**.

Table 7-5: Proposed RQOs for water quality associated with ecosystem health for the estuaries

VARIABLE	HEALTH CATEGORY					
	A	B	C	D	E	F
Dissolved oxygen	Average in estuary ≥6 mg/L		Average in estuary ≥54 mg/L	Average in lower estuary ≥4 mg/L		
Turbidity	Estuary: Clear (<10NTU) accept during high flows			Estuary: Mostly clear (<15NTU) accept during high flows		
Dissolved inorganic nitrogen (DIN) in river inflow	50th percentile ≤0.1 mg/L	50th percentile ≤0.125 mg/L	50th percentile ≤0.2 mg/L	50th percentile ≤0.35 mg/L	50th percentile ≥0.35 mg/L	
Dissolved inorganic phosphate (DIP) in river inflow	50th percentile ≤0.01 mg/L	50th percentile ≤0.015 mg/L	50th percentile ≤0.02 mg/L	50th percentile ≤0.03 mg/L	50th percentile ≥0.03 mg/L	
Toxic substances	- Substance concentrations in estuarine sediment not to exceed targets as per WIO Region guidelines or future updates (UNEP/Nairobi Convention Secretariat and CSIR, 2022) - Substance concentrations in estuarine waters not to exceed targets as per SA Water Quality Guidelines for coastal marine waters, or future updates to be prepared by Department of Forestry, Fisheries and the Environment (DFFE) (DWAF, 1995)					

These target RQOs are not cast in stone but are considered most appropriate for the level of assessment. For this study, the water quality RQOs were equated to the corresponding TEC category allocated to an estuary. Where the PES category for water quality was below the TEC category, water quality was identified as a potential risk and the water quality RQOs equivalent to the TEC category were proposed. Where the water quality PES category was higher than the TEC, the RQOs for the PES were maintained as a precautionary approach until monitoring showed a relation was appropriate.

In terms of RQO for recreational use, the recommended targets proposed for South Africa's coastal marine waters were applied as summarised in **Table 7-6** (DEA, 2012).

Table 7-6: RQOs for recreational use specified as risk-based ranges for intestinal enterococci and *E. coli* (microbiological indicator organisms) (DEA, 2012)

Category	Estimated risk per exposure	ENTEROCOCCI	<i>E. coli</i>
		(Count per 100 ml)	(Count per 100 ml)
Excellent	2.9% gastrointestinal (GI) illness risk	≤100 (95th percentile)	≤250 (95th percentile)
Good	5% GI illness risk	≤200 (95th percentile)	≤500 (95th percentile)
Sufficient or Fair (minimum requirement)	8.5% GI illness risk	≤185 (90th percentile)	≤500 (90th percentile)
Poor (unacceptable)	>8.5% GI illness risk	>185 (90th percentile)	>500 (90th percentile)

In South Africa, the minimum requirement for recreational use is the "Sufficient" or "Fair" category. Therefore, any estuary used for contract recreation had to meet this RQO. For estuaries where the Blue Flag status has been awarded, or for estuaries immediately adjacent to beaches awarded Blue Flag status, the RQO for recreation in the "Excellent" category will be assigned.

7.2.4 Microalgae

The RQOs were set for each estuary based on literature, field data and/or expert opinion informed by first-hand knowledge of the region's estuaries. RQOs were established for different estuaries based on the main groups occurring in them. Microalgae were divided into two groups, namely: benthic microalgae (microphytobenthos) and phytoplankton. These were broadly defined according to species richness, abundance/biomass, and community composition. Species richness and community composition was estimated as a % remaining of reference conditions (i.e., qualitative rating system), with community composition being based on diatom diversity (benthic microalgae) and the extent of HAB species (phytoplankton) (see **Table 7-7**). Finally, a quantitative approach was used to assess abundance, i.e., using biomass values (Chl-a concentrations). These RQOs should be further developed and refined as part of the monitoring requirements of individual systems.

Table 7-7: Microalgae: Qualitative description of health conditions estimated for ecological health score categories, expressed as modification from Reference Condition (Reference = Category A)

EHI Category	% Similarity to Reference	Simplified category	Description
A	100 – 91	Natural/Near-Natural (NN)	Phytoplankton biomass: 0 to <5 µg/L Benthic microalgae biomass: 0 to <50 mg/m ²
B	90 – 76		Harmful algae: Not present Benthic diatom diversity: H' >3

EHI Category	% Similarity to Reference	Simplified category	Description
C	75 – 61	Moderately Modified (MM)	Phytoplankton biomass: ≥ 5 but $<20 \mu\text{g/L}$ Benthic microalgae biomass: ≥ 50 but $<100 \text{ mg/m}^2$ Harmful algae: Possibly present Benthic diatom diversity: $H' >2$ but <3
D	60 – 41	Heavily Modified (HM)	Phytoplankton biomass: ≥ 20 but $<60 \mu\text{g/L}$ Benthic microalgae biomass: ≥ 100 but $<150 \text{ mg/m}^2$ Harmful algae: Present Benthic diatom diversity: $H' >1$ but <2
E	40 – 21	Severely/ Critically Modified (SM)	Phytoplankton biomass: $\geq 60 \mu\text{g/L}$ Benthic microalgae biomass: $\geq 150 \text{ mg/m}^2$ Harmful algae: Abundantly present Benthic diatom diversity: $H' <1$

7.2.5 *Macrophytes*

The RQOs were set for each estuary based on available data and recent field surveys and those data can be considered to be of high confidence. Expert opinion and Google images were used to make the assessments. RQOs were generally set to maintain the distribution of current macrophyte habitats (10 - 20 % change in area), maintain the integrity of the riparian zone and floodplain habitat and prevent the spread of invasive plants in both the water column and riparian zone. Increased nutrient input (e.g., agricultural return flows) to estuaries will result in reed encroachment, macroalgal blooms and floating aquatic invasives such as water hyacinths. Estuaries with important mangrove, salt marsh and seagrass ecosystems were identified where present. The seagrass *Zostera capensis* is endangered and specific RQOs were set for conservation and management. Because seagrass beds are naturally variable in response to freshwater flooding, the RQO is to maintain presence during low flow conditions.

7.2.6 *Macroinvertebrates*

The RQOs were set for each estuary based on literature, field data and/or expert opinion informed by first-hand knowledge of the region's estuaries. RQOs were established for different estuaries based on the taxa occurring in them. Particularly, invertebrates known to be responsive to habitat deterioration pressures (e.g., eutrophication) are accounted for in the RQOs. Also indicative of change are the presence of species that require ecological relevant periods of functional marine connectivity to complete their life-history recruitment phases. The invertebrate community is diverse and challenging to characterise, therefore these RQOs should be further developed and refined as part of the monitoring requirements of individual systems.

7.2.7 *Fish*

The RQOs were chosen based on published fish metrics for assessing the environmental condition of estuaries (Harrison and Whitfield 2004). These include the total number of taxa

as a measure of species diversity and composition, the number of species that make up 90% of the abundance as a measure of species abundance, relative abundance of estuarine-associated marine taxa as a measure of nursery function and the presence of piscivorous and benthic invertebrate feeding taxa as a measure of trophic integrity. These RQOs were set broadly for each estuary type (small fluvially dominated, predominantly open, small temporarily closed, large temporarily closed and large fluvially dominated) based on analysis of baseline data from seven sections of the coastline (Harrison et al. 2000). RQOs are expressed as requirements based on a sampling trip. For example, a requirement that 18 species should occur in an estuary implies that 18 species should be sampled during a single sampling trip. Over several trips, more than 18 species would be expected to have been recorded in the system.

The presence of seagrass-associated species in seagrass beds was selected as a further measure of nursery function in important *Zostera capensis* estuaries (based on literature). The presence of benthic soles and gobies throughout the estuary was selected as a measure of water quality (anoxic conditions affect the distribution of benthic species – Nodo et al. 2023) in selected estuaries where historically these species are abundant (Harrison et al. 2000).

Eels present in the estuary or catchment was set as a measure of connectivity in selected estuaries based on expert opinion informed by first-hand knowledge of the estuaries. These RQOs should be further developed and refined as part of the monitoring requirements of individual systems.

7.2.8 Birds

The RQOs were set for each estuary based on analysis of available data and expert opinion informed by first-hand knowledge of the estuaries. Preliminary bird lists based on CWAC counts, literature, field surveys and expert opinion were drawn for the different estuaries. These lists were then used to establish RQOs. From these baselines of known species richness and abundance records, future monitoring enables an assessment of change in these metrics. Since birds respond primarily to habitat and resource (i.e., food) availability (see above), the RQOs across these components will overlap. These RQOs should be further developed and refined as part of the monitoring requirements of individual systems.

7.3 Groundwater

The primary aspects of the RQO development are associated with quantity and quality, as well as consideration of the ecological component. RQOs provide a measure against these criteria through monitoring of water levels, chemical compounds of concern, and abstraction rates. Refer to **Table 7-8** which provides an overview of the component, general condition and special conditions for when setting the groundwater RU RQOs. A summary of the RQO development is presented in **Chapter 11**.

Table 7-8: Groundwater RQO approach

Component	Description of Approach	General Conditions	Special Conditions
Quantity and Aquifer Protection	Abstraction Rates	Existing allocations per the schedules specified in Schedule 1, General Authorisation or Water Use Licence conditions.	Boreholes to be managed according to the groundwater management plan developed from the sustainable yield tests. New applications to have allocations within the quaternary catchment surplus.
	Stressed Units	Over allocated or currently stressed catchments require more detailed assessment to more accurately determine recharge and reserve, or delineation of sub catchments is required.	
	Water Levels	Numerical limits are only set on suitable time series monitoring data. Regional drawdown should not exceed the Peak (once off) monitoring drawdown value. Long term drawdown trends should not exceed the 75 th percentile monitoring borehole drawdown. Depth to groundwater should not exceed the critical depth of the abstraction borehole at any time.	In the absence of current monitoring boreholes, no numerical limits can be set. Monitoring boreholes need to be installed or identified through a hydrocensus for baseline monitoring and setting of limits. Exceedance of the general conditions should result in further investigation and/or abstraction restrictions being applied until conditions stabilise.
Quality	Compounds of Concern	Numerical limits are only set on suitable time series monitoring data. COCs are derived from available monitoring data. Additional compounds should be considered on a site specific basis. The long term regional water quality trend should not exceed the 75 th percentile for each compound. In certain cases, the	In the absence of current monitoring boreholes, no numerical limits can be set. Monitoring boreholes need to be installed or identified through a hydrocensus for baseline monitoring and setting of limits. The TWQR limits can be applied in the absence of time series monitoring data.

Component	Description of Approach	General Conditions	Special Conditions
		75 th percentile is lower than the Target Water Quality Range for Domestic water supplies, and a more conservative numerical limit of the TWQR can be considered.	Exceedance of the general conditions should result in further investigation and/or compliance notices being issued.
Ecological Commitment	Protection zones	Protection zones are required around water resources to prevent impacts on surface water - groundwater interactions that are important to the ecological reserve and flows in surface water resources.	Determine protection zones from the radius of influence of a borehole established from borehole yield testing.

7.4 Wetlands

The wetland RQOs were created using a combination of guideline documents, namely the DWS (2011) document, the DWS (2016) method document and the more recently published Bredin et al (2019). Specific RQOs were set for most of the WRUs that were delineated and assessed in the wetland eco-classification report (Report No. WEM/WMA7/00/CON/RDM/1223). The approach outlined in DWS (2016) was followed as outlined in **Figure 7-1**, and supplemented with information from the Bredin *et al.* (2019) method. Both narrative and numerical RQOs were set for the WRUs, where sufficient data were available. The following summarises the approach undertaken for each step:

- *Collate information on flow and non-flow related impacts:* This step was undertaken during the eco-classification and assessment (refer to the final wetland report – DWS 2023, Report No. WEM/WMA7/00/CON/RDM/1623) whereby moderately detailed assessments were undertaken to determine all impacts on the WRUs.
- *Select sub-components and indicators for RQO determination and monitoring:* The main components of relevance to wetlands include water quantity, water quality, habitat and biota. Sub-components should be sensitive to actual and potential impacts and indicators should be easily measurable on a repeating basis.
- *Provide narrative RQOs for indicators of high priority WRUs:* This includes the preparation of narrative-based objectives for specific wetlands, often in the absence of strong numerical data for wetlands.
- *Provide numerical RQOs for indicators of high priority WRUs:* This includes the preparation of numerical objectives to complement the narrative RQOs but are often limited by the type and quality of baseline data that was collected for each wetland.
- *Provide broad level narrative RQOs for priority catchments:* This step was not undertaken in this study given the number of WRUs and the number of detailed RQOs set per WRU.
- *Provide broad level narrative RQOs for wetlands across the wetland region:* This step was not undertaken in this study given the number of WRUs and the number of detailed RQOs set per WRU.

Each wetland was considered individually, accounting for their unique and specific impacts and potential future impacts, which were determined during the eco-classification stage of the study. The current and potential future impacts were ranked according to their severity and likelihood of occurring, and the factors that make each wetland important and/or sensitive were considered when creating preliminary management and monitoring recommendations in the eco-classification report. These management and monitoring recommendations were largely based on the desired direction for change in selected sub-components for each wetland. The desired direction of change for these sub-components was determined by the wetland specialists involved in this study and in some cases, in consultation with stakeholders near the wetlands. The monitoring and management recommendations that were included in the eco-classification report were adapted and formalised in the RQO setting process.

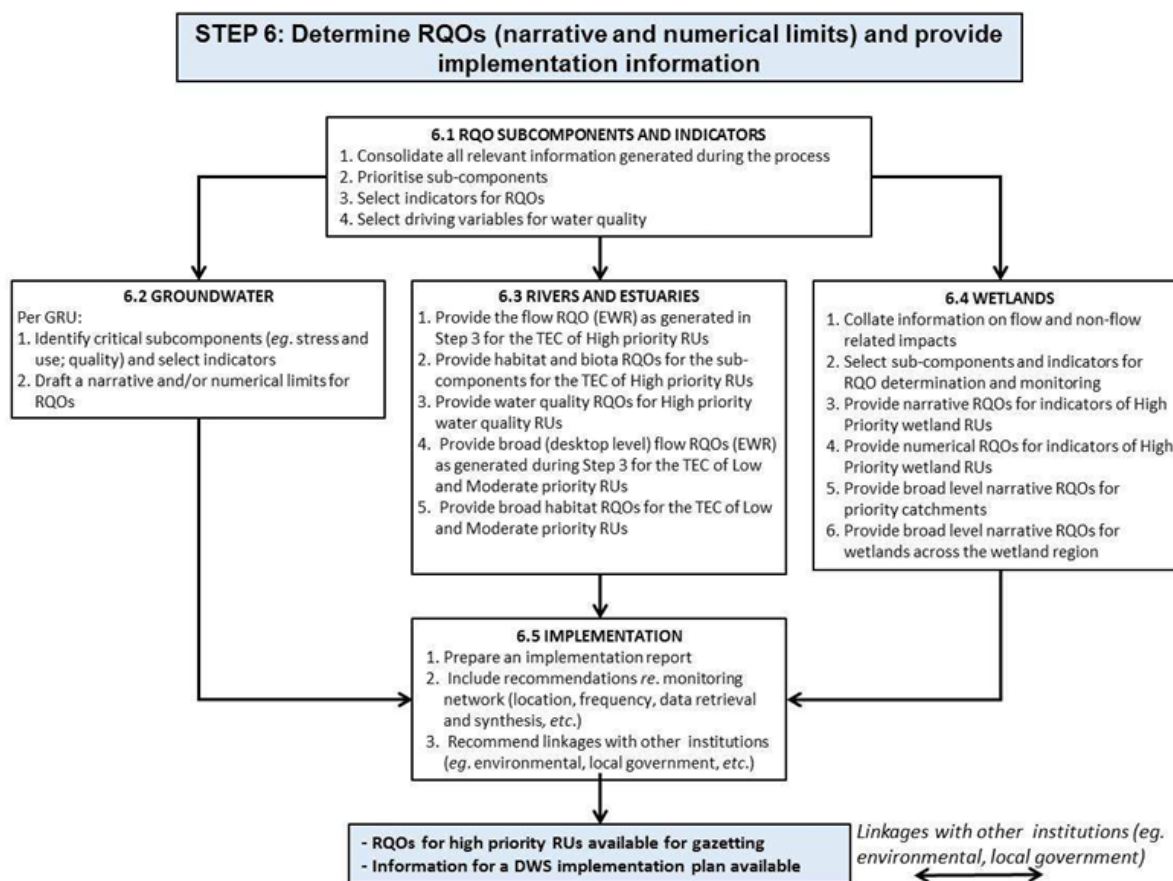


Figure 7-1: Illustration of the steps undertaken to determine RQOs for all wetland resource units in the study area (after DWS, 2016).

8. RIVERS RESOURCE QUALITY OBJECTIVES

The following sections outline the proposed RQOs for rivers within the Keiskamma, Fish to Tsistikamma catchment areas. Each priority RU and IUA is addressed in detail per sub-chapter, providing the context and rationale behind the proposed RQOs and their associated numerical limits. This comprehensive approach aims to guide the reader by offering a clear understanding of the reasoning and considerations underpinning the proposed RQOs.

8.1 (1) IUA_K01: Tsitsikamma and headwaters of Kromme to Churchill Dam

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for all water resources.

Refer to **Table 8-1** for the list of priority river RUs and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-2** includes the draft RQOs for IUA_K01 for those RUs and indicators as listed in **Table 8-1**.

Table 8-1: Resource Units delineation and selected indicators for 1. IUA_K01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
1.1	K90A-09040	K90A	Kromme	<i>All indicators. EWR site KROM01_R. Kareedouw WWTW located within the RU</i>	X	X	X	X	X	X	X		X		X	X	X
1.2	K80A-09053	K80A	Elandsbos	<i>Selected according to the RU evaluation tool. No data to set RQOs</i>													
1.3	K80D-09124	K80D	Groot (Coastal)	<i>Diatoms and IHI. Node GROO01_FV</i>	X		X	X	X					X			X
1.4	K80E-09175	K80E	Klasies	<i>No data, thus cannot set RQOs</i>													
1.5	K80E-09152	K80E	Tsitsikamma	<i>Check estuarine flow and water quality RQOs</i>													
1.6	K80F-09201	K80F	Klipdrift	<i>Check estuarine flow and water quality RQOs</i>													

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
1.7	K80F-09262	K80F	Slang	Check estuarine flow and water quality RQOs													

Table 8-2: Draft RQOs for IUA_K01

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 1.1							
Quantity	Low flows	Maintenance and drought flows required for the upstream Kromme River to Churchill Dam	EWR maintenance low and drought flows: Kromme River at KROM01_R (-33.93709; 24.26906) in K90A nMAR = 24.584 x10 ⁶ m ³ TEC=C/D category		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.210	0.027	
				Nov	0.200	0.025	
				Dec	0.139	0.018	
				Jan	0.104	0.011	
				Feb	0.104	0.012	
				Mar	0.104	0.007	
				Apr	0.108	0.000	
				May	0.146	0.011	
				Jun	0.152	0.012	
				Jul	0.177	0.011	
				Aug	0.255	0.032	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
				Sep	0.247	0.031	
	High flows	Freshets and annual flood required for the upper Kromme River	EWR freshets and floods		Freshets/ flood		
					m³/s	Duration (days)	
				Oct	3.6	2	
				Nov	3.6	2	
				Jun	3.6	2	
				Jul	3.6	2	
				Aug	9	3	
				Sep	5.5	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥100cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤11.0 mg/L No available data for Ecoregion 20.02, so values taken from Ecoregion 20.01			TSS >12.1 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category B.			-

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
				Primary focus will be on ammonia concentrations owing to the WWTW.	
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-
Habitat: Riparian Vegetation	Marginal zone (Macro-channel valley)	Dominant vegetation	Non-woody vegetation should dominate the marginal zone	Non-woody cover ≥20% (aerial cover).	Non-woody cover <25% (aerial cover).
		Key species	<i>Miscanthus ecklonii</i> , <i>Juncus lomatophyllus</i> and <i>Cliffortia linearifolia</i> must be present.	3 listed species present.	<i>Miscanthus ecklonii</i> , <i>Juncus lomatophyllus</i> or <i>Cliffortia linearifolia</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤5% (aerial cover).	Perennial alien plant species >5% (aerial cover).
		Terrestrial woody cover		No terrestrial woody plants.	Terrestrial woody plants present.
		Indigenous woody cover		Woody cover ≤30% (aerial cover).	Woody cover >25% (aerial cover).
		Non-woody cover		Non-woody cover ≥20% (aerial cover).	Non-woody cover <25% (aerial cover).
	Non-marginal (Macro-channel bank)	Dominant vegetation	The zone should remain a mix of woody and non-woody vegetation	Woody cover ≥10% (aerial cover); non-woody cover ≥30% (aerial cover).	Woody cover <15% (aerial cover); non-woody cover <30% (aerial cover).
		Key species	<i>Nuxia floribunda</i> must be present.	1 listed species present.	<i>Nuxia floribunda</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches and features should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤20% (aerial cover).	Perennial alien plant species >10% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤10% (aerial cover).	Terrestrial woody cover >10% (aerial cover).
		Indigenous woody cover		Woody cover ≥10% (aerial cover)	Woody cover <15% (aerial cover).
		Non-woody cover		Non-woody cover ≥30% (aerial cover).	Non-woody cover <35% (aerial cover).
	Riparian zone	PES	The PES category should be at least a C	VEGRAI score ≥62%	VEGRAI score <70%

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥15 indigenous species.	<15 indigenous species.
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	Ensure suitable spawning habitat for the Critically Endangered <i>Pseudobarbus senticeps</i> is present	Cobbles >70% extent within flowing riffle habitat between November and March	No flowing water present between November and March and/or cobbles >30% embedded
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <65%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >140; ASPT value: >6.0	SASS5 scores less than 145 and ASPT less than 6.4.
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
					quality deterioration and SIC become exposed.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			Hydropsychidae >2sp	Minimum abundance of an A attained.	If Hydropsychidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Philopotamidae	Minimum abundance of an A attained.	If Philopotamidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Leptoceridae	Minimum abundance of an A attained.	If Leptoceridae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as C (>100) abundance for more than two consecutive surveys.			Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI Score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3			SPI Score <14.5
Priority RU 1.3							
Quantity	Low flows	Maintenance and drought flows required for the Groot River in quaternary catchment K80D	EWR maintenance low and drought flows: Groot River at GROO01_R (-34.03209; 24.19589) in K80D nMAR = 47.573 x10 ⁶ m ³ TEC=B/C category Monitoring of flows at K8H006		Maintenanc e (m³/s)	Drought (m³/s)	
				Oct	0.394	0.147	
				Nov	0.379	0.142	
				Dec	0.314	0.118	
				Jan	0.246	0.094	
				Feb	0.229	0.089	
				Mar	0.209	0.081	
				Apr	0.219	0.085	
				May	0.246	0.094	
				Jun	0.281	0.107	
				Jul	0.305	0.115	
				Aug	0.367	0.137	
				Sep	0.406	0.151	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately $\geq 24\text{cm}$	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS $\leq 11.0\text{ mg/L}$ No available data for Ecoregion 20.02, so values taken from Ecoregion 20.01	TSS >12.1 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score $\geq 78\%$	IHI: Instream score <79.5%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score $\geq 62\%$	IHI: Riparian score <64%
Biota	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score <14.3

8.2 (2) IUA_KL01: Kromme from Churchill Dam to estuary and Gamtoos

This IUA was delineated as a **Class III**. Note: This IUA has priority RUs for all water resources, except wetlands.

Refer to **Table 8-3** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-4** includes the draft RQS for IUA_KL01 for those RUs and indicators as listed in **Table 8-3**.

Table 8-3: Resource Units delineation and selected indicators for 2. IUA_KL01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
2.1	K90D-09127	K90D	Kromme (reach downstream of Mpofu Dam)	Driven by Kromme Estuary RQOs													
2.2	K90D-09127	K90D	Kromme	Sacrificial reach - between Churchil and Mpofu Dam, water users (domestic and industrial) take priority. Thus no RQOs set.													
2.3	K90E-09147	K90E	Geelhoutboom	Selected according to the RU evaluation tool. EWR site GEEL01	X	X	X	X	X							X	X
2.4	K90F-09116	K90F	Swart	Driven by Seekoei Estuary RQOs													
2.5	K90F-09132	K90F	Seekoei	Driven by Seekoei Estuary RQOs and GW RQOs													
2.6	K90G-09096	K90G	Kabeljous	Driven by Kabeljous Estuary RQOs and GW RQOs													

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
2.7	L90A-08877	L90A	Gamtoos	<i>All indicators. EWR site GAMT01_I</i>	X	X	X	X	X			X	X		X	X	X
2.8	L90A-08951	L90A	Kouga	<i>Same ecoregion, same RQOs as priority RU 2.7</i>													
2.9	L90B-09024	L90B	Gamtoos	<i>Same ecoregion, same RQOs as priority RU 2.7. Also driven by Gamtoos estuary RQOs</i>													

Table 8-4: Draft RQOs for IUA_KL01

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 2.3							
Quantity	Low flows	Maintenance and drought flows required for the Geelhoutboom River	EWR maintenance low and drought flows: Geelhoutboom River at GEEL01 (-34.10768; 24.74194) in K90E nMAR = 3.61x10 ⁶ m ³ TEC=C/D category		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.009	0.002	
				Nov	0.009	0.001	
				Dec	0.005	0.000	
				Jan	0.003	0.000	
				Feb	0.003	0.000	
				Mar	0.004	0.000	

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
				Apr	0.005	0.000	
				May	0.006	0.001	
				Jun	0.007	0.002	
				Jul	0.008	0.002	
				Aug	0.010	0.003	
				Sep	0.010	0.003	
	High flows	Freshets and annual flood	EWR freshets and floods	Freshet / flood			
					(m3/s)	Duration (days)	
				Oct	0.3	2	
				Nov	0.3	1	
				Jun	0.3	1	
				Jul	0.3	1	
				Aug	0.3	2	
				Sep	0.3	1	
					1.0	2	
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category D, EC should be <85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L			TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L			PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. This ensures that the	To achieve the category D, DO should be >4 mg/L			DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00			<5.00
		Clarity / turbidity		-			-

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)	established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.	Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <45%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	N/A	N/A	N/A
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained at a Category D or greater.	MIRAI score ≥42%	MIRAI score <44%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >115; ASPT value: >4.8	SASS5 scores less than 120 and ASPT less than 5.0
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Caenidae	Minimum abundance of an A attained.	If Caenidae is missing in two consecutive surveys or has a

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
					single individual present in two consecutive surveys. Should biotopes become exposed for longer than a week.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.

Compo nent	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.				Any taxon occurring in an abundance of >100 for two consecutive surveys.
Priority RU 2.7							
Quantity	Low flows	Maintenance and drought flows required for the Gamtoos River to Estuary	EWR maintenance low and drought flows: Gamtoos River at GAMT01_I (-33.7609; 24.6936) in L90A nMAR = 343.9 x10 ⁶ m ³ TEC=D category		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.616	0.359	
				Nov	0.668	0.39	
				Dec	0.694	0.405	
				Jan	0.596	0.348	
				Feb	0.705	0.411	
				Mar	0.816	0.476	
				Apr	0.622	0.363	
				May	0.571	0.333	
				Jun	0.574	0.335	
				Jul	0.603	0.352	
				Aug	0.703	0.41	
				Sep	0.686	0.401	
	High flows	Freshets and annual flood required for the Gamtoos River	EWR Freshets and floods		Freshets/ flood		
					m ³ /s	Duration (days)	
				Nov	3.2	3	
				Dec	3.2	3	
				Jan	3.2	3	
				Feb	10	3	
				Mar	3.2	3	
					13	3	
				Aug	3.2	3	
				Sep	10	3	

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Water quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be ≤ 85 mS/m	EC > 85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤ 2.0 mg/L	TIN > 2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be < 0.025 mg/L	PO ₄ -P > 0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be > 6 mg/L	DO < 6 mg/L
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 43 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to < 10 % of the background TSS concentrations at a specific site and time. TSS ≤ 31.0 mg/L	TSS > 34.1 mg/L
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts	Maintain a GAI PES score of at least a 'C' or $> 62\%$	GAI PES score $< 62\%$
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 29 mm, D16 of 11 mm and D84 of 90 mm	Riffle dominated by sand and silt or only cobble
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of $< 25\%$ for riffle sediment	Embeddedness levels of $> 25\%$ for 25% of riffle area/sampling points
		Pool depth	Maintain upstream pool with deep open water	Maintain upstream pool with water > 0.5 m deep for $> 60\%$ of pool area	Upstream pool is $> 60\%$ filled with sediment and forming largely shallow habitat

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Habitat: Riparian Vegetation	Aquatic zone	Key Species	<i>Stuckenia pectinatus</i> and <i>Potamogeton schweinfurthii</i> should remain present	2 listed species present.	<i>Stuckenia pectinatus</i> or <i>Potamogeton schweinfurthii</i> absent
	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone	Non-woody cover $\geq 60\%$ (aerial cover).	Non-woody cover $< 60\%$ (aerial cover).
		Key species	<i>Cyperus textilis</i> , <i>Ischaemum fasciculatum</i> , <i>Typha capensis</i> , <i>Cotula nigellifolia</i> and <i>Persicaria madagascariensis</i> should be present	5 listed species present.	<i>Cyperus textilis</i> , <i>Ischaemum fasciculatum</i> , <i>Typha capensis</i> , <i>Cotula nigellifolia</i> or <i>Persicaria madagascariensis</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species $\leq 0\%$ (aerial cover).	Perennial alien plant species $> 5\%$ (aerial cover).
		Terrestrial woody cover		No terrestrial woody plants.	Terrestrial woody plants present.
		Indigenous woody cover		Woody cover $\leq 10\%$ (aerial cover).	Woody cover $> 10\%$ (aerial cover).
		Non-woody cover		Non-woody cover $\geq 60\%$ (aerial cover).	Non-woody cover $< 50\%$ (aerial cover).
		Reed cover		Reed cover $\leq 10\%$ (aerial cover).	Reed cover $> 5\%$ (aerial cover).
	Non-marginal (lower - flood benches)	Dominant vegetation	Non-woody vegetation should dominate the marginal zone	Non-woody cover $\geq 50\%$ (aerial cover).	Non-woody cover $< 55\%$ (aerial cover).
		Key species	<i>Cyperus textilis</i> and <i>Phragmites australis</i> should be present	2 listed species present.	<i>Cyperus textilis</i> or <i>Phragmites australis</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches and features should maintain desired	Perennial alien plant species $\leq 30\%$ (aerial cover).	Perennial alien plant species

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
			dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.		>15% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤5% (aerial cover).	Terrestrial woody cover >5% (aerial cover).
		Indigenous woody cover		0% ≥Woody cover≤20% (aerial cover)	Woody cover absent or >15% (aerial cover)
		Non-woody cover		Non-woody cover ≥50% (aerial cover).	Non-woody cover <55% (aerial cover).
		Reed cover		Reed cover ≤10% (aerial cover).	Reed cover >5% (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	The riparian vegetation structure and composition on the banks should maintain desired dominance and non-dominance, with limited or no encroachment by alien species.	Non-woody cover ≥40% (aerial cover).	Non-woody cover <45% (aerial cover).
		Indigenous woody cover		0% ≥Woody cover≤50% (aerial cover)	Woody cover absent or >45% (aerial cover)
		Alien plant species		Perennial alien plant species ≤10% (aerial cover).	Perennial alien plant species >5% (aerial cover).
	Riparian zone	PES	The PES category should be a D at least	VEGRAI score ≥42%	VEGRAI score <50%
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥15 indigenous species.	<15 indigenous species.
		Endemic riparian species	<i>Cyperus textilis</i> , endemic to South Africa, should remain present	1 listed endemic species present.	Absence of <i>Cyperus textilis</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <44%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Macroinvertebrates	Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
		MIRAI Category and Score	The Ecological Category should be maintained within a D Category.	MIRAI score ≥ 42 %	MIRAI score of < 44 %
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 80 ; ASPT value: > 5	SASS5 scores less than 90 and ASPT less than 5.3.
		Key taxa and abundance	To maintain suitable flow velocity (> 0.6 m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae > 2 sp	Minimum abundance of an A attained.	If Baetidae > 2 sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6 m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6 m/s for longer than a week, water

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
					quality deterioration and SIC become exposed.
			Hydropsychidae 2sp	Minimum abundance of an A attained.	If Hydropsychidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
			Elmidae	Minimum abundance of an A attained.	If Elmidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC and GSM become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category C/D or greater.	SPI Score ≥8.9	SPI Score <9.3

8.3 (3) IUA_L01: Kouga to Kouga Dam, Baviaanskloof

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for all water resources, except estuaries.

Refer to **Table 8-5** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-6** includes the draft RQS for IUA_L01 for those RUs and indicators as listed in **Table 8-5**.

Table 8-5: Resource Units delineation and selected indicators for 3. IUA_L01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
3.1	L81B-08697	L81B	Baviaanskloof	Same ecoregion. No RQOs set. Refer to Priority RU 3.5 for RQOs.													
3.2	L82D-08977	L82D	Kouga	All indicators. EWR site KOUG01_R	X	X	X	X	X					X	X	X	X
3.3	L82D-08998	L82D	Twee Riviere	Water quality (L82D) RQOs. Refer to GW and wetland RQOs (Krakeel). Joubertina WWTW located upstream. Node TWEE-1_FV			X	X	X	X	X			X			X
3.4	L82D-08981	L82D	Nabooms	Water quality (L82D) RQOs. Refer to GW and wetland RQOs (Krakeel). No monitoring data within Greendrop Report for Krakeel WWTW on the Nabooms River.			X	X	X	X	X						

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
3.5	L81D-08774	L81D	Baviaanskloof	Driven by the fish component - fish sanctuary (Enteromius palidus ss. and Pseudobarbus swartzi. However, no fish data along the reach to set fish RQOs											X		

Table 8-6: Draft RQOs for IUA_L01

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 3.2							
Quantity	Low flows	Maintenance and drought flows required for the Kouga River	EWR maintenance low and drought flows: Kouga River at KOU01_R (-33.78845; 24.02582) in L82D nMAR = 148.81 x10 ⁶ m ³ TEC=B/C category		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.411	0.188	
				Nov	0.406	0.186	
				Dec	0.353	0.163	
				Jan	0.282	0.131	
				Feb	0.248	0.054	
				Mar	0.227	0.107	
				Apr	0.254	0.119	
				May	0.319	0.148	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			Monitoring of flows at L8H005	Jun	0.356	0.165	
				Jul	0.372	0.171	
				Aug	0.463	0.211	
				Sep	0.464	0.212	
	High flows	Freshets and annual flood required for the Kouga River	EWR freshets and flood	Freshet/ flood			
					m ³ /s	Duration (days)	
				Oct	5	2	
				Nov	5	2	
				Apr	3	2	
				May	10	3	
				Jun	10	3	
				Jul	5	3	
				Aug	20	3	
				Sep	10	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥100cm			-

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤9.0 mg/L	TSS >9.9 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score ≥78%	IHI: Instream score <78.5%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <68.5%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	Ensure suitable spawning habitat for the Vulnerable Pseudobarbus swartzi is present	Cobbles >70% extent within flowing riffle habitat between November and March	No flowing water present between November and March and/or cobbles >30% embedded
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a B/C Category.	MIRAI score ≥78.	MIRAI score <80%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >140; ASPT value: >6.0	SASS5 scores less than 150 and ASPT less than 6.4.
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			Psephenidae	Minimum abundance of an A attained.	If Psephenidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC	
					deterioration and SIC become exposed.	
			Chlorocyphidae	Minimum abundance of an A attained.	If Chlorocyphidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and reduced availability of SIC habitats and exposure of those habitats.	
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:			
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.	
		Leptoceridae	Minimum abundance of an A attained.	If Leptoceridae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.		
	Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.		
	Diatoms	SPI and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3	SPI Score: <14.6	
Priority RU 3.3						

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Water quality	Salts	Electrical conductivity (EC)		To achieve the category D, EC should be <85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L	TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L	PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L	DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00	<5.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥100 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤117.0 mg/L	TSS >128.7 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: instream score ≥62%	IHI: Instream score <67%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category B or greater.	IHI: riparian score ≥82%	IHI: Riparian score <84%
Biota	Diatoms	SPI and Category	The Ecological Category should be maintained at a Category D or greater.	SPI Score ≥5.3	SPI Score: <5.1
Priority RU 3.4					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to	To achieve the category D, EC should be <85 mS/m	EC >85 mS/m

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Nutrients	Total Inorganic nitrogen (TIN)	establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category D, TIN should be <4 mg/L	TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L	PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L	DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00	<5.00
		Clarity / turbidity		-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
	Toxins	Listed	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. This ensures that the established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.	Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-

8.4 (4) IUA_M01: M primary catchment

This IUA was delineated as a **Class III**. Note: This IUA has priority RUs for all water resources.

Refer to **Table 8-7** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-8** includes the draft RQS for IUA_M01 for those RUs and indicators as listed in **Table 8-7**.

Table 8-7: Resource Units delineation and selected indicators for 4. IUA_M01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
4.1	M10B-08921	M10B	Elands	Selection driven from ecological (fish support area, free flowing) and SWSA. No data to set RQOs													
4.2	M10C-08897	M10C	Swartkops	All indicators. EWR site SWAR01_I. Extensive sand mining along the reach towards the town of Uitenhage	X	X	X	X	X	X		X	X		X	X	X
4.3	M10C-08879	M10C	Swartkops	Refer to Swartkops Estuary and Wetland (Chatty) RQOs (priority and drivers), water quality owing to the town of Uitenhage and various WWTW			X	X	X	X	X						

Table 8-8: Draft RQOs for IUA_M01

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 4.2							
Quantity	Low flows	Maintenance and drought flows required for the Swartkops River	EWR maintenance low and drought flows: Swartkops River at SWAR01_I (-33.7221; 25.3008) in M10C nMAR = 32.6 x10 ⁶ m ³ TEC=B/C category Monitoring of flows at M1H010		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.158	0.022	
				Nov	0.164	0.012	
				Dec	0.126	0.004	
				Jan	0.082	0.000	
				Feb	0.079	0.000	
				Mar	0.126	0.015	
				Apr	0.138	0.020	
				May	0.138	0.020	
				Jun	0.128	0.018	
				Jul	0.144	0.021	
				Aug	0.175	0.025	
				Sep	0.185	0.026	
				High flows	Freshets and annual floods required for the Swartkops River	EWR freshets and flood	
		m³/s	Duration (days)				
	Oct	1.5	2				
	Nov	1.5	2				
		6	2				
	Mar	6	2				
	Apr	6	2				
	May	6	2				
	Aug	1.5	2				
		6	2				
	Sep	20	2				
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤ 0.75 mg/L	TIN > 0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be < 0.015 mg/L	PO ₄ -P > 0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be > 7 mg/L	DO < 7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 100 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to < 10 % of the background TSS concentrations at a specific site and time. TSS ≤ 9.0 mg/L	TSS > 9.9 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category B	-
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts.	Maintain a GAI PES score of at least a 'C' or $> 62\%$.	GAI PES score $< 62\%$.
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and small cobbles	Maintain riffle with mobile sediment in the range of a D50 of 35 mm, D16 of 13 mm and D84 of 98 mm	Riffle dominated by sand or only cobble
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of $< 25\%$ for riffle sediment	Embeddedness levels of $> 25\%$ for 25% of riffle area/sampling points
Habitat: Riparian Vegetation	Aquatic zone	Key Species	<i>Nymphaea nouchali</i> should remain present	1 listed species present.	<i>Nymphaea nouchali</i> absent
	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone	Non-woody cover $\geq 40\%$ (aerial cover).	Non-woody cover $< 45\%$ (aerial cover).

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		Key species	<i>Cliffortia strobilifera</i> , <i>Pronium serratum</i> , <i>Leersia hexandra</i> , <i>Schoenoplectus decipiens</i> , <i>Cyclosorus interruptus</i> , <i>Cyperus textilis</i> , <i>Miscanthus ecklonii</i> , and <i>Persicaria madagascariensis</i> should be present	8 listed species present.	<i>Cliffortia strobilifera</i> , <i>Pronium serratum</i> , <i>Leersia hexandra</i> , <i>Schoenoplectus decipiens</i> , <i>Cyclosorus interruptus</i> , <i>Cyperus textilis</i> , <i>Miscanthus ecklonii</i> , or <i>Persicaria madagascariensis</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤0% (aerial cover).	Perennial alien plant species present
		Terrestrial woody cover		No terrestrial woody plants.	Terrestrial woody plants present.
		Indigenous woody cover		Woody cover ≤50% (aerial cover).	Woody cover >45% (aerial cover).
		Non-woody cover		Non-woody cover ≥40% (aerial cover).	Non-woody cover <45% (aerial cover).
		Palmiet cover		Palmiet cover ≥5% (aerial cover).	Palmiet cover <5% (aerial cover).
		Dominant vegetation	Non-woody vegetation should dominate the flood benches	Non-woody cover ≥60% (aerial cover).	Non-woody cover <65% (aerial cover).
	Non-marginal (lower - flood benches)	Key species	<i>Cliffortia strobilifera</i> , <i>Leersia hexandra</i> , <i>Schoenoplectus decipiens</i> and <i>Cyperus textilis</i> should be present	4 listed species present.	<i>Cliffortia strobilifera</i> , <i>Leersia hexandra</i> , <i>Schoenoplectus decipiens</i> or <i>Cyperus textilis</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches and features should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤30% (aerial cover).	Perennial alien plant species >15% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤5% (aerial cover).	Terrestrial woody cover >5% (aerial cover).
		Indigenous woody cover		0% ≥Woody cover≤20% (aerial cover)	Woody cover absent or >15% (aerial cover)
		Non-woody cover		Non-woody cover ≥50% (aerial cover).	Non-woody cover <55% (aerial cover).
	Non-marginal	Dominant vegetation	The riparian vegetation structure and composition	Woody cover ≥40% (aerial cover)	Woody cover <45% (aerial cover)

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	(upper - banks)	Alien plant species	on the banks should maintain desired dominance and non-dominance, with limited or no encroachment by alien species.	Perennial alien plant species ≤5% (aerial cover).	Perennial alien plant species present
		Key species	<i>Afrocarpus falcatus</i> , <i>Erica caffra</i> var. <i>caffra</i> , <i>Euclea divinorum</i> and <i>Olea europaea</i> subsp. <i>africana</i> should be present	4 listed species present.	<i>Afrocarpus falcatus</i> , <i>Erica caffra</i> var. <i>caffra</i> , <i>Euclea divinorum</i> or <i>Olea europaea</i> subsp. <i>Africana</i> absent
	Riparian zone	PES	The PES category should be a B at least	VEGRAI score ≥82%	VEGRAI score <82%
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥19 indigenous species.	<19 indigenous species.
		Endemic riparian species	<i>Pronium serratum</i> and <i>Cyperus textilis</i> , endemic to South Africa, should remain present	2 listed endemic species present.	Absence of <i>Pronium serratum</i> or <i>Cyperus textilis</i>
	Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%
Overall fish health			To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
Key species			To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
			Ensure suitable spawning habitat for the Endangered	Cobbles >70% extent within flowing riffle habitat between October and February	No flowing water present between October and February or cobbles >30% embedded

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
			Pseudobarbus afer is present		
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a Category C.	MIRAI score $\geq 62\%$	MIRAI score $< 65\%$.
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 125 ; ASPT value: > 6.0	SASS5 scores less than 130 and ASPT less than 6.5.
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			Philopotamidae	Minimum abundance of an A attained.	If Philopotamidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Chlorocyphidae	Minimum abundance of an A attained.	If Chlorocyphidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		No flowing water present and/or cobbles embedded
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: <14.7
Priority RU 4.3					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality	To achieve the category D, EC should be <85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L	TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L	PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L	DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00	<5.00
		Clarity / turbidity		-	-

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)	status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. This ensures that the established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.	Meet targets for use in Table 6.3 detailing high health risk guidelines	-

8.5 (5) IUA_LN01: Groot to Kouga confluence, Upper Sundays to Darlington Dam

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for all water resources, except estuaries.

Refer to **Table 8-9** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore,

Table 8-10 includes the draft RQS for IUA_LN01 for those RUs and indicators as listed in **Table 8-9**.

Table 8-9: Resource Units delineation and selected indicators for 5. IUA_LN01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
5.1	L22B-07261	L22B	Kariega	No data available													
5.2	L22B-07534	L22B	Kariega	No data available													
5.3	L23A-07632	L23A	Kariega	No data available													
5.4	L23A-07637	L23A	Kariega	No data available													
5.5	L23B-07680	L23B	Kariega	No data available													
5.6	L23C-07735	L23C	Kariega	No data available													
5.7	L23C-07777	L23C	Kariega	No data available													
5.8	L23C-07791	L23C	Kariega	No data available													

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
5.9	L23C-07795	L23C	Kariega	No data available													
5.1	L23D-07928	L23D	Kariega	No data available													
5.11	L23D-08053	L23D	Kariega	No data available													
5.12	L23D-08114	L23D	Kariega	No data available													
5.13	L30C-08207	L30C	Groot	No data available													
5.14	L50B-08289	L50B	Groot	No data available													
5.15	L50B-08375	L50B	Groot	No data available													
5.16	L50B-08394	L50B	Groot	No data available													
5.17	L70C-08510	L70C	Groot	No data available													
5.18	L70C-08562	L70C	Groot	No data available													
5.19	L70C-08580	L70C	Groot	No data available													
5.2	L70D-08594	L70D	Groot	No data available													
5.21	L70G-08902	L70G	Groot	No data available													
5.22	N13C-07374	N13C	Sundays	Same ecoregion, same RQOs as Priority RU 5.32. Refer to GW RQOs (GW_RU13)													
5.23	N21D-07510	N21D	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
5.24	N21D-07707	N21D	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.25	N22C-08085	N22C	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.26	N22C-08016	N22C	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.27	N23B-08290	N23B	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.28	N23B-08306	N23B	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.29	N24B-07715	N24B	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.3	N24B-07708	N24B	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.31	N24C-07977	N24C	Sundays	Same ecoregion, same RQOs as Priority RU 5.32													
5.32	N22C-08199	N22C	Sundays	Selected according to the RU evaluation tool. Node SUND01_FV. Jansenville WWTW located upstream			X	X	X	X	X			X		X	

Table 8-10: Draft RQOs for IUA_LN01

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 5.32					
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤ 55 mS/m	EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤ 0.75 mg/L	TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L	PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L	DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 87 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤ 8.0 mg/L	TSS >8.8 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category B. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: instream score $\geq 62\%$	IHI: Instream score $< 68.5\%$
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score $\geq 62\%$	IHI: Riparian score $< 67.5\%$
Biota	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: < 14.2

8.6 (6) IUA_N01: Sundays downstream Darlington Dam

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers and the Sundays Estuary.

Refer to **Table 8-11** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore,

Table 8-12 includes the draft RQS for IUA_N01 for those RUs and indicators as listed in **Table 8-11**.

Table 8-11: Resource Units delineation and selected indicators for 6. IUA_N01

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality				Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates
6.1	N40F-08707	N40F	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.												
6.2	N40A-08313	N40A	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.												
6.3	N40B-08540	N40B	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.												
6.4	N40C-08566	N40C	Sondags	All indicators. EWR site SUND02_R. Kirkwood WWTW	X	X	X	X	X	X	X			X	X	X
6.5	N40C-08565	N40C	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.												
6.6	N40E-08613	N40E	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.												

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality				Habitat			Biota			
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
6.7	N40E-08640	N40E	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.													
6.8	N40E-08682	N40E	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.													
6.9	N40F-08707	N40F	Sondags	Same ecoregion, same RQOs as Priority RU 6.4.													

Table 8-12: Draft RQOs for IUA_N01

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 6.4							
Quantity	Low flows	Maintenance and drought flows required for the lower Sundays River	EWR maintenance low and drought flows:		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.154	0.102	
				Nov	0.217	0.144	
				Dec	0.222	0.147	
				Jan	0.203	0.134	
				Feb	0.263	0.174	
				Mar	0.351	0.232	
				Apr	0.246	0.162	
				May	0.185	0.122	
				Jun	0.138	0.091	
		Sundays River at SUND02_R (-33.40438; 25.40792) in N40C					
		nMAR = 214.0 x10 ⁶ m³					
		TEC=D category					

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			Monitoring of flows at N4H001	Jul	0.126	0.083	
				Aug	0.157	0.104	
				Sep	0.141	0.093	
	High flows	Freshets and annual flood required for the lower Sundays River	EWR freshets and flood	Freshet / flood			
				m³/s		Duration (days)	
				Oct	2	3	
				Nov	6	3	
				Dec	6	3	
				Jan	4	3	
				Feb	6	3	
				Mar	8	3	
				Sep	2	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category D, EC should be <85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L			TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L			PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L			DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00			<5.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥65 cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤13.0 mg/L			TSS >14.3 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D			-

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing health risk guidelines	-
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C/D or greater.	IHI: instream score ≥58%	IHI: Instream score <58.3%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category D or greater.	IHI: riparian score ≥42%	IHI: Riparian score <46%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <46%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C/D Category.	MIRAI score ≥58%	MIRAI score <60%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >85; ASPT value: >5.0	SASS5 scores less than 90 and ASPT less than 5.5.
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Hydraenidae	Minimum abundance of an A attained.	If Hydraenidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and a reduction in the abundance of SIC habitats.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Leptoceridae	Minimum abundance of an A attained.	If Leptoceridae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category D or greater.	SPI Score ≥ 5.3	SPI Score <6.8

8.7 (7) IUA_P01: P primary catchment

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers and estuaries only.

Refer to **Table 8-13** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-14** includes the draft RQS for IUA_P01 for those RUs and indicators as listed in **Table 8-13**.

Table 8-13: Resource Units delineation and selected indicators for 7. IUA_P01

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality				Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates
7.1	P30A-08518	P30A	Kariega	Dry - RQOs are set for the Kariega Estuary												
7.2	P30B-08734	P30B	Kariega	Dry - RQOs are set for the Kariega Estuary												
7.3	P30C-08778	P30C	Kariega	Dry - RQOs are set for the Kariega Estuary												
7.4	P10D-08406	P10D	Boesmans	Dry - RQOs are set for the Bushmans Estuary												
7.5	P10D-08482	P10D	Boesmans	Dry - RQOs are set for the Bushmans Estuary												
7.6	P10G-08793	P10G	Bushmans	Dry - RQOs are set for the Bushmans Estuary.												

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
7.7	P40A-8472	P40A	Bloukrans	Strict water quality RQOs (for water user perspective).			X	X	X	X	X					X	
7.8	P40C-08731	P40C	Kowie	Selected according to the RU evaluation tool											X	X	

Table 8-14: Draft RQOs for IUA_P01

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 7.7					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category C, EC should be ≤ 85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤ 2.0 mg/L	TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be < 0.025 mg/L	PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be > 6 mg/L	DO <6 mg/L
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Clarity / turbidity	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. However, as the macroinvertebrate community reflects a C category, the quality for this priority RU should aim for a category C.	-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category C	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing health risk guidelines	
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <68%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >95; ASPT value: >5.0	SASS5 score: <110 and ASPT: <5.5
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week,

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
					water quality deterioration and SIC become exposed.
			Ashnidae	Minimum abundance of an A attained.	If Ashnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			Philopotamidae	Minimum abundance of an A attained.	If Philopotamidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.
Priority RU 7.8					
Biota	Fish	FRAI score	N/A	N/A	N/A
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	Ensure free passage between estuary and riverine reach to allow for <i>Pseudomyxus capensis</i> to migrate between freshwater and marine systems	>1 <i>Pseudomyxus capensis</i> (MCAP) individuals collected on two consecutive surveys	No <i>Pseudomyxus capensis</i> individuals collected on two consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <69%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >100; ASPT value: >5.3	SASS5 scores less than 115 and ASPT less than 5.5
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			Philopotamidae	Minimum abundance of an A attained.	If Philopotamidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Chlorocyphidae	Minimum abundance of an A attained.	If Chlorocyphidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and reduced availability of SIC habitats and exposure of those habitats.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
			Leptoceridae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Cobbles, marginal vegetation and stems become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.

8.8 (8) IUA_Q01: Fish

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers, groundwater and wetlands.

Refer to **Table 8-15** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore,

Table 8-16 includes the draft RQS for IUA_Q01 for those RUs and indicators as listed in **Table 8-15**.

Table 8-15: Resource Units delineation and selected indicators for 8. IUA_Q01

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality				Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates
8.1	Q30B-07056	Q30B	Pauls	<i>Ephemeral - no RQOs</i>												
8.2	Q30B-07051	Q30B	Pauls	<i>Ephemeral - no RQOs</i>												
8.3	Q30E-07122	Q30E	Great Fish	<i>Part of transfer scheme owing to importance of water supply to Qqeberha. There is a priority RU on the Great Fish further down in IUA_Q02 where more appropriate to set RQOs.</i>												
8.4	Q21B-06831	Q21B	Great Fish	<i>Same ecoregion, same RQOs as Priority RU 8.5.</i>												

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality				Habitat			Biota			
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
8.5	Q21B-06817	Q21B	Great Fish	Selected according to the RU evaluation tool. Riparian set owing to agriculture encroachment into the riparian zone. DWS REMP site.										X		X	X
8.6	Q80B-7553	Q80B	Little Fish (upper)	Ephemeral - no RQOs													
8.7	Q13B-06763	Q13B	Great Brak	Part of transfer scheme owing to importance of water supply to Gqeberha. There is a priority RU on the Great Fish further down in IUA_Q02 where more appropriate to set RQOs.													

Table 8-16: Draft RQOs for IUA_Q01

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 8.5					
Habitat	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category D or greater.	IHI: riparian score $\geq 42\%$	IHI: Riparian score $< 44\%$
Biota	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a Category C.	MIRAI score $\geq 62\%$	MIRAI score $< 64\%$.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >95; ASPT value: >6.0	SASS5 scores less than 105 and ASPT less than 6.2.
			To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		
		Key taxa and abundance	Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Hydraenidae	Minimum abundance of an A attained.	If Hydraenidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and a reduction in the abundance of SIC habitats.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		No flowing water present and/or cobbles embedded
	Diatoms	SPI and Category	The Ecological Category should be maintained at a Category C or greater.	SPI Score ≥ 9.2	SPI Score: <10.2

8.9 (9) IUA_Q02: Great Fish

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers, estuaries and wetlands.

Refer to **Table 8-17** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore,

Table 8-18 includes the draft RQS for IUA_Q02 for those RUs and indicators as listed in **Table 8-17**.

Table 8-17: Resource Units delineation and selected indicators for 9. IUA_Q02

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality				Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates
9.1	Q41A-07351	Q41A	Tarka	<i>Driven by the fish component. No data to set RQOs</i>												
9.2	Q44A-07225	Q44A	Tarka	<i>Quantity (no releases to river from upstream dam - releasing into canal), thus dependent on spills)</i>												

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
9.3	Q70A-07747	Q70A	Great Fish	<i>Same ecoregion, same RQOs as Priority RU 9.5</i>													
9.4	Q70C-08084	Q70C	Great Fish	<i>Same ecoregion, same RQOs as Priority RU 9.5</i>													
9.5	Q91B-08144	Q91B	Great Fish (Lower)	<i>All indicators. EWR site FISH03_I</i>	X	X	X	X	X	X		X	X		X	X	X
9.6	Q80G-08143	Q80G	Little Fish (Lower)	<i>Influenced from De Miskraal Dam - transfers</i>													
9.7	Q44C-07276	Q44C	Tarka	<i>Selected according to the RU evaluation tool. Node TARK01_FV</i>	X		X	X	X	X				X	X	X	X
9.8	Q50C-07657	Q50C	Great Fish (Middle)	<i>Same ecoregion, same RQOs as Priority RU 9.5</i>													
9.9	Q50B-07569	Q50B	Great Fish	<i>Same ecoregion, same RQOs as Priority RU 9.5</i>													
9.10	Q30E-07122	Q30E	Great Fish	<i>Downstream of the town of Nxuba and WWTW</i>			X	X	X	X	X						

Table 8-18: Draft RQOs for IUA_Q02

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 9.5							
Quantity	Low flows	Maintenance and drought flows required for the Great Fish River	EWR maintenance low and drought flows: Great Fish River at FISH03_I (-33.0837; 26.2252) in Q91B nMAR = 331.8 x10 ⁶ m ³ TEC=C category Monitoring of flows at Q9H012		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	1.127	0.343	
				Nov	1.541	0.351	
				Dec	1.620	0.609	
				Jan	1.603	0.493	
				Feb	2.079	0.723	
				Mar	2.607	0.877	
				Apr	1.829	0.440	
				May	1.298	0.530	
				Jun	1.067	0.469	
				Jul	0.983	0.434	
				Aug	1.007	0.437	
				Sep	0.988	0.413	
	High flows	Freshets and annual flood	EWR freshets and flood		Freshet / flood		
					m ³ /s	Duration (days)	
				Oct	10	5	
				Nov	10	5	
					30	4	
				Dec	15	5	
					30	4	
				Jan	15	5	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
					30	4	
				Feb	15	5	
					30	4	
				Mar	15	5	
					90	4	
				Apr	15	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be ≤85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤2.0 mg/L			TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be <0.025 mg/L			PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L			DO <6 mg/L
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36			5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥11 cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤121.0 mg/L			TSS >133.1 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category C			-
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts.	Maintain a GAI PES score of at least a 'C' or >62%.			GAI PES score <62%.
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length			Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 31 mm, D16 of 9 mm and D84 of 65 mm			Riffle dominated by sand or only cobble

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Pool depth	Maintain downstream pool with deep open water	Maintain downstream pool with water >0.5 m deep for >60% of pool area	Downstream pool is >60% filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of >5 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 5 m and no signs of recent fine sediment deposition on the benches
Habitat: Riparian Vegetation	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone	Non-woody cover ≥70% (aerial cover).	Non-woody cover <75% (aerial cover).
		Key species	<i>Phragmites australis</i> , <i>Cyperus textilis</i> and <i>Paspalum distichum</i> should be present	3 listed species present.	<i>Phragmites australis</i> , <i>Cyperus textilis</i> or <i>Paspalum distichum</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species absent	Perennial alien plant species present
		Terrestrial woody cover		No terrestrial woody plants.	Terrestrial woody plants present.
		Indigenous woody cover		5% ≥Woody cover ≤20% (aerial cover).	Woody cover absent or ≥20% (aerial cover).
		Non-woody cover		Non-woody cover ≥70% (aerial cover).	Non-woody cover <75% (aerial cover).
		Reed cover		Reeds cover ≤60% (aerial cover).	Reed cover >55% (aerial cover).
	Non-marginal (lower - flood benches)	Dominant vegetation	Non-woody vegetation should dominate the flood benches	Non-woody cover ≥60% (aerial cover).	Non-woody cover <65% (aerial cover).
		Key species	<i>Phragmites australis</i> , <i>Cyperus textilis</i> and <i>Cyperus sexangularis</i> must be present.	3 listed species present.	<i>Phragmites australis</i> , <i>Cyperus textilis</i> or <i>Cyperus sexangularis</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches	Perennial alien plant species ≤5% (aerial cover).	Perennial alien plant species >5% (aerial cover).

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Terrestrial woody cover	should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Terrestrial woody cover ≤5% (aerial cover).	Terrestrial woody cover >5% (aerial cover).
		Indigenous woody cover		Woody cover ≤20% (aerial cover).	Woody cover >15% (aerial cover).
		Non-woody cover		Non-woody cover ≥60% (aerial cover).	Non-woody cover <65% (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	Woody vegetation should remain dominant along the banks	Woody cover ≥60% (aerial cover).	Woody cover <65% (aerial cover).
		Key species	<i>Combretum cafferum</i> and <i>Vachellia karroo</i> should be present	2 listed species present.	<i>Combretum cafferum</i> or <i>Vachellia karroo</i> absent
		Alien plant species	There should be limited or no encroachment by alien species.	Perennial alien plant species ≤5% (aerial cover).	Perennial alien plant species >5% (aerial cover).
	Riparian zone	PES	The PES category should be a C at least	VEGRAI score ≥62%	VEGRAI score <70%
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥14 indigenous species.	<14 indigenous species.
		Endemic riparian species	<i>Combretum cafferum</i> and <i>Cyperus textilis</i> , endemic to South Africa, should remain present	2 listed endemic species present.	Absence of <i>Combretum cafferum</i> or <i>Cyperus textilis</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score $\geq 62\%$	MIRAI score $< 65\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 90 ; ASPT value: > 5.0	SASS5 score: < 110 and ASPT: < 5.3 .
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Perlidae	Abundance between 1 and an A attained.	If Perlidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric		TPC
						below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Elmidae	Minimum abundance of an A attained.		If Elmidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC and GSM become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:			
			Coenagrionidae	Minimum abundance of an A attained.		If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category C or greater.	SPI Score ≥ 9.2		SPI Score <10.3
Priority RU 9.7						
Quantity	Low flows	Maintenance and drought flows	EWR maintenance low and drought flows:		Maintenance (m³/s)	Drought (m³/s)
				Oct	0.037	0.026

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
		required for the Tarka River	Tarka River at TARK01_FV (-32.28332; 25.75928) in Q44C nMAR = 63.3 x10 ⁶ m ³ TEC=D category Monitoring of flows at Q4H013	Nov	0.054	0.042	
				Dec	0.058	0.058	
				Jan	0.060	0.060	
				Feb	0.074	0.074	
				Mar	0.099	0.097	
				Apr	0.067	0.067	
				May	0.047	0.047	
				Jun	0.037	0.037	
				Jul	0.033	0.033	
				Aug	0.035	0.035	
				Sep	0.034	0.034	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category D, EC should be <85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L			TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L			PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L			DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00			<5.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥75 cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤152.0 mg/L			TSS >167.2 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D.			-

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category D or greater.	IHI: riparian score $\geq 42\%$	IHI: Riparian score $< 45.5\%$
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score $\geq 62\%$	IHI: Riparian score $< 69\%$
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score $\geq 42\%$	FRAI score $< 42\%$
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	$< 2\%$ of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	$> 2\%$ of fish population with externally evident disease or other anomalies.
		Key species	N/A	N/A	N/A
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a D Category.	MIRAI score $\geq 42\%$	A MIRAI score $< 45\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 85 ; ASPT value: > 5.5	SASS5 score: < 90 and ASPT: < 5.6
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Hydraenidae	Minimum abundance of an A attained.	If Hydraenidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and a reduction in the abundance of SIC habitats.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the	Ensure that no family dominates the macroinvertebrate assemblage, defined as D	Any taxon occurring in an abundance of >100

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			macroinvertebrate assemblage.	(>1000) abundance for more than two consecutive surveys.	for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category D or greater.	SPI Score ≥ 5.3	SPI Score <6.2
Priority RU 9.10					
Water Quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category D, EC should be <85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L	TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L	PO ₄ -P >0.125 mg/L
	System Variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L	DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00	<5.00
		Clarity / turbidity		-	-
		TSS		-	-
	Toxins	Listed	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. This ensures that the established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.	Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	

8.10 (10) IUA_Q03: Koonap and Kat

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs only for rivers and major dams.

Refer to **Table 8-19** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-20** includes the draft RQS for IUA_Q03 for those RUs and indicators as listed in **Table 8-19**.

Table 8-19: Resource Units delineation and selected indicators for 10. IUA_Q03

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
10.1	Q94A-07526	Q94A	Kat	Same ecoregion, same RQOs as Priority RU 10.2													
10.2	Q94B-07623	Q94B	Kat	All indicators. EWR site KAT01_I	X	X	X	X	X			X	X		X	X	X
10.3	Q92G-08203	Q92G	Koonap	All indicators. EWR site KOON01_R	X	X	X	X	X					X	X	X	X
10.4	Q94F-07911	Q94F	Kat (Lower)	All indicators. EWR site KAT02_R	X	X	X	X	X					X	X	X	X

Table 8-20: Draft RQOs for IUA_Q03

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 10.2							
Quantity	Low flows	Maintenance and drought flows required for the upper Kat River	EWR maintenance low and drought flows: Upper Kat River at KAT01_I (-32.5696; 26.7218) in Q94B nMAR = 23.9 x10 ⁶ m ³ TEC=C category Monitoring of flows at Q9H026		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.145	0.027	
				Nov	0.202	0.039	
				Dec	0.207	0.040	
				Jan	0.207	0.040	
				Feb	0.239	0.047	
				Mar	0.244	0.048	
				Apr	0.207	0.040	
				May	0.156	0.030	
				Jun	0.144	0.027	
				Jul	0.126	0.023	
				Aug	0.126	0.023	
				Sep	0.130	0.024	
	High flows	Freshets and annual flood required for the lower Great Fish River	EWR freshets and flood		Freshet / flood		
					m³/s	Duration (days)	
				Oct	2	3	
				Nov	6	3	
				Dec	2.5	3	
				Jan	2.5	3	
				Feb	6	3	
				Mar	10	3	
				Apr	2	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤ 0.75 mg/L	TIN > 0.75 mg/L
		Orthophosphate ($\text{PO}_4\text{-P}$)		To achieve the category B, $\text{PO}_4\text{-P}$ should be < 0.015 mg/L	$\text{PO}_4\text{-P} > 0.015$ mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be > 7 mg/L	DO < 7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 40 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to < 10 % of the background TSS concentrations at a specific site and time. TSS ≤ 48.0 mg/L	TSS > 52.8 mg/L
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts.	Maintain a GAI PES score of at least a 'C' or $> 62\%$.	GAI PES score $< 62\%$.
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 78 mm, D16 of 38 mm and D84 of 113 mm	Riffle dominated by sand or only cobble
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of $< 25\%$ for riffle sediment	Embeddedness levels of $> 25\%$ for 25% of riffle area/sampling points
		Pool depth	Maintain downstream pool with deep open water	Maintain downstream pool with water > 0.5 m deep for $> 60\%$ of pool area	Downstream pool is $> 60\%$ filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of > 5 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 5 m and no signs of recent fine sediment deposition on the benches

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Habitat: Riparian Vegetation	Marginal zone (including inset benches)	Dominant vegetation	Non-woody vegetation should dominate the marginal zone	Non-woody cover $\geq 50\%$ (aerial cover).	Non-woody cover $< 55\%$ (aerial cover).
		Key species	<i>Berula thunbergii</i> , <i>Centella asiatica</i> , <i>Cyperus textilis</i> , <i>Persicaria lapathifolia</i> , <i>Kyllinga elatior</i> , <i>Miscanthus ecklonii</i> , <i>Gomphostigma virgatum</i> and <i>Salix mucronata</i> should be present	8 listed species present.	<i>Berula thunbergii</i> , <i>Centella asiatica</i> , <i>Cyperus textilis</i> , <i>Persicaria lapathifolia</i> , <i>Kyllinga elatior</i> , <i>Miscanthus ecklonii</i> , <i>Gomphostigma virgatum</i> or <i>Salix mucronata</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone and inset benches should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species $\leq 10\%$ (aerial cover)	Perennial alien plant species $> 5\%$ (aerial cover)
		Terrestrial woody cover		Terrestrial woody plant cover $\leq 10\%$ (aerial cover)	Terrestrial woody plant cover $> 5\%$ (aerial cover)
		Indigenous woody cover		$5\% \geq$ Woody cover $\leq 20\%$ (aerial cover).	Woody cover absent or $\geq 20\%$ (aerial cover).
		Non-woody cover		Non-woody cover $\geq 50\%$ (aerial cover).	Non-woody cover $< 55\%$ (aerial cover).
		Reed cover		Reeds to remain absent	Reeds present
	Non-marginal (Macro-channel bank)	Dominant vegetation	Woody vegetation should dominate the macro-channel bank	Woody cover $\geq 50\%$ (aerial cover).	Woody cover $< 55\%$ (aerial cover).
		Key species	<i>Celtis africana</i> , <i>Combretum caffrum</i> , <i>Gymnosporia buxifolia</i> and <i>Ziziphus mucronata</i> must be present.	4 listed species present.	<i>Celtis africana</i> , <i>Combretum caffrum</i> , <i>Gymnosporia buxifolia</i> or <i>Ziziphus mucronata</i> absent
		Alien plant species	The riparian vegetation structure and composition on the macro-channel bank should maintain desired dominance and non-dominance, with limited or no encroachment by alien species.	Perennial alien plant species $\leq 5\%$ (aerial cover).	Perennial alien plant species $> 5\%$ (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover $\leq 30\%$ (aerial cover).	Terrestrial woody cover $> 25\%$ (aerial cover).
		Indigenous woody cover		Woody cover $\geq 50\%$ (aerial cover).	Woody cover $< 55\%$ (aerial cover).
		Non-woody cover		Non-woody cover $\geq 10\%$ (aerial cover).	Non-woody cover $< 15\%$ (aerial cover).
	Riparian zone	PES	The PES category should be a C at least	VEGRAI score $\geq 62\%$	VEGRAI score $< 70\%$

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Biota		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥25 indigenous species.	<25 indigenous species.
		Endemic riparian species	<i>Combretum caffrum</i> , <i>Cotula nigellifolia</i> and <i>Cyperus textilis</i> , endemic to South Africa, should remain present	3 listed endemic species present.	Absence of <i>Combretum caffrum</i> , <i>Cotula nigellifolia</i> or <i>Cyperus textilis</i>
	Fish	FRAI score	The Ecological Category should be maintained at a Category C or greater.	FRAI score ≥62%	FRAI score <63%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	Ensure suitable habitat for the Endangered <i>Sandelia bainsii</i> is present	<i>Sandelia bainsii</i> present on two or more consecutive surveys.	<i>Sandelia bainsii</i> absent from two or more consecutive surveys.
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	A MIRAI score <65%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >150; ASPT value: >5.5	SASS5 score: <160 and ASPT: <6.0.
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
					surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
	Diatoms	Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
		SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: <15.1

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 10.3							
Quantity	Low flows	Maintenance and drought flows required for the Koonap River	EWR maintenance low and drought flows: Koonap River at KOON01_R (-33.04286; 26.65851) in Q92G nMAR = 76.9 x10 ⁶ m ³ TEC=D category		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.199	0.074	
				Nov	0.237	0.088	
				Dec	0.233	0.087	
				Jan	0.203	0.075	
				Feb	0.240	0.089	
				Mar	0.287	0.071	
				Apr	0.256	0.073	
				May	0.216	0.071	
				Jun	0.194	0.072	
				Jul	0.176	0.066	
				Aug	0.183	0.068	
				Sep	0.193	0.072	
	High flows	Freshets and annual flood for the Koonap River	EWR freshets and flood		Freshet/ flood		
					m ³ /s	Duration (days)	
				Sep	3	2	
				Oct	3	3	
				Nov	7	3	
				Dec	5	3	
				Jan	5	3	
				Feb	5	3	
				Mar	9	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category D, EC should be <85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L			TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L			PO ₄ -P >0.125 mg/L

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L	DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00	<5.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥14 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤272.0 mg/L	TSS >299.2 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <67%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <66%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a D Category.	MIRAI score ≥42	MIRAI score <45%
		SASS5 Total Score and ASPT	To ensure that the SASS5 scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >75; ASPT value: >3.5	SASS5 score: <80 and ASPT: <4.0
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC	
			Baetidae >2sp	Minimum abundance of an A attained.			If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.	
			Leptophlebiidae	Minimum abundance of an A attained.			If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.	
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:					
			Coenagrionidae	Minimum abundance of an A attained.			If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.	
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.		
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category D or greater.	SPI Score ≥5.3			SPI Score <6.9	
Priority RU 10.4								
Quantity	Low flows	Maintenance and drought	EWR maintenance low and drought flows:		Maintenance (m³/s)	Drought (m³/s)		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
		flows for lower Kat River	Lower Kat River at KAT02_R (-32.89092; 26.68434) in Q94F nMAR = 61.8 x10 ⁶ m ³ TEC=C/D category	Oct	0.156	0.030	
				Nov	0.166	0.044	
				Dec	0.207	0.045	
				Jan	0.167	0.044	
				Feb	0.194	0.051	
				Mar	0.209	0.055	
				Apr	0.176	0.046	
				May	0.169	0.033	
				Jun	0.103	0.029	
				Jul	0.088	0.025	
				Aug	0.090	0.025	
				Sep	0.136	0.026	
	High flows	Freshets and annual flood for the lower Kat River	EWR freshets and flood	Freshet / flood			
					m ³ /s	Duration (days)	
				Sep	1.5	3	
				Oct	1.5	3	
				Nov	5	3	
				Dec	3.5	3	
				Jan	3.5	3	
				Feb	3.5	3	
				Mar	5	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be ≤85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤2.0 mg/L			TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be <0.025 mg/L			PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L			DO <6 mg/L

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
		Clarity / turbidity	Use on-site observations and expert opinion.	-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤121.0 mg/L	TSS >133.1 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category D or greater.	IHI: riparian score ≥42%	IHI: Riparian score <46.5%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <65%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <65%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >115; ASPT value: >5.0	SASS5 score: <120 and ASPT <5.8
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Hydropsychidae 2sp	Minimum abundance of an A attained.	If Hydropsychidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: <14.5

8.11 (11) IUA_R01: Keiskamma

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers, major dams and estuaries.

Refer to **Table 8-21** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-22** includes the draft RQS for IUA_R01 for those RUs and indicators as listed in **Table 8-21**.

Table 8-21: Resource Units delineation and selected indicators for 11. IUA_R01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quanti ty		Quality				Habitat			Biota			
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
11.1	R10B-07640	R10B	Cata	No data to set RQOs													
11.2	R10B-07769	R10B	Keiskamma	Biological data available to set RQOs. Keiskammahoek WWTW located on the reach			X	X	X	X	X					X	
11.3	R10D-07807	R10D	Keiskamma	Same ecoregion, same RQOs as Priority RU 11.5													
11.4	R10G-07651	R10G	Tyume	Same ecoregion, same RQOs as Priority RU 11.7													
11.5	R10E-07844	R10E	Keiskamma (Upper)	All indicators. EWR site KEIS01_I	X	X	X	X	X			X	X		X	X	X

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality				Habitat			Biota			
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
11.6	R10L-08173	R10L	Keiskamma (Lower)	All indicators. EWR site KEIS02_R.	X	X	X	X	X					X	X	X	X
11.7	R10H-07938	R10H	Tyume	All indicators. EWR site TYUM01_R	X	X	X	X	X					X	X	X	X

Table 8-22: Draft RQOs for IUA_R01

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 11.2					
Quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate	To achieve the category C, EC should be ≤85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤2.0 mg/L	TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be <0.025 mg/L	PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L	DO <6 mg/L
		pH		To achieve the category C, pH should be:	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			RQOs tailored to this priority RU. It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. However, as the macroinvertebrate community reflects a C category, the quality for this priority RU should aim for a category C.	5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36	
		Clarity / turbidity		-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category C. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-
Biota	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <65%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >75; ASPT value: >5.0	SASS5 score: <85 and ASPT: <5.5
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.
Priority RU 11.5					

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Quantity	Low flows	Maintenance and drought flows required for the upper Keiskamma River	EWR maintenance low and drought flows: Upper Keiskamma River at KEIS01_I (-32.80233; 27.02431) in R10D nMAR = 58.8 x10 ⁶ m ³ TEC=D category Monitoring of flows at R1H017		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.236	0.187	
				Nov	0.240	0.238	
				Dec	0.288	0.226	
				Jan	0.220	0.218	
				Feb	0.240	0.216	
				Mar	0.248	0.188	
				Apr	0.219	0.205	
				May	0.219	0.173	
				Jun	0.199	0.157	
				Jul	0.186	0.147	
				Aug	0.203	0.161	
				Sep	0.210	0.166	
	High flows	Freshets and annual flood required for the upper Keiskamma River	EWR freshets and flood		Freshet / flood		
					m ³ /s	Duration (days)	
				Oct	5	3	
				Nov	14	3	
				Dec	8	3	
				Jan	8	3	
				Feb	14	3	
				Mar	25	3	
				Apr	5	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L	DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥73 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤48.0 mg/L	TSS >52.8 mg/L
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts.	Maintain a GAI PES score of at least a 'C/D' or >57%.	GAI PES score <57%.
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 54 mm, D16 of 19 mm and D84 of 86 mm	Riffle dominated by sand or only cobble
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of <30% for riffle sediment	Embeddedness levels of >30% for 25% of riffle area/sampling points
		Pool depth	Maintain downstream pool with deep open water	Maintain downstream pool with water >0.5 m deep for >50% of pool area	Downstream pool is >50% filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of >5 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 5 m and no signs of recent fine sediment deposition on the benches
Habitat · Riparian Vegetation	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone, but with overhanging woody vegetation	Non-woody cover ≥50% (aerial cover).	Non-woody cover <55% (aerial cover).

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Key species	<i>Cyperus textilis</i> , <i>C. longus</i> , <i>Miscanthus ecklonii</i> , <i>Ischaemum fasciculatum</i> , <i>Fuirena hirsuta</i> and <i>Salix mucronata</i> should be present	6 listed species present.	<i>Cyperus textilis</i> , <i>C. longus</i> , <i>Miscanthus ecklonii</i> , <i>Ischaemum fasciculatum</i> , <i>Fuirena hirsuta</i> or <i>Salix mucronata</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species absent	Perennial alien plant species present
		Terrestrial woody cover		Terrestrial woody plant cover ≤30% (aerial cover)	Terrestrial woody plant cover >25% (aerial cover)
		Indigenous woody cover		Woody cover ≤10% (aerial cover).	Woody cover >10% (aerial cover).
		Non-woody cover		Non-woody cover ≥50% (aerial cover).	Non-woody cover <55% (aerial cover).
		Reed cover		Reeds absent	Reeds present
	Non-marginal (lower - flood benches)	Dominant vegetation	Non-woody vegetation should dominate the flood benches	Non-woody cover ≥40% (aerial cover).	Non-woody cover <45% (aerial cover).
		Key species	<i>Cyperus dives</i> and <i>Persicaria madagascariensis</i> should be present.	2 listed species present.	<i>Cyperus dives</i> or <i>Persicaria madagascariensis</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤30% (aerial cover).	Perennial alien plant species >20% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤20% (aerial cover).	Terrestrial woody cover >15% (aerial cover).
		Indigenous woody cover		Woody cover ≤20% (aerial cover).	Woody cover >15% (aerial cover).
		Non-woody cover		Non-woody cover ≥40% (aerial cover).	Non-woody cover <45% (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	Woody vegetation should remain dominant along the banks	Woody cover ≥60% (aerial cover).	Woody cover <65% (aerial cover).
		Key species	<i>Combretum cafferum</i> and <i>Ficus ingens</i> should be present	2 listed species present.	<i>Combretum cafferum</i> or <i>Ficus ingens</i> absent
		Alien plant species	There should be limited or no encroachment by alien species.	Perennial alien plant species ≤5% (aerial cover).	Perennial alien plant species >5% (aerial cover).
	Riparian zone	PES	The PES category should be a D at least	VEGRAI score ≥42%	VEGRAI score <46%

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥26 indigenous species.	<26 indigenous species.
		Endemic riparian species	<i>Combretum cafferum</i> , <i>Cotula nigellifolia</i> and <i>Cyperus textilis</i> , endemic to South Africa, should remain present	3 listed endemic species present.	Absence of <i>Combretum cafferum</i> , <i>Cotula nigellifolia</i> or <i>Cyperus textilis</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species <i>Anguilla mossambica</i> as well as the Endangered <i>Amatolacypis sp. trevelyani</i>	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
				Ensure dominance of cobbles within flowing riffle habitat between October and February	No flowing water present and/or cobbles embedded
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <69%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >200; ASPT value: >6.0	SASS5 score: <208 and ASPT: <6.2.
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
							vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.			If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.			Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3			SPI Score <14.8
Priority RU 11.6							
Quantity	Low flows	Maintenance and drought flows required for the lower Keiskamma River	EWR maintenance low and drought flows: Lower Keiskamma River at KEIS02_R (-33.07532; 27.21853) in R10L nMAR = 107.8 x10 ⁶ m ³ TEC=B/C category Monitoring of flows at R1H015		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.810	0.283	
				Nov	0.997	0.355	
				Dec	0.920	0.326	
				Jan	0.861	0.303	
				Feb	0.945	0.332	
				Mar	0.983	0.351	
				Apr	0.905	0.319	
				May	0.770	0.268	
				Jun	0.220	0.220	
				Jul	0.220	0.220	
				Aug	0.220	0.220	
				Sep	0.754	0.260	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
	High flows	Freshets and annual flood required for the lower Keiskamma River	EWR freshets and flood		Freshet / flood		
					m³/s	Duration (days)	
				Sep	3	3	
				Oct	4	3	
				Nov	10	3	
				Dec	7	3	
				Jan	7	3	
				Feb	7	3	
				Mar	10	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category D, EC should be <85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L			TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L			PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L			DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00			<5.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥13 cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤173.0 mg/L			TSS >190.3 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: instream score ≥62%			IHI: Instream score <69%

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category B or greater.	IHI: riparian score $\geq 82\%$	IHI: Riparian score $< 84.5\%$
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score $\geq 42\%$	FRAI score $< 42\%$
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	$< 2\%$ of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	$> 2\%$ of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
			Ensure free passage between estuary and riverine reach to allow for <i>Pseudomyxus capensis</i> to migrate between freshwater and marine systems	> 1 <i>Pseudomyxus capensis</i> (MCAP) individuals collected on two consecutive surveys	No <i>Pseudomyxus capensis</i> individuals collected on two consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score $\geq 62\%$	MIRAI score $< 69\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 114 ; ASPT value: > 6.2	SASS5 scores less than 118 and ASPT less than 6.4.
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category D or greater.	SPI Score ≥ 5.3	SPI Score: <6.8

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 11.7							
Quantity	Low flows	Maintenance and drought flows required for the Tyume River	EWR maintenance low and drought flows: Tyume River at TYUM01_R (-32.91029; 26.93224) in R10H nMAR = 32.6 x10 ⁶ m ³ TEC=B/C category		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.253	0.086	
				Nov	0.306	0.106	
				Dec	0.278	0.093	
				Jan	0.256	0.088	
				Feb	0.286	0.091	
				Mar	0.301	0.093	
				Apr	0.285	0.098	
				May	0.247	0.084	
				Jun	0.225	0.076	
				Jul	0.212	0.071	
				Aug	0.232	0.079	
				Sep	0.237	0.080	
	High flows	Freshets and annual flood required for the Tyume River	EWR freshets and flood		Freshet / flood		
					m³/s	Duration (days)	
				Sep	1.5	3	
				Oct	1.5	3	
				Nov	5	3	
				Dec	2	3	
				Jan	2	3	
Feb				2	3		
Mar				5	3		
Water quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be ≤85 mS/m			EC >85 mS/m
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L			DO <6 mg/L

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥68 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤121.0 mg/L	TSS >133.1 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: instream score ≥62%	IHI: Instream score <68%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category B or greater.	IHI: riparian score ≥82%	IHI: Riparian score <84%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a B/C Category.	MIRAI score ≥78%	MIRAI score <79%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >150; ASPT value: >5.8	SASS5 scores less than 156 and ASPT less than 6.0.
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
					vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category C or greater.	SPI Score ≥ 9.2	SPI Score: <10.3

8.12 (12) IUA_R02: Buffalo/ Nahoon

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for all water resources, except groundwater.

Refer to **Table 8-23** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-24** includes the draft RQS for IUA_R02 for those RUs and indicators as listed in **Table 8-23**.

Table 8-23: Resource Units delineation and selected indicators for 12. IUA_R02

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality				Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates
12.1	R20A-07788	R20A	Buffalo	<i>Same ecoregion, same RQOs as Priority RU 12.5</i>												
12.2	R20E-07775	R20E	Yellowwoods	<i>Biological data available to set RQOs</i>												X
12.3	Not digitised (sub-set of above RU)	R20E	KwaNkwebu	<i>Selected following discussions with DWS regarding transfers with reference to Sandelia capensis/bainsiai</i>											X	
12.4	R10E-07844	R20F	Buffalo	<i>All indicators. EWR site BUFF01_I</i>	X	X	X	X	X			X	X		X	X
12.5	R20B-07915	R20B	Buffalo	<i>Selected according to the RU evaluation tool. Node BUFF03_FV. Mdantsne and Potsdam WWTW.</i>			X	X	X	X	X			X		X

Table 8-24: Draft RQOs for IUA_R02

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 12.2					
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score $\geq 62\%$	MIRAI score $< 68\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >95 ; ASPT value: >5.5	SASS5 scores less than 100 and ASPT less than 5.0
		Key taxa and abundance	To maintain suitable flow velocity ($>0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae $>2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $>2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Aeshnidae	Minimum abundance of an A attained.	If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			Coenagrionidae	Minimum abundance of an A attained.			If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Lestidae	Minimum abundance of an A attained.			If Lestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.				Any taxon occurring in an abundance of >100 for two consecutive surveys.
Priority RU 12.3							
Biota	Fish	FRAI score	N/A	N/A			N/A
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies. Specific emphasis should however be given to the prevalence of Lernaea cyprinacea (Anchor Worm) on fish present.			>2% of fish population with externally evident disease or other anomalies.
		Key species	Ensure suitable habitat for the Endangered <i>Sandelia bainsii</i> is present	<i>Sandelia bainsii</i> present on two or more consecutive surveys.			<i>Sandelia bainsii</i> absent from two or more consecutive surveys.
Priority RU 12.4							
Quantity	Low flows	Maintenance and drought flows required for the Buffalo River	EWR maintenance low and drought flows: Middle Buffalo River at BUFF01_I (-32.992; 27.641) in R20F		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.406	0.235	
				Nov	0.464	0.228	
				Dec	0.413	0.157	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			nMAR = 78.4 x10 ⁶ m ³ TEC=C/D category Monitoring of flows at R2H027	Jan	0.408	0.063	
				Feb	0.450	0.041	
				Mar	0.460	0.045	
				Apr	0.417	0.077	
				May	0.392	0.123	
				Jun	0.362	0.147	
				Jul	0.345	0.200	
				Aug	0.372	0.215	
				Sep	0.380	0.220	
	High flows	Freshets and annual flood required for the middle Buffalo River	EWR freshets and flood	Freshet / flood			
					m ³ /s	Duration (days)	
				Oct	4	4	
				Nov	20	3	
				Dec	4	4	
				Jan	4	4	
				Feb	12	3	
				Mar	20	3	
				Apr	4	4	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be ≤85 mS/m			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤2.0 mg/L			TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be <0.025 mg/L			PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L			DO <6 mg/L
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36			5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥70 cm			-

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤26.0 mg/L	TSS >28.6 mg/L
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts	Maintain a GAI PES score of at least a 'C/D' or >57%	GAI PES score <57%
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 22 mm, D16 of 10 mm and D84 of 65 mm	Riffle dominated by sand or only cobble
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of <30% for riffle sediment	Embeddedness levels of >30% for 25% of riffle area/sampling points
		Pool depth	Maintain downstream pool with deep open water	Maintain downstream pool with water >0.5 m deep for >60% of pool area	Downstream pool is >60% filled with sediment and forming largely shallow habitat
Habitat: Riparian Vegetation	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone, but with overhanging woody vegetation	Non-woody cover ≥60% (aerial cover).	Non-woody cover <65% (aerial cover).
		Key species	<i>Cyperus textilis</i> , <i>Hemarthria altissima</i> , <i>Miscanthus ecklonii</i> , <i>Ischaemum fasciculatum</i> and <i>Cotula nigellifolia</i> should be present	5 listed species present.	<i>Cyperus textilis</i> , <i>Hemarthria altissima</i> , <i>Miscanthus ecklonii</i> , <i>Ischaemum fasciculatum</i> or <i>Cotula nigellifolia</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant cover ≤5% (aerial cover)	Perennial alien plant cover >5% (aerial cover)
		Terrestrial woody cover		Terrestrial woody plants absent	Terrestrial woody plants present
		Indigenous woody cover		0% >Woody cover ≤10% (aerial cover).	Woody cover = 0% or >10% (aerial cover).
		Non-woody cover		Non-woody cover ≥60% (aerial cover).	Non-woody cover <65% (aerial cover).
		Reed cover		Reeds absent	Reeds present
		Dominant vegetation	Non-woody vegetation should dominate the flood benches	Non-woody cover ≥20% (aerial cover).	Non-woody cover <10% (aerial cover).

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Non-marginal (lower - flood benches)	Key species	<i>Miscanthus ecklonii</i> and <i>Hemarthria altissima</i> should be present.	2 listed species present.	<i>Miscanthus ecklonii</i> or <i>Hemarthria altissima</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤30% (aerial cover).	Perennial alien plant species >20% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤5% (aerial cover).	Terrestrial woody cover >5% (aerial cover).
		Indigenous woody cover		Woody cover ≤20% (aerial cover).	Woody cover >20% (aerial cover).
		Non-woody cover		Non-woody cover ≥20% (aerial cover).	Non-woody cover <10% (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	Indigenous woody vegetation should remain dominant along the banks	Woody cover ≥30% (aerial cover).	Woody cover <25% (aerial cover).
		Key species	<i>Afrocarpus falcatus</i> and <i>Combretum caffrum</i> should be present	2 listed species present.	<i>Afrocarpus falcatus</i> or <i>Combretum caffrum</i> absent
		Alien plant species	There should be limited or no encroachment by alien species.	Perennial alien plant species ≤10% (aerial cover).	Perennial alien plant species >5% (aerial cover).
	Riparian zone	PES	The PES category should be a D at least	VEGRAI score ≥42%	VEGRAI score <50%
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥28 indigenous species.	<28 indigenous species.
		Endemic riparian species	<i>Combretum caffrum</i> , <i>Cotula nigellifolia</i> and <i>Cyperus textilis</i> , endemic to South Africa, should remain present. <i>Afrocarpus falcatus</i> , protected in South Africa, should remain present	3 listed endemic species and 1 listed protected species present.	Absence of <i>Combretum caffrum</i> , <i>Cotula nigellifolia</i> , <i>Cyperus textilis</i> or <i>Afrocarpus falcatus</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies. Specific emphasis should however be	>2% of fish population with externally evident disease or other anomalies.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
				given to the prevalence of <i>Lernaea cyprinacea</i> (Anchor Worm) on fish present.	
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C/D Category.	MIRAI score $\geq 58\%$	MIRAI score $< 60\%$.
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 140 ; ASPT value: > 5.0	SASS5 score: < 142 and ASPT: < 5.9
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category C or greater.	SPI Score ≥ 9.2	SPI Score: <10.1
Priority RU 12.5					
Quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be ≤ 85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤ 2.0 mg/L	TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be <0.025 mg/L	PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L	DO <6 mg/L
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 85 cm	-

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤8.9 mg/L	TSS >9.79 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category C. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score ≥78%	IHI: Instream score <79%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score ≥78%	IHI: Riparian score <78.5%
Biota	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category C or greater.	SPI Score ≥9.2	SPI Score: <10.1

8.13 (13) IUA_S01: Upper Great Kei

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for all water resources, except estuaries.

Refer to **Table 8-25** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-26** includes the draft RQS for IUA_S01 for those RUs and indicators as listed in **Table 8-25**.

Table 8-25: Resource Units delineation and selected indicators for 13. IUA_S01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
13.1	S50E-06704	S50E	Tsomo	Same ecoregion, same RQOs as Priority RU 13.4													
13.2	S50E-06741	S50E	Tsomo	Same ecoregion, same RQOs as Priority RU 13.4													
13.3	S50J-07114	S50J	Tsomo	Same ecoregion, same RQOs as Priority RU 13.4													
13.4	S50J-07011	S50G	Tsomo	All indicators. EWR site TSOMO01_1 Site located directly downstream of Tsomo WWTW	X	X	X	X	X	X	X	X	X		X	X	X
13.5	S20D-06813	S20D	Indwe	All indicators. EWR site INDW01_R	X	X	X	X	X					X	X	X	X
13.6	S10J-06985	S10J	White-Kei	All indicators. EWR site WKEI01_R	X	X	X	X	X					X	X	X	X

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
13.7	S10E-06699	S10E	White-Kei	Same ecoregion, same RQOs as Priority RU 13.6													
13.8	S10F-06448	S10F	Cacadu	No data available to set RQOs													

Table 8-26: Draft RQOs for IUA_S01

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 13.4							
Quantity	Low flows	Maintenance and drought flows required for the Tsomo River	EWR maintenance low and drought flows: Tsomo River at TSOM01_I (-32.045; 27.822) in S50G nMAR = 196.7 x10 ⁶ m ³ TEC=C/D category Monitoring of flows at S5H002		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.496	0.287	
				Nov	0.652	0.343	
				Dec	0.664	0.231	
				Jan	0.821	0.161	
				Feb	1.052	0.178	
				Mar	1.116	0.336	
				Apr	0.836	0.417	
				May	0.490	0.301	
				Jun	0.371	0.231	

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
				Jul	0.342	0.214	
				Aug	0.352	0.220	
				Sep	0.406	0.252	
	High flows	Freshets and annual flood required for the Tsomo River	EWR freshets and flood		Freshets/ flood		
					m ³ /s	Duration (days)	
				Sep	10	5	
				Oct	10	5	
				Nov	35	4	
				Dec	20	5	
				Jan	20	5	
					35	4	
				Feb	20	5	
					35	4	
				Mar	80	5	
				Apr	10	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥47cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.			TSS >35.2 mg/L

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
				TSS ≤32.0 mg/L	
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category B. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts	Maintain a GAI PES score of at least a 'C/D' or >57%	GAI PES score <57%
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 25 mm, D16 of 8 mm and D84 of 55 mm	Riffle dominated by sand or only cobble
		Pool depth	Maintain downstream pool with deep open water	Maintain downstream pool with water >0.5 m deep for >50% of pool area	Downstream pool is >50% filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of >10 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 10 m and no signs of recent fine sediment deposition on the benches
Habitat: Riparian Vegetation	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone, but with a small woody component	Non-woody cover ≥40% (aerial cover).	Non-woody cover <45% (aerial cover).
		Key species	<i>Gomphostigma virgatum</i> , <i>Cynodon dactylon</i> , <i>Cyperus longus</i> and <i>Schoenoplectus corymbosus</i> should be present	4 listed species present.	<i>Gomphostigma virgatum</i> , <i>Cynodon dactylon</i> , <i>Cyperus longus</i> or <i>Schoenoplectus corymbosus</i> absent
		Alien plant species	The riparian vegetation structure and composition	Perennial alien plants absent	Perennial alien plants present

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		Terrestrial woody cover	in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Terrestrial woody plants absent	Terrestrial woody plants present
		Indigenous woody cover		0% >Woody cover ≤10% (aerial cover).	Woody cover absent or >10% (aerial cover).
		Non-woody cover		Non-woody cover ≥40% (aerial cover).	Non-woody cover <45% (aerial cover).
		Reed cover		Reeds absent	Reeds present
	Non-marginal (lower - flood benches)	Dominant vegetation	Woody and non-woody vegetation should co-dominate the flood benches	Non-woody cover ≥30% (aerial cover).	Non-woody cover <30% (aerial cover).
		Key species	<i>Salix mucronata</i> and <i>Combretum caffrum</i> should be present.	2 listed species present.	<i>Salix mucronata</i> or <i>Combretum caffrum</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤10% (aerial cover).	Perennial alien plant species >5% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤10% (aerial cover).	Terrestrial woody cover >5% (aerial cover).
		Indigenous woody cover		Woody cover ≥30% (aerial cover).	Woody cover <30% (aerial cover).
		Non-woody cover		Non-woody cover ≥30% (aerial cover).	Non-woody cover <30% (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	Indigenous woody vegetation should remain dominant along the banks	Woody cover ≥40% (aerial cover).	Woody cover <35% (aerial cover).
		Key species	<i>Combretum caffrum</i> , <i>Searsia pyroides</i> , <i>Senegalia caffra</i> and <i>Ziziphus mucronata</i> should be present	4 listed species present.	<i>Combretum caffrum</i> , <i>Searsia pyroides</i> , <i>Senegalia caffra</i> or <i>Ziziphus mucronata</i> absent
		Alien plant species	There should be limited or no encroachment by alien species.	Perennial alien plant species ≤15% (aerial cover).	Perennial alien plant species >5% (aerial cover).
	Riparian zone	PES	The PES category should be a category C/D at least	VEGRAI score ≥58%	VEGRAI score <60%
		Species richness	Indigenous plant species richness in the riparian	≥17 indigenous species.	<17 indigenous species.

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
			zone should be maintained.		
		Endemic riparian species	<i>Combretum cafferum</i> , endemic to South Africa, should remain present	1 listed endemic species present.	Absence of <i>Combretum cafferum</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score $\geq 42\%$	FRAI score $< 42\%$
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	$< 2\%$ of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	$> 2\%$ of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥ 62	MIRAI score $< 60\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 100 ; ASPT value: > 6.8	SASS5 scores less than 108 and ASPT less than 7.2.
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
					for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Perlidae	Minimum abundance of an A attained.	If Perlidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Elmidae	Minimum abundance of an A attained.	If Elmidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC and GSM become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: <15.1
Priority RU 13.5					

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
Quantity	Low flows	Maintenance and drought flows required for the Indwe River	EWR maintenance low and drought flows: Indwe River at INDW01_R (-31.89708; 27.40983) in S20D nMAR = 61.9 x10 ⁶ m ³ TEC=C/D category Monitoring of flows at S2H005		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.322	0.085	
				Nov	0.347	0.092	
				Dec	0.330	0.060	
				Jan	0.353	0.093	
				Feb	0.446	0.099	
				Mar	0.462	0.119	
				Apr	0.400	0.105	
				May	0.333	0.088	
				Jun	0.134	0.084	
				Jul	0.132	0.082	
				Aug	0.133	0.083	
				Sep	0.313	0.083	
	High flows	Freshets and annual flood required for the Indwe River	EWR freshets and flood		Freshets / flood		
					m ³ /s	Duration (days)	
				Sep	1.5	3	
				Oct	1.5	3	
				Nov	5	3	
				Dec	6	3	
				Jan	6	3	
				Feb	6	3	
				Mar	10	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L	DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥61cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤48.0 mg/L	TSS >52.8 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <68.5%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <66.5%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C/D Category.	MIRAI score ≥58%	MIRAI score <59%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >62; ASPT value: >5.2	SASS5 score: <65 and ASPT: <5.4

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:				
			Baetidae >2sp	Minimum abundance of an A attained.		If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.	
			Trichorythidae	Minimum abundance of an A attained.		If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.	
			Leptophlebiidae	Minimum abundance of an A attained.		If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.	
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.		
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3		SPI Score: <15	
Priority RU 13.6							
Quantity	Low flows	Maintenance and drought flows required for the White Kei River	EWR maintenance low and drought flows: White Kei River at WKEI01_R (-32.00306; 27.35105) in S10J		Maintenance (m³/s)	Drought (m³/s)	
				Oct	1.005	0.195	
				Nov	1.151	0.222	
				Dec	1.170	0.146	
				Jan	1.282	0.244	

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
			nMAR = 155.7 x10 ⁶ m ³ TEC=C category	Feb	1.609	0.303	
				Mar	1.651	0.308	
				Apr	1.417	0.268	
				May	1.076	0.208	
				Jun	0.433	0.200	
				Jul	0.402	0.186	
				Aug	0.406	0.188	
				Sep	0.802	0.190	
	High flows	Freshets and annual flood required for the White Kei River	EWR freshets and flood	Freshets/ flood			
					m ³ /s	Duration (days)	
				Sep	3.5	3	
				Oct	3.5	3	
				Nov	8	3	
				Dec	5	3	
				Jan	5	3	
				Feb	8	3	
				Mar	20	3	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥80cm			-

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤48.0 mg/L	TSS >52.8 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <68%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <65%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <63%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >110; ASPT value: >6.0	SASS5 score: <115 and ASPT: <6.4
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
					deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Elmidae	Minimum abundance of an A attained.	If Elmidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC and GSM become exposed.
	Diatoms	Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
		SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: <13.8

8.14 (14) IUA_S02: Black Kei

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers, major dams and wetlands.

Refer to **Table 8-27** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-28** includes the draft RQS for IUA_S02 for those RUs and indicators as listed in **Table 8-27**.

Table 8-27: Resource Units delineation and selected indicators for 14. IUA_S02

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
14.1	S32K-07057	S32K	Black Kei	All indicators. EWR site BKEI01_I	X	X	X	X	X			X	X		X	X	X
14.2	S32G-07224	S32G	Klipplaat	Selected according to the RU evaluation tool. Node KLIP01_FV. The Sada/Wittlesea WWTW located within this RU.			X	X	X	X	X			X		X	X
14.3	S31G-06899	S31G	Klaas Smits	Selected according to the RU evaluation tool. Node KSMI01_FV. Located downstream of Komani WWTW			X	X	X	X	X			X			X
14.4	S31F-06731	S31F	Komani	Selected according to the RU evaluation tool. Closely associated with Komani WWTW.			X	X	X	X	X						

Table 8-28: Draft RQOs for IUA_S02

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 14.1							
Quantity	Low flows	Maintenance and drought flows required for the Black Kei River	EWR maintenance low and drought flows: Black Kei River at BKEI01_I (-32.118; 27.069) in S32K nMAR = 187.9 x10 ⁶ m ³ TEC=D category		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	0.918	0.632	
				Nov	1.049	0.721	
				Dec	0.986	0.545	
				Jan	0.949	0.515	
				Feb	1.156	0.796	
				Mar	1.232	0.848	
				Apr	1.109	0.764	
				May	0.973	0.670	
				Jun	0.924	0.637	
				Jul	0.875	0.602	
				Aug	0.885	0.610	
				Sep	0.903	0.622	
	High flows	Freshets and annual flood required for the Black Kei River	EWR freshets and flood		Freshet / flood		
					m ³ /s	Duration (days)	
				Oct	7	5	
				Nov	30	3	
				Dec	7	5	
				Jan	7	5	
				Feb	7	5	
					30	3	
				Mar	60	5	
				Apr	7	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L	PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L	DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥51cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤48.0 mg/L	TSS >52.8 mg/L
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts	Maintain a GAI PES score of at least a 'C' or >62%	GAI PES score <62%
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of <25% for riffle sediment	Embeddedness levels of >25% for 25% of riffle area/sampling points
		Pool depth	Maintain upstream pool with deep open water	Maintain upstream pool with water >0.5 m deep for >60% of pool area	Upstream pool is >60% filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of >5 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 5 m and no signs of recent fine sediment deposition on the benches
Habitat: Riparian Vegetation	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone, but with a small woody component	Non-woody cover ≥20% (aerial cover).	Non-woody cover <25% (aerial cover).

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		Key species	<i>Cyperus sexangularis</i> , <i>C. longus</i> , <i>Cynodon dactylon</i> , <i>Miscanthus ecklonii</i> and <i>Salix mucronata</i> should be present	5 listed species present.	<i>Cyperus sexangularis</i> , <i>C. longus</i> , <i>Cynodon dactylon</i> , <i>Miscanthus ecklonii</i> or <i>Salix mucronata</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant cover ≤5%	Perennial alien plants present
		Terrestrial woody cover		Terrestrial woody plants absent	Terrestrial woody plants present
		Indigenous woody cover		0% >Woody cover ≤20% (aerial cover).	Woody cover absent or >20% (aerial cover).
		Non-woody cover		Non-woody cover ≥20% (aerial cover).	Non-woody cover <25% (aerial cover).
		Reed cover		Reeds absent	Reeds present
	Non-marginal (upper - floodplain)	Dominant vegetation	Non-woody vegetation should dominate the floodplain	Non-woody cover ≥50% (aerial cover).	Non-woody cover <50% (aerial cover).
		Key species	<i>Miscanthus ecklonii</i> and <i>Cynodon dactylon</i> should be present	2 listed species present.	<i>Miscanthus ecklonii</i> or <i>Cynodon dactylon</i> absent
		Alien plant species	The riparian vegetation structure and composition on the floodplain should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤15% (aerial cover).	Perennial alien plant species >5% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤10% (aerial cover).	Terrestrial woody cover >5% (aerial cover).
		Indigenous woody cover		0% >Woody cover ≤10% (aerial cover).	Woody cover absent or >10% (aerial cover).
		Non-woody cover		Non-woody cover ≥50% (aerial cover).	Non-woody cover <50% (aerial cover).
	Non-marginal (lower - banks)	Dominant vegetation	Woody and non-woody vegetation should co-dominate the banks	Woody cover ≥10% (aerial cover). Non-woody cover ≥40% (aerial cover).	Woody cover <15% (aerial cover). Non-woody cover <35% (aerial cover).
		Key species	<i>Miscanthus ecklonii</i> , <i>Cynodon dactylon</i> , <i>Schoenoplectus corymbosus</i> and <i>Celtis africana</i> should be present	4 listed species present.	<i>Miscanthus ecklonii</i> , <i>Cynodon dactylon</i> , <i>Schoenoplectus corymbosus</i> or <i>Celtis africana</i> absent
		Alien plant species	There should be limited or no encroachment by alien species.	Perennial alien plant species ≤15% (aerial cover).	Perennial alien plant species >5% (aerial cover).
	Riparian zone	PES	The PES category should be a D at least	VEGRAI score ≥42%	VEGRAI score <48%

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥16 indigenous species.	<16 indigenous species.
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a D/E Category.	MIRAI score ≥42%	MIRAI score <42%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >85; ASPT value: >5.0	SASS5 score: <90 and ASPT: <6.0.
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
					deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3	SPI Score: <13.3
Priority RU 14.2					
Water quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be ≤85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤2.0 mg/L	TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be <0.025 mg/L	PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L	DO <6 mg/L
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36	5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 47 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤ 121.0 mg/L	TSS >133.1 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category C. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score $\geq 78\%$	IHI: Instream score <78%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score $\geq 62\%$	IHI: Riparian score <66.5%
Biota	Macroinvertebrates	MIRAI Category and Score	N/A	N/A	N/A
		SASS5 Total Score and ASPT	N/A	N/A	N/A
		Key taxa and abundance	To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon: Coenagrionidae.	Minimum abundance of an A attained.	Coenagrionidae missing in two consecutive surveys or has a single individual present in two consecutive surveys.
		Taxon dominance	To ensure that no group consistently dominates the fauna, defined as C abundance (>100) over more than two consecutive surveys.		Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI	The Ecological Category should be maintained at a Category C or greater.	SPI Score ≥ 9.2	SPI Score: <11

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 14.3					
Water quality	Salts	Electrical conductivity (EC)		To achieve the category D, EC should be <85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L	TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L	PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L	DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00	<5.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥25 cm	-
		TSS (WQGDSS Tool)	Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time	Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤801.0 mg/L	TSS >881.1 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category C/D or greater.	IHI: instream score ≥58%	IHI: Instream score <58.5%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score ≥78%	IHI: Instream score <79.5%
Biota	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category D or greater.	SPI Score ≥5.3	SPI Score <5.3

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 14.4					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category D, EC should be <85 mS/m	EC >85 mS/m
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L	DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00	<5.00
		Clarity / turbidity		-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
	Toxins	Listed	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. This ensures that the established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.	Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D. Primary focus will be on ammonia concentrations owing to the WWTW.	-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines	-

8.15 (15) IUA_S03: Lower Great Kei

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers, major dams and estuaries.

Refer to **Table 8-29** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-30** includes the draft RQS for IUA_S03 for those RUs and indicators as listed in **Table 8-29**.

Table 8-29: Resource Units delineation and selected indicators for 15. IUA_S03

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality				Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates
15.1	S60A-07662	S60A	Gubu	<i>Selected according to the RU evaluation tool. No data available to set RQOs</i>												
15.2	S60A-07606	S60A	Kubusi	<i>Selected according to the RU evaluation tool. No data available to set RQOs</i>												
15.3	S60B-07635	S60B	Kubusi	<i>Make use of RQOs determined for priority RU 15.7</i>												
15.4	S70A-07524	S70A	Great Kei	<i>All indicators. EWR site GKEI01_I</i>	X	X	X	X	X			X	X		X	X
15.5	S70D-07307	S70D	Gcuwa	<i>All indicators. EWR site GCUW01_R</i>	X	X	X	X	X				X		X	X
15.6	S70D-07307	S70D	Gcuwa	<i>Selected according to the RU evaluation tool. Node GCUW01_FV. Located directly downstream from Butterworth WWTW</i>			X	X	X	X	X					X
15.7	S60E-07531	S60B	Kubusi	<i>All indicators. EWR site KUBU03_R</i>	X	X	X	X	X					X	X	X

Table 8-30: Draft RQOs for IUA_S03

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 15.4							
Quantity	Low flows	Maintenance and drought flows required for the Great Kei River	EWR maintenance low and drought flows: Great Kei River at GKEI01_I (-32.508; 27.966) in S70A nMAR = 897.2 x10 ⁶ m ³ TEC=C category Monitoring of flows at S7H004		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	3.524	1.200	
				Nov	4.360	1.461	
				Dec	4.274	1.431	
				Jan	4.535	1.511	
				Feb	5.673	1.873	
				Mar	6.073	1.984	
				Apr	5.216	1.724	
				May	3.888	1.312	
				Jun	3.350	1.151	
				Jul	3.074	1.062	
				Aug	3.107	1.072	
				Sep	3.222	1.111	
	High flows	Freshets and annual flood required for the Great Kei River	EWR freshets and flood		Freshets / flood		
					m ³ /s	Duration (days)	
				Sep	30	5	
				Oct	30	5	
				Nov	45	5	
				Dec	45	5	
				Jan	45	5	
				Feb	45	5	
				Mar	45	5	
					120	5	
				Apr	45	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤ 0.75 mg/L	TIN > 0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be < 0.015 mg/L	PO ₄ -P > 0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be > 7 mg/L	DO < 7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 59 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to < 10 % of the background TSS concentrations at a specific site and time. TSS ≤ 32.0 mg/L	TSS > 35.2 mg/L
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts	Maintain a GAI PES score of at least a 'C' or $> 62\%$	GAI PES score $< 62\%$
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel, cobble and boulders	Maintain riffle with mobile sediment in the range of a D50 of 45 mm, D16 of 20 mm and D84 of 90 mm	Riffle dominated by sand or only cobble and boulders
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of $< 25\%$ for riffle sediment	Embeddedness levels of $> 25\%$ for 25% of riffle area/sampling points
		Pool depth	Maintain downstream pool with deep open water	Maintain downstream pool with water > 0.5 m deep for $> 60\%$ of pool area	Downstream pool is $> 60\%$ filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of > 20 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 20 m and no signs of recent fine sediment deposition on the benches
Habitat: Riparian				Non-woody cover $\geq 25\%$ (aerial cover).	Non-woody cover $< 30\%$ (aerial cover).

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Marginal zone (including inset benches)	Dominant vegetation	Non-woody vegetation should dominate the marginal zone, but with a small woody component	0% >Woody cover ≤20% (aerial cover).	Woody cover absent or >20% (aerial cover).
		Key species	<i>Cynodon dactylon</i> , <i>Cyperus longus</i> , <i>C. textilis</i> , <i>Schoenoplectus paludicola</i> , <i>Gomphostigma virgatum</i> and <i>Salix mucronata</i> should be present	6 listed species present.	<i>Cynodon dactylon</i> , <i>Cyperus longus</i> , <i>C. textilis</i> , <i>Schoenoplectus paludicola</i> , <i>Gomphostigma virgatum</i> or <i>Salix mucronata</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plants absent	Perennial alien plants present
		Terrestrial woody cover		Terrestrial woody plants absent	Terrestrial woody plants present
		Reed cover		Reeds absent	Reeds present
	Non-marginal (lower - floodplain)	Dominant vegetation	Woody and non-woody vegetation should co-dominate the floodplain	Non-woody cover ≥10% (aerial cover).	Non-woody cover <15% (aerial cover).
				Woody cover ≥10% (aerial cover).	Woody cover <15% (aerial cover).
		Key species	<i>Cynodon dactylon</i> , <i>Vachellia karroo</i> , <i>V. robusta</i> , <i>Combretum caffrum</i> and <i>Gymnosporia buxifolia</i> should be present.	5 listed species present.	<i>Cynodon dactylon</i> , <i>Vachellia karroo</i> , <i>V. robusta</i> , <i>Combretum caffrum</i> or <i>Gymnosporia buxifolia</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤10% (aerial cover).	Perennial alien plant species >5% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤30% (aerial cover).	Terrestrial woody cover >30% (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	Indigenous woody vegetation should remain dominant along the banks	Woody cover ≥60% (aerial cover).	Woody cover <65% (aerial cover).
		Key species	<i>Vachellia karroo</i> , <i>V. robusta</i> , <i>Combretum caffrum</i> and <i>Gymnosporia buxifolia</i> should be present	4 listed species present.	<i>Vachellia karroo</i> , <i>V. robusta</i> , <i>Combretum caffrum</i> or <i>Gymnosporia buxifolia</i> absent
		Alien plant species	There should be limited or no encroachment by alien species.	Perennial alien plant species ≤10% (aerial cover).	Perennial alien plant species >5% (aerial cover).

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Biota	Riparian zone	PES	The PES category should be a C/D at least	VEGRAI score $\geq 58\%$	VEGRAI score $< 60\%$
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥ 21 indigenous species.	< 21 indigenous species.
		Endemic riparian species	<i>Combretum cafferum</i> , <i>Cyperus textilis</i> and <i>Schoenoplectus paludicola</i> endemic to South Africa, should remain present	3 listed endemic species present.	Absence of <i>Combretum cafferum</i> , <i>Cyperus textilis</i> or <i>Schoenoplectus paludicola</i>
	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score $\geq 42\%$	FRAI score $< 45\%$
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	$< 2\%$ of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	$> 2\%$ of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species.	At least two (2) <i>Anguilla</i> species present on two or more consecutive surveys.	< 2 <i>Anguilla</i> spp. present on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score $\geq 62\%$	MIRAI score $\geq 64\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 120 ; ASPT value: > 6.4	SASS5 scores less than 110 and ASPT less than 7.5.
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobles) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Perlidae	Minimum abundance of an A attained.	If Perlidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Elmidae	Minimum abundance of an A attained.	If Elmidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC and GSM become exposed.
			Hydropsychidae >2sp	Minimum abundance of an A attained.	If Hydropsychidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC	
			Aeshnidae	Minimum abundance of an A attained.			If Aeshnidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and marginal vegetation become exposed.	
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:					
			Coenagrionidae	Minimum abundance of an A attained.			If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.	
			Chlorolestidae	Minimum abundance of an A attained.			If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.	
	Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.			Any taxon occurring in an abundance of >100 for two consecutive surveys.		
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3			SPI Score: <13.9	
Priority RU 15.5								
Quantity	Low flows	Maintenance and drought flows required for the Gcuwa River	EWR maintenance low and drought flows:		Maintenance (m³/s)	Drought (m³/s)		
			Gcuwa River at GCUW01_R (-32.31937; 28.13580) in S70D	Oct	0.348	0.066		
			nMAR = 67.6 x10 ⁶ m³	Nov	0.389	0.074		
			TEC=D category	Dec	0.294	0.056		
				Jan	0.255	0.049		
				Feb	0.306	0.058		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			Monitoring of flows at S7H001	Mar	0.366	0.070	
				Apr	0.362	0.069	
				May	0.307	0.058	
				Jun	0.280	0.053	
				Jul	0.292	0.056	
				Aug	0.300	0.057	
				Sep	0.326	0.062	
	High flows	Freshets and annual flood required for the Gcuwa River	EWR freshets and flood		Freshets / flood		
					m³/s	Duration (days)	
				Nov	2	2	
				Dec	0.8	2	
				Jan	0.8	2	
				Feb	0.8	2	
				Mar	2	2	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥11cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.			TSS >35.2 mg/L

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
				TSS ≤32.0 mg/L	
Habitat: Riparian Vegetation	Marginal zone (river bed)	Dominant vegetation	The Marginal zone should be dominated by non-woody vegetation	Non-woody cover ≥10% (aerial cover).	Non-woody cover <15% (aerial cover).
		Key species	<i>Miscanthus ecklonii</i> and <i>Cyperus textilis</i> should be present	2 listed species present.	<i>Miscanthus ecklonii</i> or <i>Cyperus textilis</i> absent
	Non-marginal (river banks)	Dominant vegetation	The non-marginal (banks) zone should be dominated by indigenous woody vegetation	Woody cover ≥60% (aerial cover).	Woody cover <65% (aerial cover).
		Key species	<i>Combretum cafferum</i> and <i>Senegalia caffra</i> should be present	2 listed species present.	<i>Combretum cafferum</i> or <i>Senegalia caffra</i> absent
	Riparian zone	PES	The PES category should be a C/D at least	VEGRAI score ≥58%	VEGRAI score <60%
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥12 indigenous species.	<12 indigenous species.
		Endemic riparian species	<i>Combretum cafferum</i> and <i>Cyperus textilis</i> endemic to South Africa, should remain present	2 listed endemic species present.	Absence of <i>Combretum cafferum</i> or <i>Cyperus textilis</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <46%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	At least two (2) <i>Anguilla</i> species present on two or more consecutive surveys.	<2 <i>Anguilla</i> spp. present on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a D Category.	MIRAI score ≥42%	MIRAI score <45%

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >80; ASPT value: >5.0	SASS5 score: <85 and ASPT: <5.5
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		
			Baetidae 2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Hydropsychidae >2sp	Minimum abundance of an A attained.	If Hydropsychidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3	SPI Score: <15
Priority RU 15.6					
Water quality	Salts	Electrical conductivity (EC)		To achieve the category D, EC should be <85 mS/m	EC >85 mS/m

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category D, TIN should be <4 mg/L			TIN >4 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category D, PO ₄ -P should be <0.125 mg/L			PO ₄ -P >0.125 mg/L
	System variables	Dissolved oxygen		To achieve the category D, DO should be >4 mg/L			DO <4 mg/L
		pH		To achieve the category D, pH should be: 5th Percentile: 5.46 – 5.7 95th Percentile: 8.56 – 10.00			<5.00
		Clarity / turbidity	Use on-site observations and expert opinion.	No data			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤91.0 mg/L			TSS >100.1 mg/L
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category D. Primary focus will be on ammonia concentrations owing to the WWTW.			-
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines			-
Biota	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category D or greater.	SPI Score ≥5.3			SPI Score <6.3
Priority RU 15.7							
Quantity	Low flows	Maintenance and drought flows required for the Kubusi River	EWR maintenance low and drought flows: Kubusi River at KUBU03_R (-32.50722; 27.73135) in S60E nMAR = 98.1 x10 ⁶ m ³ TEC=C category		Maintenance (m³/s)	Drought (m³/s)	
				Oct			
				Nov	0.496	0.193	
				Dec	0.505	0.179	
				Jan	0.524	0.175	
				Feb	0.631	0.128	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
				Mar	0.653	0.192	
				Apr	0.606	0.143	
				May	0.421	0.142	
				Jun	0.292	0.139	
				Jul	0.251	0.128	
				Aug	0.268	0.138	
				Sep	0.290	0.150	
	High flows	Freshets and annual flood required for the Kubusi River	EWR freshets and flood		Freshets / flood		
					m ³ /s	Duration (days)	
				Sep	2.5	3	
				Oct	4	3	
				Nov	8	5	
				Dec	4	3	
				Jan	4	3	
				Feb	4	3	
				Mar	8	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥72 cm			-

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤32.0 mg/L	TSS >35.2 mg/L
Habitat	Instream Habitat	Score and category	No data		
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <64.2%
Biota: Riparian Vegetation	Marginal zone (river bed)	Dominant vegetation	The Marginal zone should be dominated by non-woody vegetation	Non-woody cover ≥50% (aerial cover).	Non-woody cover <55% (aerial cover).
		Key species	<i>Miscanthus ecklonii</i> and <i>Cyperus textilis</i> should be present	2 listed species present.	<i>Miscanthus ecklonii</i> or <i>Cyperus textilis</i> absent
	Non-marginal (river banks)	Dominant vegetation	The non-marginal (banks) zone should be dominated by indigenous woody vegetation	Woody cover ≥60% (aerial cover).	Woody cover <65% (aerial cover).
		Key species	<i>Combretum caffrum</i> and <i>Senegalia caffra</i> should be present	2 listed species present.	<i>Combretum caffrum</i> or <i>Senegalia caffra</i> absent
	Riparian zone	PES	The PES category should be a C at least	VEGRAI score ≥62%	VEGRAI score <66%
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥12 indigenous species.	<12 indigenous species.
		Endemic riparian species	<i>Combretum caffrum</i> and <i>Cyperus textilis</i> endemic to South Africa, should remain present	2 listed endemic species present.	Absence of <i>Combretum caffrum</i> or <i>Cyperus textilis</i>
	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <42%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Macroinvertebrates	Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species <i>Anguilla mossambica</i>	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
		MIRAI Category and Score	The Ecological Category should be maintained within a B/C Category.	MIRAI score $\geq 78\%$	MIRAI score $< 79\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 180 ; ASPT value: > 6.3	SASS5 score: < 185 and ASPT: < 6.6
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Perlidae	Minimum abundance of an A attained.	If Perlidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Psephenidae	Minimum abundance of an A attained.	If Psephenidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Elmidae	Minimum abundance of an A attained.	If Elmidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC and GSM become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Chlorolestidae	Minimum abundance of an A attained.	If Chlorolestidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: < 14.2

8.16 (16) IUA_T01: Upper Mbashe, Upper Mthatha

This IUA was delineated as a **Class II**. Note: This IUA has priority RUs for rivers, groundwater and wetlands.

Refer to **Table 8-31** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-32** includes the draft RQS for IUA_T01 for those RUs and indicators as listed in **Table 8-31**.

Table 8-31: Resource Units delineation and selected indicators for 16. IUA_T01

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
16.1	T11A-06296	T11A	Slang	<i>Water quality. Priority wetland RQOs will take preference, as located within the same quaternary catchment (T11A)</i>			X	X	X								
16.2	T11A-06376	T11A	KuKowa	<i>Localised water quality impacts (erosion)</i>			X	X	X								
16.3	T11A-06467	T11A	Ntungwana	<i>Localised water quality impacts (erosion)</i>			X	X	X								
16.4	T11H-06654	T11H	Mbhashe	<i>All indicators. EWR site MBHA02_R</i>	X	X	X	X	X					X	X	X	X
16.5	T20A-06339	T20A	Mthatha	<i>Water quality</i>			X	X	X								

Table 8-32: Draft RQOs for IUA_T01

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 16.1					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly	To achieve the category B/C, EC should be ≤85 mS/m	EC >85 mS/m

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Nutrients	Total Inorganic nitrogen (TIN)	recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category B/C, TIN should be <1 mg/L	TIN >1 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B/C, PO ₄ -P should be <0.025 mg/L	PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category B/C, DO should be >6 mg/L	DO <6 mg/L
		pH		To achieve the category B/C, pH should be: 5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00	5th Percentile: 5.00 – 5.23 95th Percentile:9.05 – 9.36
		Clarity / turbidity		-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
Priority RU 16.2					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category B/C, EC should be ≤85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B/C, TIN should be <1 mg/L	TIN >1 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B/C, PO ₄ -P should be <0.025 mg/L	PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category B/C, DO should be >6 mg/L	DO <6 mg/L

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		pH	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. This ensures that the established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.	To achieve the category B/C, pH should be: 5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00	5th Percentile: 5.00 – 5.23 95th Percentile:9.05 – 9.36
		Clarity / turbidity		-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
Priority RU 16.3					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category B/C, EC should be ≤85 mS/m	EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B/C, TIN should be <1 mg/L	TIN >1 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B/C, PO ₄ -P should be <0.025 mg/L	PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. This ensures that the established RQOs uphold minimum acceptable water quality standards and support the sustainable management of the water resource.	To achieve the category B/C, DO should be >6 mg/L	DO <6 mg/L
		pH		To achieve the category B/C, pH should be: 5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00	5th Percentile: 5.00 – 5.23 95th Percentile:9.05 – 9.36
		Clarity / turbidity		-	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.	-
Priority RU 16.4					

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Quantity	Low flows	Maintenance and drought flows required for the upper Mbashe River	EWR maintenance low and drought flows: Mbashe River at MBHA02_R (-31.80786; 28.34699) in T11H nMAR = 373.4 x10 ⁶ m ³ TEC=B/C category Monitoring of flows at T1H013		Maintenance (m ³ /s)	Drought (m ³ /s)	
				Oct	1.410	0.927	
				Nov	1.739	1.119	
				Dec	1.725	0.825	
				Jan	1.878	0.668	
				Feb	2.290	0.765	
				Mar	2.492	1.381	
				Apr	2.062	1.169	
				May	1.505	0.981	
				Jun	1.276	0.853	
				Jul	1.152	0.778	
				Aug	1.101	0.749	
				Sep	1.264	0.847	
	High flows	Freshets and annual flood required for the upper Mbashe River	EWR freshets and flood		Freshets / flood		
					m ³ /s	Duration (days)	
				Sep	10	5	
				Oct	15	3	
				Nov	25	3	
				Dec	25	3	
				Jan	20	3	
				Feb	30	3	
				Mar	50	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 95 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤ 32.0 mg/L	TSS >35.2 mg/L
Habitat	Instream Habitat	Score and Category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score $\geq 78\%$	IHI: Instream score <78.1%
	Riparian Habitat	Score and Category	The Ecological Category should be maintained at a Category B or greater.	IHI: riparian score $\geq 82\%$	IHI: Riparian score <84.5%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category C or greater.	FRAI score $\geq 62\%$	FRAI score <63%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species.	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a B/C Category.	MIRAI score $\geq 78\%$	MIRAI score <79%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >140; ASPT value: >6.3	SASS5 scores less than 145 and ASPT less than 6.4.
		Key taxa and abundance	To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Prosopistomatidae	Abundance between 1 and an A attained.	Velocities decrease below 0.6m/s for

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
					longer than a week, water quality deterioration and SIC become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as a D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: <14.5
Priority RU 16.5					
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU.	To achieve the category B, EC should be ≤ 55 mS/m	EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤ 0.75 mg/L	TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L	PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen	It is important to emphasise that, in line with the Department's mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. However, as water quality in this IUA does not appear to be a driver, quality for this priority RU should aim for a category B.	To achieve the category B, DO should be >7 mg/L	DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity		Aim for clarity to be approximately ≥ 95 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤ 32.0 mg/L	TSS >35.2 mg/L

8.17 (17) IUA_T02: Lower Mbashe

This IUA was delineated as a **Class II**. Note: This IUA has priority RU for only Mbashe River and estuary.

Refer to **Table 8-33** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-34** includes the draft RQS for IUA_T02 for those RUs and indicators as listed in **Table 8-33**.

Table 8-33: Resource Units delineation and selected indicators for 17. IUA_T02

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity		Quality					Habitat			Biota		
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
17.1	T13C-06941	T13E	Mbhashe	All indicators. EWR site MBAS01_I	X	X	X	X	X			X	X		X	X	X

Table 8-34: Draft RQOs for IUA_T02

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Priority RU 17.1							
Quantity	Low flows	Maintenance and drought flows required for the middle Mbashe River	EWR maintenance low and drought flows: Mbashe River at MBAS01_I (-31.958;		Maintenance (m³/s)	Drought (m³/s)	
				Oct	3.854	1.412	
				Nov	4.629	1.685	
				Dec	4.480	1.374	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			28.472) in T13C nMAR = 673.8 x10 ⁶ m ³ TEC=C/D category Monitoring of flows at T1H014	Jan	4.728	1.240	
				Feb	5.687	1.811	
				Mar	6.178	2.223	
				Apr	5.253	1.903	
				May	4.016	1.469	
				Jun	3.467	1.279	
				Jul	3.200	1.184	
				Aug	3.085	1.144	
				Sep	3.428	1.266	
	High flows	Freshets and annual flood required for the middle Mbashe River	EWR freshets and flood	Freshets / flood			
				m ³ /s		Duration (days)	
				Oct	37	5	
				Nov	37	5	
					50	5	
				Dec	50	5	
				Jan	50	5	
				Feb	37	5	
					50	5	
				Mar	37	5	
					200	5	
				Apr	37	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately $\geq 77\text{cm}$	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS $\leq 16.0\text{ mg/L}$	TSS >17.6 mg/L
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts	Maintain a GAI PES score of at least a 'C/D' or >57%	GAI PES score <57%
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 40% of riverbank length	Bank erosion of more than 40% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 28 mm, D16 of 11 mm and D84 of 66 mm	Riffle dominated by sand or only cobble and boulders
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of <30% for riffle sediment	Embeddedness levels of >30% for 25% of riffle area/sampling points
		Pool depth	Maintain downstream pool with deep open water	Maintain downstream pool with water >0.5 m deep for >50% of pool area	Downstream pool is >50% filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of >10 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 10 m and no signs of recent fine sediment deposition on the benches
Habitat: Riparian Vegetation	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone, but with a small woody component	Non-woody cover $\geq 5\%$ (aerial cover).	Non-woody cover <10% (aerial cover).
				5% $\geq$ Woody cover $\leq 30\%$ (aerial cover).	Woody cover absent or >25% (aerial cover).
		Key species	<i>Phragmites mauritianus</i> , <i>Cyperus longus</i> , <i>Schoenoplectus decipiens</i> , <i>Miscanthus ecklonii</i> and	5 listed species present.	<i>Phragmites mauritianus</i> , <i>Cyperus longus</i> , <i>Schoenoplectus decipiens</i> , <i>Miscanthus ecklonii</i> or <i>Gomphostigma virgatum</i> absent

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			<i>Gomphostigma virgatum</i> should be present		
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plants absent	Perennial alien plants present
		Terrestrial woody cover		Terrestrial woody plants absent	Terrestrial woody plants present
		Reed cover		Reed cover ≤20% (aerial cover)	Reed cover >15% (aerial cover)
	Non-marginal (lower - flood bench)	Dominant vegetation	Non-woody vegetation should dominate the flood benches	Non-woody cover ≥40% (aerial cover).	Non-woody cover <45% (aerial cover).
				5% ≥Woody cover ≤40% (aerial cover).	Woody cover absent or >40% (aerial cover).
		Key species	<i>Cynodon dactylon</i> should be present.	1 listed species present.	<i>Cynodon dactylon</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species ≤10% (aerial cover).	Perennial alien plant species >5% (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover ≤10% (aerial cover).	Terrestrial woody cover >5% (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	Indigenous woody vegetation should remain dominant along the banks	Woody cover ≥15% (aerial cover).	Woody cover <20% (aerial cover).
		Key species	<i>Vachellia karroo</i> and <i>Combretum caffrum</i> should be present	2 listed species present.	<i>Vachellia karroo</i> or <i>Combretum caffrum</i> absent
		Alien plant species	There should be limited or no encroachment by alien species.	Perennial alien plant species ≤10% (aerial cover).	Perennial alien plant species >5% (aerial cover).
	Riparian zone	PES	The PES category should be a C/D at least	VEGRAI score ≥58%	VEGRAI score <60%
		Species richness	Indigenous plant species richness in the riparian	≥18 indigenous species.	<18 indigenous species.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			zone should be maintained.		
		Endemic riparian species	<i>Combretum cafferum</i> endemic to South Africa, should remain present	1 listed endemic species present.	Absence of <i>Combretum cafferum</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score $\geq 42\%$	FRAI score $< 44\%$
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	$< 2\%$ of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	$> 2\%$ of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score $\geq 62\%$	MIRAI score $< 65\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 120 ; ASPT value: > 6.8	SASS5 score: < 125 and ASPT: < 7.2
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
					quality deterioration and biotopes become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score <14.6

8.18 (18) IUA_T03: Lower Mthatha

This IUA was delineated as a **Class III**. Note: This IUA has priority RU for all water resources, except wetlands.

Refer to **Table 8-35** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-36** includes the draft RQS for IUA_T03 for those RUs and indicators as listed in **Table 8-35**.

Table 8-35: Resource Units delineation and selected indicators for 17. IUA_T03

RU No.	SQ Reach	Quat	River	Rationale	Component											
					Quantity		Quality					Habitat			Biota	
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates
18.1	T20C-06527	T20C	Mthatha	<i>Selected according to the RU evaluation tool – directly downstream of the Mthatha WWTW</i>			X	X	X	X	X					
18.2	T20G-06794	T20G	Mthatha	<i>All indicators. EWR site MTHA01_I</i>	X	X	X	X	X		X	X	X		X	X

Table 8-36: Draft RQOs for IUA_T03

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric		TPC	
Priority RU 18.1							
Water quality	Salts	Electrical conductivity (EC)	In the absence of water quality data necessary to establish practical and effective RQOs, it is strongly recommended that the Department initiate the collection of baseline water quality data. This baseline data will provide a foundational understanding of the current water quality status and enable the Department to set reasonable, evidence-based, and accurate RQOs tailored to this priority RU. It is important to emphasise that, in line with the Department’s mandate, none of the selected water quality indicators should fall below the narrative RQOs for a category D classification. However, as further downstream in priority RU 18.2, the water quality category was a B, thus quality for this priority RU should aim for a category C.	To achieve the category C, EC should be ≤85 mS/m		EC >85 mS/m	
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be ≤2.0 mg/L		TIN >2.0 mg/L	
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be <0.025 mg/L		PO ₄ -P >0.025 mg/L	
	System variables	Dissolved oxygen		To achieve the category C, DO should be >6 mg/L		DO <6 mg/L	
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile:9.05 – 9.36		5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67	
		Clarity / turbidity		-		-	
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.		-	
	Toxins	Listed		Meet targets for use in Table 6.2 detailing rating values for toxic substances to achieve a category C. Primary focus will be on ammonia concentrations owing to the WWTW.		-	
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing high health risk guidelines		-	
Priority RU 18.2							
Quantity	Low flows	Maintenance and drought flows required for the lower Mthatha River	EWR maintenance low and drought flows: Mthatha River at MTHA01_I (-31.9262; 29.1364) in T20G		Maintenance (m³/s)	Drought (m³/s)	
				Oct	2.471	1.808	
				Nov	2.974	1.894	
				Dec	2.925	1.803	
				Jan	3.033	1.146	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric		TPC	
			nMAR = 389.2 x10 ⁶ m ³ TEC=C category	Feb	3.686	1.418	
				Mar	4.049	2.221	
				Apr	3.684	1.644	
				May	2.706	2.014	
				Jun	2.340	1.462	
				Jul	2.177	1.314	
				Aug	2.053	1.442	
				Sep	2.194	1.343	
	High flows	Freshets and annual flood required for the lower Mthatha Rivers (MCM)	EWR Freshets and flood		Freshets / flood		
					m ³ /s	Duration (days)	
				Oct	15	4	
				Nov	15	4	
				Jan	15	4	
				Feb	15	4	
				Mar	15	4	
				Apr	15	4	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m		EC >55 mS/m	
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L		TIN >0.75 mg/L	
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L		PO ₄ -P >0.015 mg/L	
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L		DO <7 mg/L	
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69		5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00	
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥45cm		-	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤16.0 mg/L	TSS >17.6 mg/L
	Pathogens	Faecal coliforms and <i>E. coli</i>		Meet targets for use in Table 6.3 detailing health risk guidelines	-
Habitat	Geomorphology	GAI score	Maintain or improve catchment drivers and site impacts	Maintain a GAI PES score of at least a 'C' or >62%	GAI PES score <62%
		Bank erosion	Maintain low to moderate proportion of banks actively eroding	Maintain bank erosion below 30% of riverbank length	Bank erosion of more than 30% of riverbank length
		Bed sediment size	Maintain dominant riffle sediment size to include gravel and cobble	Maintain riffle with mobile sediment in the range of a D50 of 52 mm, D16 of 18 mm and D84 of 100 mm	Riffle dominated by sand or only cobble
		Embeddedness	Maintain low embeddedness of riffle sediment	Maintain embeddedness of <25% for riffle sediment	Embeddedness levels of >25% for 25% of riffle area/sampling points
		Pool depth	Maintain upstream pool with deep open water	Maintain upstream pool with water >0.5 m deep for >60% of pool area	Upstream pool is >60% filled with sediment and forming largely shallow habitat
		Floodbench	Maintain flood benches along at least one of the banks	Maintain flood bench of >5 m wide along at least one bank with signs of recent fine sediment deposition	Channel erosion to the extent where there are no benches wider than ~ 5 m and no signs of recent fine sediment deposition on the benches
Habitat: Riparian Vegetation	Marginal zone	Dominant vegetation	Non-woody vegetation should dominate the marginal zone, but with a small woody component	Non-woody cover ≥ 25% (aerial cover). 5% ≥ Woody cover ≤ 30% (aerial cover).	Non-woody cover <30% (aerial cover). Woody cover absent or >25% (aerial cover).
		Key species	<i>Miscanthus ecklonii</i> , <i>Cyperus dives</i> , <i>Salix mucronata</i> and <i>Gomphostigma virgatum</i> should be present	4 listed species present.	<i>Miscanthus ecklonii</i> , <i>Cyperus dives</i> , <i>Salix mucronata</i> or <i>Gomphostigma virgatum</i> absent
		Alien plant species	The riparian vegetation structure and composition in the marginal zone should maintain desired dominance and non-dominance, with limited or no	Perennial alien plants absent	Perennial alien plants present
		Terrestrial woody cover		Terrestrial woody plants absent	Terrestrial woody plants present
		Reed cover		Reeds absent	Reeds present

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			encroachment by alien or terrestrial species.		
	Non-marginal (lower - flood bench)	Dominant vegetation	Non-woody vegetation should dominate the flood benches	Non-woody cover $\geq 40\%$ (aerial cover).	Non-woody cover $< 65\%$ (aerial cover).
				5% $\geq$ Woody cover $\leq 40\%$ (aerial cover).	Woody cover absent or $> 35\%$ (aerial cover).
		Key species	<i>Miscanthus ecklonii</i> , <i>Cynodon dactylon</i> and <i>Hemarthria altissima</i> should be present.	3 listed species present.	<i>Miscanthus ecklonii</i> , <i>Cynodon dactylon</i> or <i>Hemarthria altissima</i> absent
		Alien plant species	The riparian vegetation structure and composition on the flood benches should maintain desired dominance and non-dominance, with limited or no encroachment by alien or terrestrial species.	Perennial alien plant species $\leq 10\%$ (aerial cover).	Perennial alien plant species $> 5\%$ (aerial cover).
		Terrestrial woody cover		Terrestrial woody cover $\leq 10\%$ (aerial cover).	Terrestrial woody cover $> 5\%$ (aerial cover).
	Non-marginal (upper - banks)	Dominant vegetation	Indigenous woody vegetation should remain dominant along the banks	Woody cover $\geq 20\%$ (aerial cover).	Woody cover $< 25\%$ (aerial cover).
		Key species	<i>Vachellia karroo</i> , <i>Ziziphus mucronata</i> , <i>Ficus sur</i> and <i>Combretum caffrum</i> should be present	4 listed species present.	<i>Vachellia karroo</i> , <i>Ziziphus mucronata</i> , <i>Ficus sur</i> or <i>Combretum caffrum</i> absent
		Alien plant species	Encroachment by alien species should be kept in check	Perennial alien plant species $\leq 50\%$ (aerial cover).	Perennial alien plant species $> 40\%$ (aerial cover).
	Riparian zone	PES	The PES category should be a D at least	VEGRAI score $\geq 42\%$	VEGRAI score $< 50\%$
		Species richness	Indigenous plant species richness in the riparian zone should be maintained.	≥ 14 indigenous species.	< 14 indigenous species.
		Endemic riparian species	<i>Combretum caffrum</i> endemic to South Africa, should remain present	1 listed endemic species present.	Absence of <i>Combretum caffrum</i>
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category C or greater.	FRAI score $\geq 62\%$	FRAI score $< 65\%$
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	$< 2\%$ of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	$> 2\%$ of fish population with externally evident disease or other anomalies.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	At least two (2) <i>Anguilla</i> species present on two or more consecutive surveys.	<2 <i>Anguilla</i> spp. present on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <64%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >85; ASPT value: >6.0	SASS5 score: <87 and ASPT: <6.2
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.	If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon (also which have a preference for cobbles):		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Paleomonidae	Minimum abundance of an A attained.	If Paleomonidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems(and cobbles) become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 13.3	SPI Score: <14.4

8.19 (19) IUA_T04: Pondoland coastal

This IUA was delineated as a **Class I**. Note: This IUA has priority RUs for all water resources, except dams.

Refer to **Table 8-37** for the list of priority river RU and the selected sub-components and indicators as per the RU Evaluation tool. Furthermore, **Table 8-38** includes the draft RQS for IUA_T04 for those RUs and indicators as listed in **Table 8-37**.

Table 8-37: Resource Units delineation and selected indicators for 18. IUA_T04

RU No.	SQ Reach	Quat	River	Rationale	Component												
					Quantity			Quality			Habitat			Biota			
					Low Flows	High Flows	Nutrients	Salts	System variables	Toxics	Pathogens	Geomorphology	Riparian vegetation	IHI	Fish	Aquatic macroinvertebrates	Diatoms
19.1	T70E-06459	T70E	Mtakatye	Selected according to the RU evaluation tool			X	X	X					X			X
19.2	T80D-06960	T80D	Xora	No available data to set RQOs													
19.3	T90A-07092	T90B	Nqabarha	All indicators. NQAB01_R	X		X	X	X					X	X	X	X
19.4	T90D-07329	T90D	Qhorha	No available data to set RQOs													
19.5	T90F-07544	T90F	Sihlontweni	No available data to set RQOs													
19.6	T70B-06498	T70B	Mngazi	All indicators. EWR site MNGA01_R	X	X	X	X	X					X	X	X	X
19.7	T60C-05942	T60C	Mtentu	All indicators. EWR site MTEN01_R	X	X	X	X	X					X	X	X	X
19.8	T60G-06145	T60G	Mzikaba	Selected according to the RU evaluation tool	X	X									X	X	

Table 8-38: Draft RQOs for IUA_T04

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority RU 19.1					
Water Quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤ 55 mS/m	EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤ 0.75 mg/L	TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be < 0.015 mg/L	PO ₄ -P >0.015 mg/L
	System Variables	Dissolved oxygen		To achieve the category B, DO should be > 7 mg/L	DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69	5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 95 cm	-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤ 32.0 mg/L	TSS >35.2 mg/L
Habitat	Instream Habitat	Instream score and category	The Ecological Category should be maintained at a Category B/C or greater.	IHI: instream score $\geq 78\%$	IHI: Instream score <79.5%
	Riparian Habitat	Riparian score and category	The Ecological Category should be maintained at a Category B or greater.	IHI: riparian score $\geq 82\%$	IHI: Riparian score <84.5%
Biota	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥ 15.5	SPI Score: <15.0
Priority RU 19.3					

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
Quantity	Low flows	Maintenance and drought flows required for the Nqabara River	EWR maintenance low and drought flows: Nqabara River at NQAB01_R (-32.09193; 28.40023) in T90A nMAR = $9.8 \times 10^6 \text{ m}^3$ TEC=C category		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.041	0.017	
				Nov	0.048	0.020	
				Dec	0.038	0.015	
				Jan	0.030	0.012	
				Feb	0.033	0.013	
				Mar	0.041	0.017	
				Apr	0.045	0.018	
				May	0.040	0.016	
				Jun	0.040	0.016	
				Jul	0.039	0.016	
				Aug	0.039	0.016	
				Sep	0.040	0.016	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category C, EC should be $\leq 85 \text{ mS/m}$			EC >85 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category C, TIN should be $\leq 2.0 \text{ mg/L}$			TIN >2.0 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category C, PO ₄ -P should be $< 0.025 \text{ mg/L}$			PO ₄ -P >0.025 mg/L
	System variables	Dissolved oxygen		To achieve the category C, DO should be $> 6 \text{ mg/L}$			DO <6 mg/L
		pH		To achieve the category C, pH should be: 5th Percentile: 5.00 – 5.23 95th Percentile: 9.05 – 9.36			5th Percentile: 5.23 – 5.46 95th Percentile: 9.36 – 9.67
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately $\geq 95 \text{ cm}$			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time.			TSS >61.6 mg/L

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
				TSS ≤56.0 mg/L	
Habitat	Instream Habitat	Instream score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <67.5%
	Riparian Habitat	Riparian score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <62%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category D or greater.	FRAI score ≥42%	FRAI score <44%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	Indigenous species must be represented.	At least 1 indigenous fish species present.	No indigenous species present
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a C Category.	MIRAI score ≥62%	MIRAI score <66%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >85; ASPT value: >5.0	SASS5 scores less than 89 and ASPT less than 5.7.
		Key taxa and abundance	To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			Baetidae >2sp	Minimum abundance of an A attained.			If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Leptophlebiidae	Minimum abundance of an A attained.			If Leptophlebiidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.			Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category C or greater.	SPI Score ≥9.2			SPI Score: <9.8
Priority RU 19.6							
Quantity	Low flows	Maintenance and drought flows required for the Mngazi River	EWR maintenance low and drought flows: Mngazi River at MNGA01_R (-31.60896; 29.40512) in T70B nMAR = 78.2 x10 ⁶ m ³ TEC=B/C category		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.451	0.183	
				Nov	0.533	0.177	
				Dec	0.481	0.242	
				Jan	0.429	0.211	
				Feb	0.498	0.247	
				Mar	0.605	0.280	
				Apr	0.602	0.305	
				May	0.464	0.232	
				Jun	0.449	0.221	
				Jul	0.427	0.210	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
				Aug	0.388	0.186	
				Sep	0.420	0.204	
	High flows	Freshets and annual flood required for the Mngazi River	EWR freshets/ flood		Freshets / flood		
					m³/s	Duration (days)	
				Sep	2	3	
				Oct	2	3	
				Nov	6	5	
				Dec	5	3	
				Jan	2	3	
				Feb	4	3	
				Mar	8	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile:8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile:8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥81 cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤16.0 mg/L			TSS >17.6 mg/L
Habitat	Instream Habitat	Score and category	The Ecological Category should be maintained at	IHI: riparian score ≥58%			IHI: Riparian score <59%

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			a Category C/D or greater.		
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score ≥62%	IHI: Riparian score <68%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category C or greater.	FRAI score ≥62%	FRAI score <65%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.	>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a B Category.	MIRAI score ≥82%	MIRAI score <84%
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: >185; ASPT value: >6.0	SASS5 score: <188 and ASPT: <6.3
		Key taxa and abundance	To maintain suitable flow velocity (>0.6m/s) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae >2sp	Minimum abundance of an A attained.	If Baetidae >2sp is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
					surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Perlidae	Minimum abundance of an A attained.	If Perlidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
			Atyidae	Minimum abundance of an A attained.	If Atyidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems become exposed.
			Paleomonidae (also has a preference to cobbles)	Minimum abundance of an A attained.	If Paleomonidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Water quality deterioration and marginal vegetation and stems(and cobbles) become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.			Any taxon occurring in an abundance of >100 for two consecutive surveys.
	Diatoms	SPI score and Category	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3			SPI Score: <13.7
Priority RU 19.7							
Quantity	Low flows	Maintenance and drought flows required for the Mtentu River	EWR maintenance low and drought flows: Mtentu River at MTEN01_R (-31.13048; 29.75718) in T60C nMAR = 89.6 x10 ⁶ m ³ TEC=B/C category		Maintenance (m³/s)	Drought (m³/s)	
				Oct	0.856	0.150	
				Nov	1.150	0.210	
				Dec	1.139	0.209	
				Jan	1.100	0.201	
				Feb	1.236	0.226	
				Mar	1.220	0.226	
				Apr	1.146	0.210	
				May	0.904	0.160	
				Jun	0.822	0.142	
				Jul	0.754	0.129	
				Aug	0.682	0.114	
				Sep	0.735	0.124	
	High flows	Freshets and annual flood required for the Mtentu River	EWR Freshets and flood		Freshets / flood		
					m³/s	Duration (days)	
				Aug	2	3	
				Sep	2	3	
				Oct	4	3	
				Nov	15	5	
				Dec	7	2	
				Jan	7	2	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
				Feb	7	2	
				Mar	10	5	
Water quality	Salts	Electrical conductivity (EC)		To achieve the category B, EC should be ≤ 55 mS/m			EC >55 mS/m
	Nutrients	Total Inorganic nitrogen (TIN)		To achieve the category B, TIN should be ≤ 0.75 mg/L			TIN >0.75 mg/L
		Orthophosphate (PO ₄ -P)		To achieve the category B, PO ₄ -P should be <0.015 mg/L			PO ₄ -P >0.015 mg/L
	System variables	Dissolved oxygen		To achieve the category B, DO should be >7 mg/L			DO <7 mg/L
		pH		To achieve the category B, pH should be: 5th Percentile: 6.00 – 6.24 95th Percentile: 8.37 – 8.69			5th Percentile: 6.24 – 6.46 95th Percentile: 8.69 – 9.00
		Clarity / turbidity	Use on-site observations and expert opinion.	Aim for clarity to be approximately ≥ 93 cm			-
		TSS (WQGDSS Tool)		Any increase in TSS concentrations must be limited to <10 % of the background TSS concentrations at a specific site and time. TSS ≤ 2.5 mg/L			TSS >2.75 mg/L
Biota: Riparian Vegetation	Instream Habitat	Score and category	The Ecological Category should be maintained at a Category A/B or greater.	IHI: riparian score $\geq 88\%$			IHI: Riparian score <89%
	Riparian Habitat	Score and category	The Ecological Category should be maintained at a Category C or greater.	IHI: riparian score $\geq 62\%$			IHI: Riparian score <61.5%
Biota	Fish	FRAI score	The Ecological Category should be maintained at a Category C or greater.	FRAI score $\geq 62\%$			FRAI score <64%
		Overall fish health	To ensure fish population recorded is in good health with no	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to			>2% of fish population with externally evident disease or other anomalies.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			prevalence of disease and/or anomalies.	be noted but not used in this assessment of anomalies.	
		Key species	To ensure flows (including flooding events) and habitats allow for migration and presence of catadromous species	<i>Anguilla mossambica</i> present on two or more consecutive surveys.	<i>Anguilla mossambica</i> absent on two or more consecutive surveys
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a B/C Category.	MIRAI score $\geq 78\%$	MIRAI score $< 79\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 170 ; ASPT value: > 6.0	SASS5 score: < 175 and ASPT: < 6.3 .
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobble) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			Perlidae	Minimum abundance of an A attained.			If Perlidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Psephenidae	Minimum abundance of an A attained.			If Psephenidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:				
		Coenagrionidae	Minimum abundance of an A attained.			If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.	
	Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.			Any taxon occurring in an abundance of >100 for two consecutive surveys.	
	Diatoms	SPI	The Ecological Category should be maintained at a Category B or greater.	SPI Score ≥13.3			SPI Score: <13.7
Priority RU 19.8							
Quantity	Low flows	Maintenance and drought flows required for the Msikaba River	EWR maintenance low and drought flows:		Maintenance (m³/s)	Drought (m³/s)	
			Msikaba River at MSIK_EWR2 (-31.25175; 29.74885) in T60G	Oct	0.684	0.382	
				Nov	0.889	0.467	
				Dec	0.847	0.446	
				Jan	0.790	0.424	

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric			TPC
			nMAR = 128.9 x10 ⁶ m ³ TEC=B/C category	Feb	0.918	0.486	
				Mar	0.914	0.459	
				Apr	0.846	0.450	
				May	0.691	0.385	
				Jun	0.654	0.474	
				Jul	0.629	0.332	
				Aug	0.565	0.335	
				Sep	0.601	0.353	
	High flows	Freshets and annual flood required for the Msikaba River	EWR freshets and flood	Freshets / flood			
					m ³ /s	Duration (days)	
				Oct	10	4	
				Nov	30	5	
				Dec	10	4	
				Jan	10	4	
				Feb	10	4	
				Mar	10	5	
					30	5	
	Fish	FRAI score	The Ecological Category should be maintained at a Category B or greater.	FRAI score ≥82%			FRAI score <85%
		Overall fish health	To ensure fish population recorded is in good health with no prevalence of disease and/or anomalies.	<2% of fish population with externally evident disease or other anomalies. Parasite infestation to be noted but not used in this assessment of anomalies.			>2% of fish population with externally evident disease or other anomalies.
		Key species	To ensure population of <i>Enteromius anoplus</i> sl. remains viable	<i>Enteromius anoplus</i> sl. present on every survey at >3 individuals/minute, and sampled population must include various size cohorts.			<i>Enteromius anoplus</i> sl. absent during any survey or present at <1 individual/minute and/or only adult fish present during low flows in spring

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
	Macroinvertebrates	MIRAI Category and Score	The Ecological Category should be maintained within a B/C Category.	MIRAI score $\geq 78\%$	MIRAI score $< 79\%$
		SASS5 Total Score and ASPT	To ensure that the SASS scores attained, support the specified Ecological Category.	To ensure that the SASS5 scores and ASPT values occur in the following range: SASS5 score: > 120 ; ASPT value: > 6.2	SASS5 score: < 115 and ASPT: < 6.2
		Key taxa and abundance	To maintain suitable flow velocity ($> 0.6\text{m/s}$) and to maintain clean, unembedded surface area (cobbles) to support the following flow-dependent taxa:		
			Baetidae $> 2\text{sp}$	Minimum abundance of an A attained.	If Baetidae $> 2\text{sp}$ is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and biotopes become exposed.
			Heptageniidae	Minimum abundance of an A attained.	If Heptageniidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Trichorythidae	Minimum abundance of an A attained.	If Trichorythidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.
			Perlidae	Minimum abundance of an A attained.	If Perlidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.6m/s for longer than a week, water quality deterioration and SIC become exposed.

Component	Sub- component	Indicator	RQO Narrative	RQO Numeric	TPC
			Psephenidae	Minimum abundance of an A attained.	If Psephenidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. Velocities decrease below 0.3m/s for longer than a week, water quality deterioration and SIC become exposed.
			To maintain sufficient quantity and quality of inundated vegetation to support the following vegetation-dwelling taxon:		
			Coenagrionidae	Minimum abundance of an A attained.	If Coenagrionidae is missing in two consecutive surveys or has a single individual present in two consecutive surveys. If marginal vegetation becomes exposed for longer than a week.
		Taxon dominance	Ensure that no family dominates the macroinvertebrate assemblage.	Ensure that no family dominates the macroinvertebrate assemblage, defined as D (>1000) abundance for more than two consecutive surveys.	Any taxon occurring in an abundance of >100 for two consecutive surveys.

9. MAJOR DAMS RESOURCE QUALITY OBJECTIVES

The following section presents the proposed RQOs for the major prioritised dams within the Keiskamma and Fish-to-Tsitsikamma catchment areas, organised by their respective IUAs. The dams are summarised in **Table 9-1**, which provides a clear overview along with the context and rationale supporting the proposed RQOs.

Table 9-1: Draft RQOs for major dams per IUA

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
IUA_K01					
Priority Dam: 1.8 Churchill Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of dam to sustain optimal dam levels to support and protect downstream water users.		
Vegetation	In-channel <i>Phragmites</i> sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites</i> sp. and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_KL01					
Priority Dam: 2.1 Mpofu Dam					
Quantity	Dam operation and levels	Minimal operating level required in the dam	Update and review operation of dam to sustain optimal dam levels to support water users and protect downstream estuary.		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	System (dam) operating rules	Operating rules	Update and review operating rules to support water users and protect downstream estuary.		
Vegetation	In-channel <i>Phragmites</i> sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites</i> sp. and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_L01					
Priority Dam: 3.6 Kouga Dam					
Quantity	Dam operation and levels	Minimal operating level required in the dam	Update and review minimum operation of dam to sustain optimal dam levels to support water users and protect downstream Gamtoos River and Estuary.		
	System (dam) operating rules	Operating rules	Update and review operating rules to support water users and protect downstream river and estuary.		
Vegetation	In-channel <i>Phragmites</i> sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites</i> sp. and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_M01					
Priority Dam: 4.4 Groendal Dam					

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and downstream aquatic ecosystem.		
Vegetation	In-channel <i>Phragmites sp.</i> /reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_LN01					
Priority Dam: 5.33 Nqweba Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support downstream users.		
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for ≥50cm	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a ≤20.0 µg/l	Observation of cyanobacteria blooms noted in the dam

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 5.34 Darlington Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support downstream users, aquatic ecosystems (Sundays River and Estuary).		
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for ≥50cm	

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Vegetation	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_N01					
Priority Dam: 6.10 Korhaansdrift Weir					
Quantity	System (dam) operating rules	Operating rules	Update and review operating rules of the weir to protect aquatic ecosystems downstream (Sundays River and Estuary).		
IUA_Q03					
Priority Dam: 10.5 Kat River Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support downstream users and protect aquatic ecosystems.		
Vegetation	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_R01					
Priority Dam: 11.8 Sandile Dam					

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and to protect the downstream aquatic ecosystem.		
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a $\leq 20.0 \mu\text{g/l}$	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority Dam: 11.9 Cata Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users.		
Quality	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a ≤20.0 µg/l	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 11.10 Binfield Dam					

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and to protect downstream aquatic ecosystems.		
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for ≥50cm	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a ≤20.0 µg/l	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_R02					

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority Dam: 12.6 Laing Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and protect downstream aquatic ecosystem.		
	System (dam) operating rules	Operating rules	Update and review operating rules of the dams linked to the Buffalo River to protect aquatic ecosystems downstream and optimise water provision to users.		
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a $\leq 20.0 \mu\text{g/l}$	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 12.7 Rooikrantz Dam					
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a $\leq 20.0 \mu\text{g/l}$	Observation of cyanobacteria blooms noted in the dam
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 12.8 Bridledrift Dam					

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users.		
	System (dam) operating rules	Operating rules	Update and review operating rules of the dams linked to the Buffalo River to optimise water provision to users.		
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a $\leq 20.0 \mu\text{g/l}$	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 12.9 Nahoon Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and protect downstream aquatic ecosystem (Nahoon Estuary).		
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for ≥50cm	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a ≤20.0 µg/l	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 12.10 Maden Dam					
Quality	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a $\leq 20.0 \mu\text{g/l}$	Observation of cyanobacteria blooms noted in the dam
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_S01					
Priority Dam: 13.9 Xonxa Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and protect downstream aquatic ecosystem.		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Reduction in live storage	Current dam volume and increased sedimentation; bathymetric survey	Monitor levels of sedimentation in the dam	Should not change by $\geq 5\%$ over a 5 year period	Observation of levels of sedimentation in the dam
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	
Vegetation	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 13.10 Lubisi Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and to protect downstream aquatic ecosystem.		
	Reduction in live storage	Current dam volume and increased sedimentation; bathymetric survey	Monitor levels of sedimentation in the dam	Should not change by $\geq 5\%$ over a 5 year period	Observation of levels of sedimentation in the dam
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a $\leq 20.0 \mu\text{g/l}$	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 13.12 Ncora Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and water transfers to Mbashe River and to protect downstream aquatic ecosystems.		
	System (dam) operating rules	Operating rules	Update and review operating rules of the dam, including hydro power releases and transfers to Mbashe River to protect aquatic ecosystems downstream.		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Reduction in live storage	Current dam volume and increased sedimentation; bathymetric survey	Monitor levels of sedimentation in the dam	Should not change by $\geq 5\%$ over a 5 year period	Observation of levels of sedimentation in the dam
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a $\leq 20.0 \mu\text{g/l}$	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_S02					

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
Priority Dam: 14.5 Waterdown Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and protect downstream aquatic ecosystem.		
Vegetation	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: 14.6 Oukraal Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and protect downstream aquatic ecosystem.		
	Reduction in live storage	Current dam volume and increased sedimentation; bathymetric survey	Monitor levels of sedimentation in the dam	Should not change by ≥5% over a 5 year period	Observation of levels of sedimentation in the dam
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for ≥50cm	

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Eutrophication	Cyanobacteria	Indication of eutrophication from remote sensing. The numbers of cyanobacteria must be kept within mesotrophic levels.	Chlorophyll a ≤20.0 µg/l	Observation of cyanobacteria blooms noted in the dam
	Pathogens	Escherichia coli	The presence of pathogens should not pose a risk to human health		
Vegetation	Alien aquatic plant species	All alien aquatic plant species		0% coverage of any aquatic alien plant species	Observation of any alien aquatic plant species noted in the dam
	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_S03					
Priority Dam: 15.8 Gcuwa Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and protect downstream aquatic ecosystem.		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Reduction in live storage	Current dam volume and increased sedimentation; bathymetric survey	Monitor levels of sedimentation in the dam	Should not change by $\geq 5\%$ over a 5 year period	Observation of levels of sedimentation in the dam
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for $\geq 50\text{cm}$	
Vegetation	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
Priority Dam: RU15.9 Xilinx Dam.					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support downstream users.		
	System (dam) operating rules	Operating rules	Update and review operating rules of the dam, including releases to Gcuwa Dam downstream to supply users.		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Reduction in live storage	Current dam volume and increased sedimentation; bathymetric survey	Monitor levels of sedimentation in the dam	Should not change by ≥5% over a 5 year period	Observation of levels of sedimentation in the dam
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for ≥50cm	
Vegetation	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted
IUA_T03					
Priority Dam: 18.3 Mthatha Dam					
Quantity	Dam operations and levels	Minimal operating level required in the dam	Update and review operation of the dam to sustain optimal dam levels to support users and protect downstream aquatic ecosystems (Mthatha River and Estuary).		
	System (dam) operating rules	Operating rules	Update and review operating rules of the dam, including hydro power releases to protect aquatic ecosystems downstream.		

Component	Sub-component	Indicator	RQO Narrative	RQO Numeric	TPC
	Reduction in live storage	Current dam volume and increased sedimentation; bathymetric survey	Monitor levels of sedimentation in the dam	Should not change by ≥5% over a 5 year period	Observation of levels of sedimentation in the dam
Quality	Clarity/ Secchi Disc Indication	Secchi Disk Indication	Maintain system to ensure increase in clarity - broad indication of eutrophication	No data. Aim for ≥50cm	
Vegetation	In-channel Phragmites sp./reeds	Dense reeds	Reed infestation indicative of a response to limited flow / lack of releases through the system.	70 - 80% of the channel width must be retained as an open channel with no encroachment from <i>Phragmites sp.</i> and <i>Arundo donax</i> (Spanish Reed)	Dense reed infestation establishing needs to be noted

10. ESTUARIES RESOURCE QUALITY OBJECTIVES

The following sections outline the proposed RQOs for the priority estuaries within the Keiskamma, Fish to Tsistikamma catchment areas. Those selected estuaries per associated IUA are addressed in detail per sub-chapter, providing the context and rationale behind the proposed RQOs and their associated numerical limits. This comprehensive approach aims to guide the reader by offering a clear understanding of the reasoning and considerations underpinning the proposed RQOs.

The remaining prioritized estuaries according to their high ecological status, ecological uniqueness due to vulnerable fish species, mangroves, saltmarshes and seagrass, are listed, along with broad RQOs within **Appendix B, Appendix C and Appendix D** of this report.

10.1 (1) IUA_K01: Tsitsikamma and headwaters of Kromme to Churchill Dam

Tsitsikamma Estuary

NAME	Tsitsikamma	Estuary Type	Small Temporarily Closed
PES	B/C	REC	B
Trajectory	↓	TEC	B
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows; • Manage agricultural runoff in the catchment (e.g., fertilizing, buffer zones).			

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
Hydrology	C	nMAR	20	
		% nMAR	72	
Hydrodynamics	C	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥73	
		Mouth 100% open		
Water Quality: Salinity	C	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥73	
		Salinity	0-35	
Water Quality: General	↑C	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥63	
		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.125	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.015	
Water Quality Category	C	Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and <i>E. coli</i> < 500 counts per 100 ml (90%ile).	•
Physical habitat	A	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥93	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	↑C	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥63	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events.	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte composition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	20	
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		●
		No land conversion on the floodplain from the present (baseline - 2024)		●
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	
		No significant reduction in zooplankton species richness and biomass annually	<20%	

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
		No significant reduction in zoobenthos species richness and biomass annually	<20%	
		No significant reduction in mud and/or sand prawn biomass (3 yr period)	<20%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
Fish	↑C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥63	
		Number of fish species	≥4	
		Number of species making up 90% of abundance	~3	
		Estuarine-associated marine composition	>50	
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<20%	
		No significant reduction in Wader species (3 yr period), with change <%	<20%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<20%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<20%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<20%	

Slang Estuary

NAME	Slang	Estuary Type	Small Temporarily Closed
PES	C/D	REC	C/D
Trajectory	↓	TEC	C/D
The following interventions will result in halting the negative trajectory and achieving TEC: · Restore/protect base flows · Manage agricultural runoff in the catchment (e.g. fertilizing, buffer zones)			

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
Hydrology	B	nMAR	5	
		% nMAR	90	
Hydrodynamics	C	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥73	
		Mouth open	0-25%	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	↑E	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥38	
		Estuary: Average Dissolved Oxygen (mg/l)	>4*	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<15 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.35	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.03	

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	D	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥43	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		•
Microalgae	D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥43	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<60	

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
		Average benthic microalgae biomass (mg/m2) (entire estuary)	100-150	
		Average benthic diatom diversity (H') (entire estuary)	02-Jan	
		Presence of bloom conditions (> 20 µg Chl-a l-1)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	D	Maintain macrophyte composition representatives of a Target EC:	≥43	
		< % change in composition, distribution & abundance of macrophyte habitats	20	
		No invasive alien vegetation in EFZ		•
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		•
		No land conversion on the floodplain from present (baseline - 2024)		•
Invertebrates	D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥43	
		No significant reduction in zooplankton species richness and biomass annually	<20%	
		No significant reduction in zoobenthos species richness and biomass annually	<20%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<20%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		•
Fish	D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥43	
		Number of fish species	≥4	

Component/Indicator	TEC	Description	RQO Numeric	RQO Narrative
Birds		Number of species making up 90% of abundance	~3	
		Estuarine-associated marine composition	>50	
	C	Maintain avifaunal community representatives of a Target EC:	≥73	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<20%	
		No significant reduction in Wader species (3 yr period), with change <%	<20%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<20%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<20%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<20%	

Klipdrif (Oos) Estuary

NAME	Klipdrif (Oos)	Estuary Type	Small Temporarily Closed
PES	C	REC	C
Trajectory	↓	TEC	C
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows • Manage agricultural runoff in catchment(e.g. fertilizing, buffer zones)			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	B	nMAR	33	
		% nMAR	56	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrodynamics	C	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥73	
		Mouth open	0-25%	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	↑E	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥38	
		Estuary: Average Dissolved Oxygen (mg/l)	>4*	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<15 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.35	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.03	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAf, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	↑D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥58	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		Presence of bloom conditions (> 20 µg Chl-a l)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	C	Maintain macrophyte coposition representatives of a Target EC:	≥73	
		< % change in composition, distribution & abundance of macrophyte habitats	20	
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Invertebrates	D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥43	
		No significant reduction in zooplankton species richness and biomass annually	<20%	
		No significant reduction in zoobenthos species richness and biomass annually	<20%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<20%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
Fish	D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥43	
		Number of fish species	≥4	
		Number of species making up 90% of abundance	~3	
		Estuarine-associated marine composition	>50	
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<20%	
		No significant reduction in Wader species (3 yr period), with change <%	<20%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<20%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<20%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<20%	

10.2 (2) IUA_KL01: Kromme from Churchill Dam to estuary and Gamtoos

Kromme Estuary

NAME	Kromme	Estuary type	Predominantly Open
PES	C/D	REC	C
Trajectory	↓	TEC	C
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows & ensure EWR flow release (2 MCM annually released to the estuary, but excluding droughts) • Maintain/protect floods/spills • Improve urban runoff (stormwater) in the estuary functional zone • Manage agricultural runoff (e.g. fertilizing, buffer zones) in the catchment • Rehabilitate riparian areas/ wetlands & restore 50 ha saltmarsh • Control recreational activities impacting on birds and/or seagrass • Manage/reduce fishing pressure/ bait collection • Investigate the eradication of alien fish.			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	E	nMAR	72	
		% nMAR	51 (including 2MCM/a release to the Kromme estuary)	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	↑E	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥38	
		Salinity	0-40	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Water Quality: General	↑E	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥38	
		Estuary: Average Dissolved Oxygen (mg/l)	>4*	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.35	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.03	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAf, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	•
Physical habitat	↑C	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥63	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥58	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹), except for 'natural' blooms that occur within weeks of freshwater pulse/flood events.	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	D	Maintain macrophyte composition representatives of a Target EC:	≥43	
		Change in composition, distribution & abundance of macrophyte habitats	<10%	
		Healthy Zostera capensis beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from Baseline (2024).		●
		Restored area (ha)	50 ha saltmarsh	
Invertebrates	↑F	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥18	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	↑D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥58	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>5	
		Estuarine-associated marine composition	>50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumppnose) abundant in eelgrass beds		●
		Soles and gobies throughout estuary		●

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		No fish kills due to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature-induced)		●
		Eels (e.g. <i>Anguilla mossambica</i>) present in estuary OR catchment r more consecutive surveys		
Birds	↑C	Maintain avifaunal community representatives of a Target EC:	≥63	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palearctic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Seekoei Estuary

NAME	Seekoei	Estuary type	Large Temporarily Closed
PES	D/E	REC	C
Trajectory	↓	TEC	C

The following interventions will result in halting the negative trajectory and achieving TEC:

- Restore/protect base flows
- Manage agricultural runoff from the catchment (e.g. fertilizing, buffer zones)
- Restore connectivity/ hydrodynamic functioning in the estuary (severely disrupted by causeway)
- Improve mouth management (e.g. elevated water levels)
- Rehabilitate riparian areas/ wetlands and restore 57 ha saltmarsh
- Remove alien vegetation

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	D	nMAR	20	
		% nMAR	56	
		Refer to Groundwater RQOs in Chapter 11.	-	Abstractions must not exceed the surplus. No further use is allowed without a detailed assessment.
Hydrodynamics	↑E	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥38	
		Mouth open (annually)	75-100	
Water Quality:	↑E	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥38	
Salinity		Salinity	0-45	
Water Quality:	↑D	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥58	
General		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.2	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAf, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	↑C	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥63	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		•

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Microalgae	D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥38	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<20	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<100	
		Average benthic diatom diversity (H') (entire estuary)	>2	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹), except during natural periods of hypersalinity and closed mouth conditions (i.e., droughts), or following flood events.		●
		Presence of potentially HAB-forming taxa	0	
Macrophytes	↑E	Maintain macrophyte composition representatives of a Target EC:	≥38	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
		Restored area (ha)	57 ha saltmarsh	
Invertebrates	↑E	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥38	
		No significant reduction in zooplankton species richness and biomass annually	<10%	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
Fish	↑E	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥38	
		Number of fish species	>10	
		Number of species making up 90% of abundance	>3	
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	↑E	Maintain avifaunal community representatives of a Target EC:	≥38	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palearctic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	>1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

**GRAII value stands for Groundwater Resource Assessment Phase II, a national-level project carried out by DWS, completed in 2005. Its purpose was to develop algorithms and produce datasets and maps for key groundwater parameters—such as storage, annual recharge, baseflow, and abstraction potential—on a grid or quaternary-catchment basis*

Gamtoos Estuary

NAME	Gamtoos	Estuary type	IUA_KL01	Predominantly Open
PES	D	REC	C	
Trajectory	↓	TEC	C/D	
The following interventions will result in halting the negative trajectory and achieving TEC: • Develop an Estuary Management Plan for the Gamtoos Estuary to identify key actions required to halt the ongoing degradation of estuary condition and restore and coordinate restoration efforts (requirement of National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008); • Increase base flows (e.g., through the removal of alien vegetation, unauthorised abstractions were relevant) to prevent mouth closure; • Maintain a degree of natural hydrodynamic variability and periodic system flushing to prevent persistent eutrophic conditions (i.e., harmful algal blooms (HABs), hypoxia, loss of species diversity); • Reduce nutrient inputs by implementing agricultural best management practices (e.g., prevent overfertilization and irrigation) and restoring indigenous riparian vegetation; • Institute a buffer zone around the river and EFZ that would improve the nutrient status and help with sedimentation issues; • Develop and approve an Estuary Mouth/Maintenance Management Plan (required under the Environmental Impact Assessment regulations under the National Environmental Management Act (No. 107 of 1998) to facilitate artificial breaching if required in future; • Reduce fishing pressure by managing access, increase compliance and improve community interactions to restore nursery function; • Prevent further disturbance of estuary riparian vegetation, including reducing trampling and grazing by livestock, the occurrence of fire, and remove alien vegetation from the EFZ; and • Undertake active restoration of the degraded estuary floodplain and reduce agriculture impacts in the supratidal area of the system (175 ha)				

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	D	nMAR	393.3	
		% nMAR	49	
		River inflow	No flows < 0.25 m³/s (to prevent mouth closure).	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydro-dynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	↑C	Maintain water quality appropriate for dependent biotic components of TEC category:	≥63	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10	
		Estuary: Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.02	
		Estuary: Dissolved Inorganic Phosphate (DIP) (mg/l) in freshwater reaches	<0.50	
		River: Median Dissolved Oxygen (mg/l)	>6	
		River: pH	7.5<>8.5	
		River: Turbidity (NTU)	<10	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.02	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	<0.5	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		●
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		●
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat		Maintain physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥73	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥43	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<20	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Average benthic microalgae biomass (mg/m ²)	<75	
		Average benthic diatom diversity (H') (entire estuary)	>2	
		Blooms may occur in spring/summer, but for no longer than a week at a time. Hypereutrophic bloom conditions (> 60 µg Chl-a l ⁻¹) should not occur.		•
		HAB-forming taxa, such as <i>Heterosigma akashiwo</i> and <i>Prorocentrum cordatum</i> , may be present during spring/summer but blooms should not occur.		•
Macrophytes	C/D	Maintain macrophyte composition representatives of a Target EC:	≥58	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Healthy <i>Zostera capensis</i> beds		•
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		•
		No invasive alien vegetation in EFZ		•
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		•
		No land conversion on the floodplain from Baseline (2024).		•
		Restored area (ha)	175 ha saltmarsh	
Invertebrates	C	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥73	
		No significant reduction in zooplankton species richness and biomass annually	<10%	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥73	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>5	
		Estuarine-associated marine composition	>50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Soles and gobies throughout estuary		●
		No fish kills do to low DO. pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
		Eels (e.g. <i>Anguilla mossambica</i>) present in estuary OR catchment r more consecutive surveys		●
Birds	B/C	Maintain avifaunal community representatives of a Target EC:	≥73	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Kabeljous Estuary

NAME	Kabeljous	Estuary type	Large Temporarily Closed
PES	B	REC	B
Trajectory	↓	TEC	B
The following interventions will result in halting the negative trajectory and achieving TEC: • Develop Estuary Management Plan for the Kabeljous Estuary to prioritise key actions needed to improve the condition and coordinate restoration efforts; • Ensure maintenance of low-flow conditions (including groundwater) to prevent prolonged periods of mouth closure and the development of extreme hypersalinity that promotes microalgal and macroalgal accumulations; • Increase base flows (e.g., through the removal of alien vegetation, unauthorised abstractions and/or forestry); • Reduce nutrient inputs by implementing agricultural best management practices (e.g., prevent overfertilization and over-irrigation) and restoring riparian vegetation; • Reduce fishing pressure by managing access, increase compliance and improve community interactions to restore nursery function; • Prevent disturbance of riparian vegetation, including trampling by humans and cattle, fire, and removal of alien vegetation; and • Prevent artificial breaching of the mouth (currently not a concern).			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	B	nMAR	5	
		% nMAR	89	
		Refer to Groundwater RQOs in Chapter 11.	-	Abstractions must not exceed the surplus. No further use is allowed without a detailed assessment.
Hydrodynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-45	
Water Quality: General	C	Maintain water quality appropriate for dependent biotic components of TEC category:	≥73	
		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10	
		Estuary: Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.03	
		Estuary: Dissolved Inorganic Phosphate (DIP) (mg/l) in freshwater reaches	<0.140	
		River: Median Dissolved Oxygen (mg/l)	>6	
		River: pH	7.5<>8.5	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		River: Turbidity (NTU)	<10	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.03	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	<0.140	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		●
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		●
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B/C	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥73	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Microalgae	B/C	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥73	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<15	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹) should only occur during natural periods of hypersalinity and closed mouth conditions (i.e., droughts), or following flood events.		●
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte composition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Healthy <i>Zostera capensis</i> beds		●
		Maintain saltmarsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		●
		No land conversion on the floodplain from Baseline (2024).		●
		Maintain the integrity of the freshwater wetlands in the blind arm as they contain high biodiversity and provide ecological services.		●
		Restored area (ha)		0.5 Saltmarsh

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Invertebrates	C	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥73	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
Fish	C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥73	
		Number of fish species	>10	
		Number of species making up 90% of abundance	>3	
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	B/C	Maintain avifaunal community representatives of a Target EC:	≥73	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.3 (4) IUA_M01: Swartkops

Swartkops Estuary

NAME	Swartkops	Estuary Type	Predominantly Open
PES	D	REC	C
Trajectory	↓	TEC	C/D
The following interventions will result in halting the negative trajectory and achieving TEC: • Support the refurbishment and upgrade to recycle/reclaim effluent from WWTW/ • Ensure compliance with effluent water quality parameters as per WWTW (3) discharge licences. • Encourage the expansion of the solid waste catchment systems (litter traps) in key canals, e.g. Motherwell • Reduce fishing pressure (especially illegal gill and seine netting) • Control destructive bait collection (use of spades and forks) through increased compliance and provision of appropriate gear to small-scale bait collectors. • Restore abandoned dry salt pan habitats to encourage the return of high bird numbers using Motherwell Canal stormwater to rewet the Redhouse pans (ongoing). • Restore saltmarsh habitat (400ha) • Restore riparian habitat through the removal of invasive alien plants in the middle and upper reaches. • Prevent trampling and overgrazing of intertidal and supratidal salt marsh. • Control the movement of people and animals that disturb feeding, nesting and breeding of birds. Implement protected areas for birds as indicated in the Estuary Management Plan, particularly the gull nesting areas.			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	E	nMAR	57	
		% nMAR	124	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrodynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	↑E	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥38	
		Estuary: Average Dissolved Oxygen (mg/l)	>4*	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<15 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.35	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.03	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli <	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
			500 counts per 100 ml (90%ile).	
Physical habitat	D	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥43	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		•
Microalgae	↑D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥58	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<20	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<100	
		Average benthic diatom diversity (H') (entire estuary)	03-Feb	
		Presence of hypereutrophic bloom conditions Hypereutrophic blooms can only occur in spring/summer and for no longer than a week at a time.	> 60 µg Chl-a l ⁻¹	Spatial extent of high-biomass events should not exceed 2km to ensure habitat availability for faunal taxa to avoid adverse bloom conditions.

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Presence of potentially HAB-forming taxa		HAB-forming taxa, such as <i>Heterosigma akashiwo</i> , should only occur in spring/summer and blooms should not last longer than a week to prevent adverse impacts on higher trophic levels.
Macrophytes	↑E	Maintain macrophyte composition representatives of a Target EC:	≥38	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Healthy <i>Zostera capensis</i> beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
		Restored area (ha)	400ha saltmarsh/saltpan	
Invertebrates	↑E	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥38	
		No significant reduction in zooplankton species richness and biomass annually	<10%	●
		No significant reduction in zoobenthos species richness and biomass annually	<10%	●
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	↑E	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥38	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>5	
		Estuarine-associated marine composition	>50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumpnose) abundant in eelgrass beds		●
		Soles and gobies throughout estuary		●
		No fish kills due to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	↑D	Maintain avifaunal community representatives of a Target EC:	≥58	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.4 (6) IUA_N01: Sundays

Sundays Estuary

NAME	Sundays	Estuary Type	Predominantly Open
PES	C/D	REC	B
Trajectory	↓	TEC	C
The following interventions will result in halting the negative trajectory and achieving TEC • Reduce/restore base flows; • Priority: Manage agricultural runoff from the catchment (e.g. fertilizing, buffer zones); • Ensure compliance with effluent water quality parameters as per WWTW discharge licences; • Control/manage plastic pollution; • Rehabilitate riparian areas/ wetlands & restore 30 ha saltmarsh; • Remove alien vegetation; • Control recreational activities impacting on birds; • Manage/reduce fishing pressure/ bait collection; and • Investigate the eradication of alien fish.			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	C	nMAR	263	
		% nMAR	95	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		% Mouth open	100	
Water Quality: Salinity	C	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥73	
		Salinity	0-35	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Water Quality: General	↑F	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥18	
		Estuary: Average Dissolved Oxygen (mg/l)	>4*	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<15 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.35	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.03	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥58	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		Presence of hypereutrophic blooms (> 60 µg Chl-a l ⁻¹) limited to spring/summer and for no longer than a week at a time. Spatial extent of high-biomass events do not exceed 2km to ensure habitat availability for faunal taxa to avoid adverse bloom conditions.		●
		Presence of potentially HAB-forming taxa should only occur in spring/summer and blooms should not last longer than a week to prevent adverse impacts on higher trophic levels.		<i>Heterosigma akashiwo</i>
Macrophytes	↑D	Maintain macrophyte composition representatives of a Target EC:	≥58	
		< % change in composition, distribution & abundance of macrophyte habitats	10	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
		Restored area (ha)	30ha saltmarsh	
Invertebrates	↑D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥58	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	↑E	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥38	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>6	
		Estuarine-associated marine composition	>50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Soles and gobies throughout estuary		•
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		•
		Eels (e.g. Anguilla mossambica) present in estuary OR catchment r more consecutive surveys		•
Birds	↑D	Maintain avifaunal community representatives of a Target EC:	≥58	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.5 (7) IUA_P01: P Catchment

Kariega Estuary

NAME	Kariega	Estuary Type	Predominantly Open
PES	C	REC	C
Trajectory	↓	TEC	C
The following interventions will contribute to species protection, halting the negative trajectory and achieving TEC: • Increase the protection of the estuary to ensure the protection of Estuarine pipefish and seagrass, i.e. stewardship agreements with Private Nature Reserve adjacent to the system; • Develop an Estuary Management Plan for the Kariega Estuary to prioritise key actions required to improve/protect the system and coordinate restoration efforts (requirement of National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008) to coordinate management and restoration actions; • Prevent further loss of low-flow conditions to limit the extent and duration of hypersalinity that leads to a loss of primary productivity. Increase base flows (e.g. through the removal of alien vegetation, unauthorised abstractions and/or forestry) to prevent mouth closure; • Create interventions within the catchment and institute a buffer zone around the river and EFZ that would improve the nutrient status and help with sedimentation issues; • Reduce fishing and bait collection pressure by managing access, increase compliance and improve community interactions to restore nursery function; • Undertake restoration of the estuary floodplain and reduce agriculture impacts in the supratidal area of the system (restore 135 ha saltmarsh); and • Prevent disturbance of indigenous riparian vegetation, including trampling, cattle, fire, and removal of alien vegetation.			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	E	nMAR	22	
		% nMAR	60	
Hydrodynamics	C/D	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥58	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-40	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Water Quality: General	B	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10	
		Estuary: Dissolved inorganic nitrogen (DIN) (mg/l)	<0.01	
		Estuary: Dissolved inorganic phosphate (DIP) (mg/l) in freshwater reaches	<0.080	
		River: Median Dissolved Oxygen (mg/l)	>6	
		River: pH	7.5<>8.5	
		River: Turbidity (NTU)	<10	
		River: Median Dissolved inorganic nitrogen (DIN) (mg/l)	<0.2	
		River: Median Dissolved inorganic phosphate (DIP) (mg/l)	<0.080	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		For recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90 percentile) and E. coli < 500 counts per 100 ml (90 percentile).	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Physical habitat	B/C	Maintain Physical habitat appropriate for dependent biotic components of TEC category:	≥73	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from Present State (2025).		●
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10 (0-35 salinity) or < 2 (>35 salinity)	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	C	Maintain macrophyte coposition representatives of a Target EC:	≥73	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Healthy <i>Zostera capensis</i> beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		●
		No land conversion on the floodplain from Baseline (2024).		●
		Restored area (ha)	135 ha saltmarsh	●
Invertebrates	C/D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥58	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥73	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>6	
		Estuarine-associated marine composition	<50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumppose) abundant in eelgrass beds		●
		Soles and gobies throughout estuary		●

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Birds	C	Maintain avifaunal community representatives of a Target EC:	≥73	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Bushmans Estuary

NAME	Bush-mans	IUA CODE	Predominantly Open
PES	C	REC	B
Trajectory	↓	TEC	B
The following interventions will contribute to species protection, halting the negative trajectory and achieving TEC: • Restore/protect base flows • Improve WWTW infrastructure/operations (Average WWTW volume: 1205 m³/day) • Reduce grazing (sheep, cattle, goats) by grazing plan • Control recreational activities impacting on birds and/or seagrass • Manage/reduce fishing pressure/ bait collection • Investigate eradication of alien fish			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	B	nMAR	43	
		% nMAR	79	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	B	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved inorganic nitrogen (DIN) (mg/l)	≤0.125	
		River: Median Dissolved inorganic phosphate (DIP) (mg/l)	≤0.015	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		For recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90 percentile) and E. coli < 500 counts per 100 ml (90 percentile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•
		Estuary: Sand/mud distribution change by < 20% from Present State (2025).		•
Microalgae	↑D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥58	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	03-Feb	
		No presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	↑C	Maintain macrophyte coposition representatives of a Target EC:	≥63	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Healthy <i>Zostera capensis</i> beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from Baseline (2024).		●
Invertebrates	↑C	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥63	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	↑C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥63	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>6	
		Estuarine-associated marine composition	>50	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumpnose) abundant in eelgrass beds		●
		Soles and gobies throughout estuary		●
		No fish kills do to low DO. pH , hypersalinity or ammonia toxicity (excluding temperature induced)		●
		Eels (e.g.Anguilla mossambica) present in estuary OR catchment in 2 or more consecutive surveys		●
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Kowie Estuary

NAME	Kowie	Estuary Type	Predominantly Open
PES	C	REC	B/C
Trajectory	-	TEC	B/C
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows • Manage agricultural runoff in the catchment (e.g. fertilizing, buffer zones) • Maintain WWTW infrastructure/operations (Average WWTW volume (m3/day): 1200) • Rehabilitate riparian areas/ wetlands • Remove alien vegetation • Control recreational activities impacting birds and seagrass • Manage/reduce fishing pressure/ bait collection • Investigate eradication of alien fish			

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	B	nMAR	31	
		% nMAR	89	
Hydrodynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-40	
Water Quality: General	B	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.125	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.015	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAf, 1995 or future		●

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		●
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	D	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥43	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m ²) for 90th %ile (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	↑D	Maintain macrophyte composition representatives of a Target EC:	≥58	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Healthy <i>Zostera capensis</i> beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
Invertebrates	↑D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥58	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	↑D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥58	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>6	
		Estuarine-associated marine composition	>50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumpnose) abundant in eelgrass beds		●
		Soles and gobies throughout the estuary		●
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature-induced)		●
Birds	↑D	Maintain avifaunal community representatives of a Target EC:	≥58	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

West Kleinemonde Estuary

NAME	West Kleinemonde	Estuary Type	Large Temporarily Closed
PES	B	REC	B
Trajectory	↓	TEC	B
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows • Protect eelgrass beds to ensure habitat if estuarine pipefish recruits back into the system. in future (used to occur in the estuary) • Manage agricultural runoff in the catchment (e.g. fertilizing, buffer zones) • Control recreational activities impacting on birds and/or seagrass • Manage/reduce fishing pressure/ bait collection			

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	A	nMAR	6	
		% nMAR	91	
Hydrodynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth open	0-25%	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	C	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥73	
		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.2	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		•
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Phytoplankton biomass ($\mu\text{g}/\text{l}$) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m^2) for 90th %ile (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions ($> 20 \mu\text{g Chl-a l}$)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte coposition representatives of a Target EC:	≥ 88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Healthy <i>Zostera capensis</i> beds		•
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		•
		No invasive alien vegetation in EFZ		•
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		•
		No land conversion on the floodplain from present (baseline - 2024)		•
		Restored area (ha)	20ha saltmarsh	
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥ 88	
		No significant reduction in zooplankton species richness and biomass annually	<10%	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
Fish	B	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥88	
		Number of fish species	>15	
		Number of species making up 90% of abundance	≥5	
		Estuarine-associated marine composition	<50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

East Kleinemonde Estuary

NAME	East Kleine-monde	Estuary Type	Large Temporarily Closed
PES	B	REC	B
Trajectory	↓	TEC	B
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows • Protect eelgrass beds to ensure habitat if estuarine pipefish recruits back into the system. in future (used to occur in the estuary) • Manage agricultural runoff in the catchment (e.g. fertilizing, buffer zones) • Control recreational activities impacting on birds and/or seagrass • Manage/reduce fishing pressure/ bait collection			

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	A	nMAR	3	
		% nMAR	96	
Hydrodynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth open	0-25%	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Salinity	0-35	
Water Quality: General	C	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥73	
		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.2	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		•
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte coposition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		•
		No invasive alien vegetation in EFZ		•
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		•
		No land conversion on the floodplain from present (baseline - 2024)		•

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Restored area (ha)	7ha saltmarsh	
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
Fish	B	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥88	
		Number of fish species	>15	
		Number of species making up 90% of abundance	≥5	
		Estuarine-associated marine composition	<50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		No fish kills do to low DO, pH , hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	

Component/Indicator	TEC	Description	Numerical RQO	Narrative RQO
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.6 (9) IUA_Q02: Great Fish

Great Fish Estuary

NAME	Great Fish	Estuary Type	Predominantly Open
PES	C	REC	B/C
Trajectory	↓	TEC	B/C
The following interventions will result in halting the negative trajectory and achieving TEC:			
Restore/protect base flows			

- Apply agricultural practices that would assist with a reduction in return flow and reduce nutrient loading, and institute riparian buffer zones to control sediment erosion
- Manage/reduce fishing pressure/ bait collection (e.g. night ban, catch and release policy, increase compliance) river and estuary.
- Effective management of Fort Beaufort and Cradock WWTW;
- Remove alien vegetation from EFZ & Restore 60ha of saltmarsh
- Control recreational activities (e.g. boating) impacting on birds
- Investigate the eradication of alien fish
- Revisiting the operation rules of the Orange Transfer Scheme in some cases allocated water seems to be released for use but not required/taken up by the licence holder.

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	B	nMAR	496	
		% nMAR	90	
Hydrodynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water General	Quality: ↓ D	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥58	
		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved inorganic nitrogen (DIN) (mg/l)	≤0.2	
		River: Median Dissolved inorganic phosphate (DIP) (mg/l)	≤0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		=
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		=
		For recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90 percentile) and E. coli < 500 counts per 100 ml (90 percentile).	=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		=
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		=
		Estuary: Sand/mud distribution change by < 20% from Present State (baseline 2024).		=
Microalgae	↓ D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥58	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<15	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<100	
		Average benthic diatom diversity (H') (entire estuary)	2-3	
		No presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events during increased water residency periods	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte composition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		=
		No invasive alien vegetation in EFZ		=
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		=
		No land conversion on the floodplain from Baseline (2024).		=
Invertebrates	↓ D	Restored area (ha)	60ha saltmarsh	
		Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥58	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		=
		Presence & evidence of recruitment of mud crabs and mud prawns		=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Fish	↓ D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥58	
		Number of fish species	>15	
		Number of species making up 90% of abundance	>5	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		=
		Soles and gobies throughout estuary		=
		Eels (e.g. Anguilla mossambica) present in estuary OR catchment in 2 or more consecutive surveys		=
Birds	↓ C	Maintain avifaunal community representatives of a Target EC:	≥63	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.7 (11) IUA_R01: Keiskamma

Keiskamma Estuary

NAME	Keiskamma	Estuary Type	Predominantly Open
PES:	C	REC:	B
Trajectory	↓	TEC:	B
The following interventions will result in halting the negative trajectory and achieving TEC: - Develop an Estuary Management Plan for the Keiskamma Estuary to prioritise key actions required to address the ongoing decline in condition and coordinate restoration efforts; § Reduce fishing and bait collection pressure by managing access, increased compliance and improving community interactions; - Ensure maintenance of low-flow conditions to prevent prolonged periods of increased water residency that promote the accumulation of microalgal communities;			

- Manage ever-increasing nutrient inputs by implementing agricultural best management practices (e.g., prevent overfertilization and irrigation) and restoring indigenous riparian vegetation;
- Restore saltmarsh areas that are fallow at present (130ha)
- Prevent disturbance of riparian vegetation, including trampling and severe overgrazing by cattle in the EFZ; and
- Removal of alien vegetation from EFZ as well. § Manage/control recreational boating activities in the estuary, particularly affecting bank stability, critical habitats (eel grass, saltmarsh) and bird abundance.

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	C	nMAR	129	
		% nMAR	77	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	A	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥93	
		Salinity	0-35	
Water General Quality:	C	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥73	
		Estuary: Average Dissolved Oxygen (mg/l)	>6 (surface waters), can be hypoxic in bottom waters if water column stratifies especially in Zones B and C.	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<50 (low flows)	
		Estuary: Dissolved inorganic nitrogen (DIN) (mg/l)	<0.24	
		Estuary: Dissolved inorganic phosphate (DIP) (mg/l) in freshwater reaches	<0.02	
		River: Median Dissolved Oxygen (mg/l)	>6	
		River: pH	7.5<>8.5	
		River: Turbidity (NTU)	<50 (Low flows)	
		River: Median Dissolved inorganic nitrogen (DIN) (mg/l)	<0.24	
		River: Median Dissolved inorganic phosphate (DIP) (mg/l)	<0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAf, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		=
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B/C	Maintain Physical habitat appropriate for dependent biotic components of TEC category:	≥73	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		=
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		=
		Estuary: Sand/mud distribution change by < 20% from Present State (2025).		=
Microalgae	B/C	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥73	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		No presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events during increased water residency periods	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	A/B	Maintain macrophyte coposition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Maintain healthy <i>Zostera capensis</i> beds (no bait collection, boat keel and prop scars)		=
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		=
		No invasive alien vegetation in EFZ		=
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		=
		No land conversion on the floodplain from baseline (2024)		=
Invertebrates	B	Restored area (ha)	130ha saltmarsh	
		Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Presence & evidence of recruitment of mud crabs and mud prawns		=
Fish	B	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥88	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>=6	
		Estuarine-associated marine composition	>50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		=
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumprnose) abundant in eelgrass beds		=
		Soles and gobies throughout estuary		=
		Eels (e.g. Anguilla mossambica) present in estuary OR catchment in 2 or more consecutive surveys		=
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.8 (12) IUA_R02: Buffalo/Nahoon

Nahoon Estuary

NAME	Nahoon	Estuary Type	Predominantly Open
PES	C/D	REC	C
Trajectory	↓	TEC	C

The following interventions will result in halting the negative trajectory and achieving TEC:

- Maintain/protect base flows and floods
- Improve urban runoff (stormwater) in EFZ and catchment
- Improve WWTW infrastructure/operations (Average WWTW volume (m³/day):: 680)
- Control/manage plastic pollution
- Remove alien vegetation
- Control recreational activities impacting on birds and/or seagrass
- Manage/reduce fishing pressure/ bait collection
- Investigate the eradication of alien fish

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	C	nMAR	33	
		% nMAR	68	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	D	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥43	
		Salinity	0-35	
Water Quality: General	↓ D	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥58	
		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved inorganic nitrogen (DIN) (mg/l)	≤0.2	
		River: Median Dissolved inorganic phosphate (DIP) (mg/l)	<0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		=
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90 percentile) and E. coli < 500 counts per 100 ml (90 percentile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		=
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		=
		Estuary: Sand/mud distribution change by < 20% from Present State (2025).		=
Microalgae	↓ D	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥58	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<20	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	2-3	
		Blooms may occur in spring/summer, but for no longer than a week at a time. No hypereutrophic bloom conditions (> 60 µg Chl-a l ⁻¹) should not occur.		=
		No HAB-forming taxa, such as, may be present during spring/summer but blooms should not occur.		<i>Heterosigma akashiwo</i>
Macrophytes	C	Maintain macrophyte composition representatives of a Target EC:	≥73	
		< % change in composition, distribution & abundance of macrophyte habitats	20	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	3.7	
		Sediment pH maintained in mangrove areas	7	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Healthy <i>Zostera capensis</i> beds		=
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		=
		No invasive alien vegetation in EFZ		=
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		=
		No land conversion on the floodplain from Baseline (2024).		=
Invertebrates	↓ D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥58	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		=
		Presence & evidence of recruitment of mud crabs and mud prawns		=
Fish	↓ D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥58	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>=5	
		Estuarine-associated marine composition	>50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		=
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumpnose) abundant in eelgrass beds		=
		Soles and gobies throughout estuary		=
Birds	↓ D	Maintain avifaunal community representatives of a Target EC:	≥58	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Tyolomnqa Estuary

NAME	Tyolomnqa	Estuary type	Large Temporarily Closed
PES	B	REC	A/B
Trajectory	↓	TEC	A/B
The following interventions will result in halting the negative trajectory and achieving TEC: • Manage/reduce fishing pressure/ bait collection • Control recreational activities impacting birds			

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	A	nMAR	36	
		% nMAR	97	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth open %	100	
Water Quality: Salinity	A	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥93	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Water Quality: General		Salinity	0-35	
		Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.125	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.015	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		=
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		=
	B	Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat		Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		=
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		=
	B	Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		=
Microalgae		Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l)	0	
	B	Presence of potentially HAB-forming taxa	0	
Macrophytes		Maintain macrophyte coposition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
	B	Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	0.6	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Healthy <i>Zostera capensis</i> beds		=
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		=
		No invasive alien vegetation in EFZ		=
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		=
		No land conversion on the floodplain from present (baseline - 2024)		=
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		=
Fish	↓ C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥63	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>=6	
		Estuarine-associated marine composition	<50	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		=
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumpnose) abundant in eelgrass beds		=
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		=
Birds	↓ C	Maintain avifaunal community representatives of a Target EC:	≥63	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.9 (15) IUA_S03: Great Kei

Great Kei Estuary

NAME	Great Kei	Estuary Type	Large Fluvially Dominated
PES	C	REC	B/C
Trajectory	↓	TEC	B/C
The following interventions will result in halting the negative trajectory and achieving TEC:			

- Develop an Estuary Management Plan for the Great Kei Estuary to prioritise key actions required to address the ongoing decline in condition and coordinate restoration efforts;
- Reduce fishing and bait collection pressure by managing access, increased compliance and community interactions;
- Ensure maintenance of low-flow conditions to prevent prolonged periods of increased water residency that promote the accumulation of phytoplankton and benthic microalgal communities;
- Manage nutrient inputs by implementing agricultural best management practices (e.g., prevent overfertilization and irrigation) and restoring indigenous riparian vegetation;
- Prevent disturbance of riparian vegetation (especially mangroves), including trampling and grazing/browsing by cattle and fire;
- Remove alien vegetation within the EFZ; and
- Manage/control recreational activities (e.g. boating) in the lower and middle reaches, particularly along the shoreline on the seaside affecting bird abundance.
- Manage/control vehicle access on banks near the mouth to prevent damage to critical habitats

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	C/D	nMAR (MCM)	1041	
		% nMAR	74	
Hydrodynamics	B	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥88	
		Mouth 100% open	100	
Water Quality: Salinity	C	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥73	
		Salinity	0-35	
Water Quality: General	C	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥73	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<50 (low flows)	
		Estuary: Dissolved inorganic nitrogen (DIN) (mg/l)	<0.2	
		Estuary: Dissolved inorganic phosphate (DIP) (mg/l) in freshwater reaches	<0.02	
		River: Median Dissolved Oxygen (mg/l)	>6	
		River: pH	7.5<>8.5	
		River: Turbidity (NTU)	<50 (low flows)	
		River: Median Dissolved inorganic nitrogen (DIN) (mg/l)	<0.2	
		River: Median Dissolved inorganic phosphate (DIP) (mg/l)	<0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future		=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		=
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90 percentile) and E. coli < 500 counts per 100 ml (90 percentile).	
Physical habitat	B/C	Maintain Physical habitat appropriate for dependent biotic components of TEC category:	≥73	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		=
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		=
		Estuary: Sand/mud distribution change by < 20% from Present State (2025).		=
Microalgae	B/C	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥73	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<75 (flow: <10 m ³ /s) OR >50 (flow: >10 m ³ /s)	
		Average benthic diatom diversity (H') (entire estuary)	>2 (flow: <10 m ³ /s) OR >3 (flow: >10 m ³ /s)	
		No presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events during increased water residency periods	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte composition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	1.6	
		Sediment pH maintained in mangrove areas	7	
		Healthy <i>Zostera capensis</i> beds		=
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		=
		No invasive alien vegetation in EFZ		=
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		No land conversion on the floodplain from baseline (2024).		=
		Restored area (ha)	4ha saltmarsh	
Invertebrates	B/C	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥73	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		=
		Presence & evidence of recruitment of mud crabs and mud prawns		=
Fish	B	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥88	
		Number of fish species	>=20	
		Number of species making up 90% of abundance	>=4	
		Estuarine-associated marine composition		
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		=
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumppnose) abundant in eelgrass beds		=
		Soles and gobies throughout estuary		=
		Eels (e.g. Anguilla mossambica) present in estuary OR catchment in 2 or more consecutive surveys		=
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.10 (17) IUA_T02: Lower Mbashe

Mbashe Estuary

NAME	Mbashe	Estuary Type	Large Fluvially Dominated
PES	B/C	REC	B
Trajectory	↓	TEC	B
The following interventions will result in halting the negative trajectory and achieving TEC: - Develop an Estuary Management Plan to prioritise key management actions required to achieve the REC and coordinate restoration efforts; - Significantly reduce fishing pressure by managing access, increased compliance and community interactions to achieve Marine Protected Area (MPA) protection objectives and REC; - Manage nutrient inputs by implementing agricultural best management practices (e.g., prevent overfertilization and irrigation) and restoring indigenous riparian vegetation buffers; - Prevent disturbance of riparian vegetation, including cattle trampling, occurrence of fire, and removal of alien vegetation in the EFZ and mangroves. - Especially limit trampling and browsing of salt marsh and browsing and harvesting of mangroves. Mangroves are legally protected by two separate pieces of legislation: National Forests Act (84 of 1998) and the Marine Resources Act (18 of 1998). The species <i>Bruguiera gymnorhiza</i> and <i>Rhizophora mucronata</i> are further protected by the Protected Tree list (DWAF, 2010). All these would be addressed through an Estuary Management Plan. The sustainable use of mangroves should be encouraged with the harvesting of mangroves and a maintenance plan for Mangrove harvesting should be developed; and - Manage/reduce fishing pressure by managing access, increasing compliance and improving community awareness.			

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	C	nMAR	787	
		% nMAR	109	
Hydrodynamics	B	*/	≥88	
		Mouth 100% open	100	
Water Quality: Salinity	C	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥73	
		Salinity	0-35	
Water Quality: General	C	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥73	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<40 (low flows)	
		Estuary: Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.29	
		Estuary: Dissolved Inorganic Phosphate (DIP) (mg/l) in freshwater reaches	<0.02	
		River: Median Dissolved Oxygen (mg/l)	>6	
		River: pH	7.5<>8.5	
		River: Turbidity (NTU)	<40 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.2	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	<0.02	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		=
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		=
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		=
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		=
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		=
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<75 (flow: <10 m3/s) OR >50 (flow: >10 m3/s)	
		Average benthic diatom diversity (H') (entire estuary)	>2 (flow: <10 m3/s) OR >3 (flow: >10 m3/s)	
		No presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events during increased water residency periods	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	A/B	Maintain macrophyte composition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	7.6	
		Sediment pH maintained at 7 in mangrove areas		=
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		=

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		No invasive alien vegetation in EFZ		=
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		=
		No land conversion on the floodplain from Baseline (2024).		=
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		=
		Presence & evidence of recruitment of mud crabs and mud prawns		=
Fish	B	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥88	
		Number of fish species	≥20	
		Number of species making up 90% of abundance	≥4	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		=
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumpnose) abundant in eelgrass beds		=
		Soles and gobies throughout estuary		=
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		=
		Eels (e.g. Anguilla mossambica) present in estuary OR catchment r more consecutive surveys		=
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palearctic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.11 (18) IUA_T03: Lower Mthatha

Mtata Estuary

NAME	Mtata	Estuary Type	Predominantly Open
PES:	C	REC	B/C
Trajectory	↓	TEC	B/C
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows and floods • Manage agricultural runoff (e.g. fertilizing, buffer zones) • Rehabilitate riparian areas/ wetlands • Remove alien vegetation			

- Implement cattle exclusion zone (browsing of mangroves)
- Control mangrove harvesting
- Manage/reduce fishing pressure/ bait collection
- Investigate eradication of alien fish
- Restore/protect against impact from mining

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	C	nMAR	392	
		% nMAR	81	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	↓ D	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥58	
		Estuary: Average Dissolved Oxygen (mg/l)	>5	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<50 (low flows)	
		River: Median Dissolved inorganic nitrogen (DIN) (mg/l)	≤0.2	
		River: Median Dissolved inorganic phosphate (DIP) (mg/l)	≤0.02	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		=
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		=
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	↓ C	Maintain Physical habitat appropriate for dependent biotic components of TEC category:	≥63	

		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		=
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		=
		Estuary: Sand/mud distribution change by < 20% from Present State (2025).		=
Microalgae	↓ C	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥63	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<75	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		No presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events during increased water residency periods	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	↓ C	Maintain macrophyte coposition representatives of a Target EC:	≥63	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	29.3	
		Sediment pH maintained in mangrove areas	7.0	
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		=
		No invasive alien vegetation in EFZ		=
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		=
		No land conversion on the floodplain from Baseline (2024).		=
Invertebrates	↓ D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥58	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		=
		Presence & evidence of recruitment of mud crabs and mud prawns		=
Fish	↓ D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥58	

		Number of fish species	≥20	
		Number of species making up 90% of abundance	≥4	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		=
		Soles and gobies throughout estuary		=
		Eels (e.g. Anguilla mossambica) present in estuary OR catchment in 2 or more consecutive surveys		=
Birds	↓ C	Maintain avifaunal community representatives of a Target EC:	≥63	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

10.12 (19) IUA_T04: Pondoland coastal

Mngazi Estuary

NAME	Mngazi	Estuary Type	Large Temporarily Closed
PES	B	REC	B
Trajectory	↓	TEC	B
The following interventions will result in halting the negative trajectory and achieving TEC: - Develop an Estuary Management Plan for the Mngazi Estuary to identify key actions required to address the downward trajectory in estuary condition and coordinate restoration efforts where required (National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008)); - Ensure maintenance of low-flow baseflow conditions to prevent prolonged periods of mouth closure that promote microalgal accumulation and the severity of bottom-water hypoxia (lack of oxygen); - Manage nutrient inputs by implementing agricultural best management practices (e.g., prevent overfertilization and irrigation) and restoring indigenous riparian vegetation (buffer zones);			

- Manage/reduce fishing pressure by managing access, increasing compliance and improving community awareness; and
- Prevent disturbance of riparian vegetation, including trampling by cattle, fire, and remove alien vegetation from the EFZ.

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	A/B	nMAR	87	
		% nMAR	96	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth open	>90%	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	B	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6 (surface waters), can become hypoxic in bottom waters in deep areas (>3 m depth)	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<20 (low flows) or <100 (high flows)	
		Estuary: Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.22	
		Estuary: Dissolved Inorganic Phosphate (DIP) (mg/l) in freshwater reaches	<0.015	
		River: Median Dissolved Oxygen (mg/l)	>6	
		River: pH	7.5<>8.5	
		River: Turbidity (NTU)	<20 (low flows) or <100 (high flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.2	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	<0.015	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		●
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<10	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>2.5	
		No presence of bloom conditions (> 20 µg Chl-a l ⁻¹), with the exception of 'natural' blooms that occur within weeks of freshwater pulse/flood events	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte coposition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	20	
		Healthy Zostera capensis beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
Fish	B/C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥73	
		Number of fish species	≥15	
		Number of species making up 90% of abundance	≥5	
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumppnose) abundant in eelgrass beds		●
		No fish kills do to low DO. pH , hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Xora Estuary

NAME	Xora	Estuary Type	Predominantly Open
PES	B/C	REC	B
Trajectory	↓	TEC	B
The following interventions will result in halting the negative trajectory and achieving TEC: • Maintain/protect floods and base flows • Remove alien vegetation			

- Implement cattle exclusion zone (browsing of mangroves)
- Control mangrove harvesting
- Manage/reduce fishing pressure/ bait collection

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	B	nMAR	52	
		% nMAR	82	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth open	100%	
Water Quality: Salinity	A	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥93	
		Salinity	0-35	
Water Quality: General	A	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥93	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.1	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.01	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAf, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012): Enterococci < 185 counts per 100 ml (90 percentile) and E. coli < 500 counts per 100 ml (90 percentile).		•
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	A	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥93	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte coposition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	22.5	
		Sediment pH maintained in mangrove areas	7.0	
		Healthy Zostera capensis beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
		Restored area (ha)	100ha saltmarsh	
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Fish	↑C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥63	
		Number of fish species	≥20	
		Number of species making up 90% of abundance	≥4	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Soles and gobies throughout estuary		●
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Mzintlava Estuary

NAME	Mzint-lava	Estuary Type	Predominantly Open
PES	A/B	REC	A-A/B
Trajectory	-	TEC	A-A/B
- The following interventions will result in halting the negative trajectory and achieving TEC: - Rehabilitate riparian areas/ wetlands - Control mangrove harvesting - Manage/reduce fishing pressure/ bait collection			

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	A	nMAR	70	
		% nMAR	96	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	B	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	<0.125	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	<0.015	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAf, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		●
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		●
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte composition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	3.0	
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥73	
		Number of fish species	>20	
		Number of species making up 90% of abundance	>=6	
		Estuarine-associated marine composition	>40	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Soles and gobies throughout estuary		●
		No fish kills do to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
		Eels (e.g. Anguilla mossambica) present in estuary OR catchment r more consecutive surveys		
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Mngazana Estuary

NAME	Mnga-zana	Estuary Type	Predominantly Open
PES	B	REC	A/B
Trajectory	↓	TEC	A/B
The following interventions will result in halting the negative trajectory and achieving TEC: • Restore/protect base flows • Rehabilitate riparian areas/ wetlands • Implement cattle exclusion zone (browsing of mangroves) • Control mangrove harvesting • Manage/reduce fishing pressure/ bait collection			

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	A	nMAR	49	
		% nMAR	97	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	A	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥93	
		Salinity	0-35	
Water Quality: General	B	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		Estuary: Dissolved Inorganic Nitrogen (DIN) (mg/l)		
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.125	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.015	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		•
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		•
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		•
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		•

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m ²) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	↑C	Maintain macrophyte coposition representatives of a Target EC:	≥63	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	147.0	
		Sediment pH maintained at 7 in mangrove areas		●
		Healthy <i>Zostera capensis</i> beds		●
		Maintain salt marsh integrity (no/limited evidence of trampling and overgrazing)		●
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
Invertebrates	↑D	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥58	
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Fish	↑D	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥58	
		Number of fish species	>20	
		Number of species making up 90% of abundance	≥6	
		Estuarine-associated marine composition	>40	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Juvenile eelgrass-associated species (blacktail, strepie, pipefish, stumpnose) abundant in eelgrass beds		●
		Soles and gobies throughout estuary		●
		No fish kills due to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)		●
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palearctic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

Mtentu Estuary

NAME	Mtentu	Estuary Type	Predominantly Open
PES	B	REC	A/B
Trajectory	↓	TEC	A/B
- The following interventions will result in halting the negative trajectory and achieving TEC: - Restore/protect base flows - Rehabilitate riparian areas/ wetlands - Remove alien vegetation - Control mangrove harvesting - Manage/reduce fishing pressure/ bait collection - Investigate eradication of alien fish			

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
Hydrology	B	nMAR	157	
		% nMAR	93	
Hydrodynamics	A	Maintain hydrodynamics regime appropriate for dependent biotic components of TEC category:	≥93	
		Mouth 100% open	100	
Water Quality: Salinity	B	Maintain salinity regime appropriate for dependent biotic components of TEC category:	≥88	
		Salinity	0-35	
Water Quality: General	B	Maintain Water quality appropriate for dependent biotic components of TEC category:	≥88	
		Estuary: Average Dissolved Oxygen (mg/l)	>6	
		Estuary: pH	7.5<>8.5	
		Estuary: Turbidity (NTU) (should decrease with increasing salinity)	<10 (low flows)	
		River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	≤0.125	
		River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	≤0.015	
		Metal and agrochemical concentrations in estuary exceed target values as per SA Water Quality Guidelines for coastal marine waters (DWAF, 1995 or future updates) or where not available as per Quality Guidelines for the Western Indian Ocean (e.g. UNEP et al. 2022)		●

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		Pesticides/herbicides (marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR, 2009 or official future updates thereof)		●
		Recreational use areas in estuary (DEA, 2012)	Enterococci < 185 counts per 100 ml (90%ile) and E. coli < 500 counts per 100 ml (90%ile).	
Physical habitat	B	Maintain Physical habitat appropriate for dependent biotic components (microalgae, macrophytes, invertebrates, fish and birds) of TEC category:	≥88	
		River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)		●
		Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)		●
		Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).		●
Microalgae	B	Maintain the composition, richness, and abundance of phytoplankton and benthic microalgal assemblages of TEC category:	≥88	
		Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	<5	
		Average benthic microalgae biomass (mg/m2) (entire estuary)	<50	
		Average benthic diatom diversity (H') (entire estuary)	>3	
		Presence of bloom conditions (> 20 µg Chl-a l ⁻¹)	0	
		Presence of potentially HAB-forming taxa	0	
Macrophytes	B	Maintain macrophyte composition representatives of a Target EC:	≥88	
		< % change in composition, distribution & abundance of macrophyte habitats	10	
		Mangrove extent (ha) maintained, with canopy intact, no stumps & seedlings present	0.5	
		No invasive alien vegetation in EFZ		●
		Protect/Maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land based activities.		●
		No land conversion on the floodplain from present (baseline - 2024)		●
Invertebrates	B	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	≥88	

Component/ indicator	TEC	Description	Numerical RQO	Narrative RQO
		No significant reduction in zooplankton species richness and biomass annually	<10%	
		No significant reduction in zoobenthos species richness and biomass annually	<10%	
		No significant reduction in mud and/or sand prawn biomass (3yr period)	<10%	
		Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness) (indication of poor water quality, anoxia/hypoxia)		●
		Presence & evidence of recruitment of mud crabs and mud prawns		●
Fish	↑C	Maintain fish composition, richness, and abundance representatives of a Target EC:	≥63	
		Number of fish species	>20	
		Number of species making up 90% of abundance	≥6	
		Estuarine-associated marine composition	>40	
		Juvenile predatory fish present (kob, grunter, steenbras, leervis)		●
		Soles and gobies throughout estuary		●
		Eels (e.g. <i>Anguilla mossambica</i>) present in estuary OR catchment r more consecutive surveys		●
Birds	B	Maintain avifaunal community representatives of a Target EC:	≥88	
		No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <%	<10%	
		No significant reduction in Wader species (3 yr period), with change <%	<10%	
		Waterfowl (ducks and geese) numbers stable (3 yr period), with change <%	<10%	
		Tern and gull (roost at mouth) numbers stable (3 yr period), with change <%	<10%	
		Palaeartic migrants present in summer (stable over 3 yr period), with change <%	<10%	
		Resident Fish Eagle breeding pair	≥1	
		Overall water bird community stable/consistent (3 yr period), with change <%	<10%	

11. GROUNDWATER RESOURCE QUALITY OBJECTIVES

The following section presents the proposed RQOs for the prioritised 17 groundwater RUs within the Keiskamma and Fish-to-Tsitsikamma catchment areas, organised by their respective IUAs. The groundwater RUs are summarised in **Error! Not a valid bookmark self-reference.**, which provides a clear overview along with the context and rationale supporting the proposed RQOs

Table 11-1: Resource Quality Objectives for prioritised groundwater RU per IUA

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
IUA_K01						
GW_RU01	K80A K80B K80C K80D K80E K80F K90A K90B	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently stressed, may require detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	Peak drawdown <16.2 m 75th percentile drawdown <10.2 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients		NO ₃ /NO ₂ <1.4
				Salts		EC <74 (70)
				Sulphates		SO ₄ <16 (200)
				Other	long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	Na <104 (100)
						Cl <165 (100)
						F < 0.2 (1)
						Mn <0.22 (0.05)

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
IUA_KL01						
GW_RU02	K90E K90F K90G	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Over allocated and currently stressed, may require detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	Peak drawdown <13.4 m 75th percentile drawdown <8.5 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ /NO ₂ <0.1
				Salts		EC <109 (70)
				Sulphates		SO ₄ <48 (200)
				Other		Na <89 (100) Cl <200 (100) F < 0.3 (1) Pb <0.015 (0.01)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses.	-

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
					Dry season flow not to exhibit declining trend for more than 5 years.	
IUA_L01						
GW_RU03	L82B L82D	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently stressed, may require detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Identify suitable monitoring borehole	-
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <0.4
				Salts		EC <21 (70)
				Sulphates		SO ₄ <5 (200)
				Other		Na <25 (100) Cl <47 (100) F < 0.1 (1) Pb <0.015 (0.01)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
		IUA_LN01				
GW_RU12		Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions.	Q <Average recharge per hectare

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
	N12A N12B N12C				New users are to remain within the allocable groundwater volume.	
			Stress	Abstraction and allocation	Currently stressed, may require detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <2.5 m 75th percentile drawdown <2.2 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <5.4
				Salts		EC <116 (70)
				Sulphates		SO ₄ <123 (200)
				Other		Na <100 (100) Cl <115 (100) F < 0.9 (1) Mg <48 (30)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses.	-
GW_RU13	N13A N13B N13C	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently stressed, may require detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <16.5 m 75th percentile drawdown <8.7 m

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	Long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <0.1
				Salts		EC <402 (70)
				Sulphates		SO ₄ <501 (200)
				Other		Na <632 (100) Cl <722 (100) F < 0.7 (1) Mg <121 (30) Pb <0.045 (0.01)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses.	-
GW_RU14	N14A N14B N14C	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Over allocated and currently stressed, may require detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <20.6 m 75th percentile drawdown <15.7 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients		NO ₃ / NO ₂ <6.4
				Salts		EC <235 (70)

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
				Sulphates	Long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	SO ₄ <150 (200)
				Other		Na <196 (100) Cl <441 (100) F < 1.3 (1) Mg <69 (30) Pb <0.045 (0.01)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses.	-
IUA_M01						
GW_RU04	M10A M10B	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Identify suitable monitoring borehole	-
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)	Identify suitable monitoring borehole. long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	-
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
GW_RU05	M10C M10D	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
			Stress	Abstraction and allocation	Over allocated and currently stressed, requires detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <10.9 m 75th percentile drawdown <6.8 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)	long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	-
				Nutrients		NO ₃ / NO ₂ <0.2
				Salts		EC <18 (70)
				Sulphates		SO ₄ <7 (200)
				Other		Na <19 (100) Cl <35(100) F < 0.1 (1)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
GW_RU06	M20A M20B M30A M30B	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users is to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Over allocated and currently stressed, requires detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <9.5 m 75th percentile drawdown <7.1 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
		Quality	Quality	Time series water quality (Quarterly / Bi annual)	Identify suitable monitoring borehole. long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	-
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
IUA_Q01						
GW_RU20	Q14A Q14B Q14C Q14D	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Over allocated and currently stressed, requires detailed assessment for new allocations for recharge and reserve determination, or delineation of sub catchments.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <5.7 m 75th percentile drawdown <3.6 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	Long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <0.8
				Salts		EC <62 (70)
				Sulphates		SO ₄ <39 (200)
				Other		Na <33 (100) Cl <18 (100) F <0.7 (1) Mg <37 (30)

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses.	-
IUA_S01						
GW_RU35	S20C S20D	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users is to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Identify suitable monitoring borehole	-
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)	Identify suitable monitoring borehole	-
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
IUA_T01						
GW_RU40	T11A T11C T11D T11E T11F T11G T11H	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <5.7 m 75th percentile drawdown <4.6 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <0.1
				Salts		EC <52 (70)
				Sulphates		SO ₄ <17 (200)
				Other		Na <98 (100) Cl <43 (100) F < 4.2 (1)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
GW_RU42	T20A	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Identify suitable monitoring borehole	-
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	Long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <3.4
				Salts		EC <52 (70)
				Sulphates		SO ₄ <5 (200)

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
				Other		Na <43 (100) Cl <47 (100) F < 0.2 (1)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
IUA_T03						
GW_RU44	T20B T20C T20D T20E T20F T20G	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <4.2 m 75th percentile drawdown <3.6 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	Long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <1.1
				Salts		EC <132 (70)
				Sulphates		SO ₄ <21 (200)
				Other		Na <148 (100) Cl <212 (100) F < 0.4 (1) Mg <38 (30) Al <1.09 (0.15) Fe <0.43 (0.1)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve.	-

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
					Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	
IUA_T04						
GW_RU45	T60A T60B T60C T60D T60E T60F T60G T60H T60J T60K	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <1.2 m 75th percentile drawdown <0.8 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	Long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <2.7
				Salts		EC <15 (70)
				Sulphates		SO ₄ <3 (200)
				Other		Na <13 (100) Cl <11 (100) F < 0.2 (1) Pb <0.028 (0.01)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
GW_RU46	T70A T70B	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions.	Q <Average recharge per hectare

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
	T70C T70D T70E T70F T70G				New users are to remain within the allocable groundwater volume.	
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <8.7 m 75th percentile drawdown <5.4 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)	Identify suitable monitoring borehole	-
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-
GW_RU48	T90A T90D T90G T90F	Quantity and Aquifer	Abstraction	Allocations	Existing users to comply with allocation schedules including GA, Schedule 1, and licence conditions. New users are to remain within the allocable groundwater volume.	Q <Average recharge per hectare
			Stress	Abstraction and allocation	Currently not stressed.	Q <Current surplus
			Water Level	Time series drawdown in monitoring boreholes (monthly)	Drawdown in monitoring boreholes should not exceed peak drawdown or not exhibit declining trends over 5 years and exceed the 75th percentile drawdown.	peak drawdown <3.9 m 75th percentile drawdown <2.9 m
			Protection Zone	Other water users	The radius of influence should not intersect any other protection zone	-
		Quality	Quality	Time series water quality (Quarterly / Bi annual)		-
				Nutrients	Long term trend should not exceed the 75th percentile or the TWQR for domestic use (in brackets) if higher for Compounds of Concern	NO ₃ / NO ₂ <16
				Salts		EC <68 (70)
				Sulphates		SO ₄ <11 (200)

GWRU	Quats	Component	Sub Component	Indicator/Measure	Narrative RQO	Numeric RQO
				Other		Na <46 (100) Cl <90 (100) F < 0.3 (1) As <2.0 (0.01)
		Ecological	Baseflow Component	Dry season flow	Protection zones for watercourses are required to protect the ecological reserve. Groundwater flow reversal to be prevented near water courses. Dry season flow not to exhibit declining trend for more than 5 years.	-

12. WETLAND RESOURCE QUALITY OBJECTIVES

The following section presents the proposed RQOs for the prioritised WRUs within the Keiskamma and Fish-to-Tsitsikamma catchment areas, organised by their respective IUAs. The wetland RUs are summarised in **Table 12-1**, which provides a clear overview along with the context and rationale supporting the proposed RQOs.

Table 12-1: Wetland Resource Quality Objectives

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
1. IUA_K01								
WRU01	Lottering	Valley-bottom/Seep	C	C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Lottering wetland.	The PES of the Lottering wetland should not fall below the REC of C.
					Habitat	Ecological connectivity	Extent of plantations within the valley-bottom wetland	A small portion of the plantation on the eastern margins of the wetland should be excised from the valley-bottom wetland to provide key ecological connectivity, buffer capacity, improved hydrology, and gene flow between them and neighbouring sites
					Habitat	Wetland vegetation	Maintenance of a structurally and compositionally diverse wetland and fynbos habitat	Maintain a burning and grazing regime that is ecologically favourable, both for general wetland and fynbos ecological functioning
	Slang	Valley-bottom/Seep	B	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Slang wetland.	The PES of the Slang wetland should not fall below the REC of B.

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Habitat	Ecological connectivity	Extent of plantations within the seep wetland	A small portion of plantation should be excised from the seep wetland at the head of the Slang wetland to provide key ecological connectivity, buffer capacity, improved hydrology, and gene flow between them and neighbouring sites
					Habitat	Wetland vegetation	Maintenance of a structurally and compositionally diverse wetland and fynbos habitat	Maintain a burning and grazing regime that is ecologically favourable, both for general wetland and fynbos ecological functioning
WRU02	Kromme	Unchannelled Valley-bottom	A	A	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Kromme wetland complex.	The PES of the Kromme wetland complex should not fall below the REC of A.
					Habitat	Invasive Alien Plants	Extent of IAPs within the wetland relative to the extent recorded in the baseline assessment.	IAPs extent should be managed to ensure it does not increase above the extent mapped in the baseline assessment (2.5%) for the Krugersland and Kompanjiesdrif wetlands.
					Habitat	Wetland Vegetation	Extent and overall health of the <i>Prionium serratum</i> (Palmiet) population within the wetland.	Maintain a viable Palmiet population within the Kromme wetland through the use of fire and targeted IAP clearing.
3. IUA_L01								
WRU03	Krakeel	Valley-bottom	D	C/D	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Krakeel wetland complex.	The PES of the Krakeel wetland complex should not fall below the BAS of C/D.

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Habitat	Invasive Plants Alien	Extent of IAPs within the wetland relative to the extent of the remaining natural or semi-natural wetland areas recorded in the baseline assessment.	IAPs extent within the remaining natural or semi-natural wetland areas should be managed to ensure it does not increase above a threshold that could be potentially harmful to the habitat of the Krakeel wetland (2.5%).
4. IUA_M01								
WRU04	Longmore	Valley-bottom	C	B/C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Longmore wetlands.	The PES of the Longmore wetland complex should not fall below the BAS, which is a C category
					Biota	Critically Endangered Vanstadensberg honeybush tea (<i>Cyclopia longifolia</i>) population and its habitat quality in the Longmore wetlands	Abundance of <i>C. longifolia</i> and associated habitat quality within the Longmore wetlands	The overall abundance of <i>C. longifolia</i> in the Longmore wetlands should not decrease below that in the baseline assessment.
					Habitat	Wetland vegetation	Maintenance of a structurally and compositionally diverse wetland and fynbos habitat	Maintain a burning and grazing regime that is ecologically favourable, both for general wetland and fynbos ecological functioning
					Habitat	Geomorphology	Extent of erosion within the Longmore wetland.	Erosion threatening the wetland needs to be effectively controlled.
WRU05	Chatty River	Floodplain	D	C/D	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health	The PES of the Chatty River floodplain wetland should not fall below the BAS of C/D.

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
							assessment undertaken for the Chatty River floodplain wetland.	
					Quality	Water Quality	Estuary indicators apply (see water quality related estuary indicators for the Swartkops Estuary)	Estuary RQOs apply (see Swartkops Estuary RQO).
		Channelled valley-bottom	D	C/D	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Chatty River channelled valley-bottom wetlands.	The PES of the Chatty River channelled valley-bottom wetlands should not fall below the BAS of C/D.
					Quality	Water Quality	Estuary indicators apply (see water quality related estuary indicators for the Swartkops Estuary)	Estuary RQOs apply (see Swartkops Estuary RQO).
5.IUA_LN01								
WRU06	Sneeuberg West	Seep	B	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Sneeuberg West seep wetlands.	The PES of the Sneeuberg West seep wetlands should not fall below the REC, which is a B category.
		Valley-bottom	C	C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Sneeuberg West valley-bottom wetlands.	The PES of the Sneeuberg West valley-bottom wetlands should not fall below the REC, which is a C category.

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Quantity	flow volumes	The volume of inflows, throughflows, and outflows of the wetland, to ensure some degree of flow maintenance is achieved across the valley-bottom wetlands.	The volume of groundwater inflow into the valley-bottom wetlands should not be reduced.
8. IUA_Q01								
WRU27	Loodsberg	Seep	B	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Loodsberg seep wetlands.	The PES of the Loodsberg seep wetlands should not fall below the REC, which is a B category.
		Valley-bottom	C	C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Loodsberg valley-bottom wetlands.	The PES of the Loodsberg valley-bottom wetlands should not fall below the REC, which is a C category.
9. IUA_Q02								
WRU10	Dagbreek	Valley-bottom	B	A/B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Dagbreek wetland complex.	The PES of the Dagbreek complex should not fall below the BAS – A/B category
					Habitat	Invasive Plants Alien	In instances where exotic species have been established and/or cultivated, e.g., <i>Populus</i> sp., these should be removed.	IAPs extent should be managed to ensure these do not increase above the extent mapped in the baseline assessment and/or impact on the structural integrity of the engineered structures

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Habitat	Bush encroachment	The encroachment of trees, e.g., <i>Vachellia karoo</i> , should be carefully managed in the majority of the wetlands, as not only does this reduce the integrity of the wetland habitat but also threatens the integrity of the engineered structures.	Bush encroachment within the wetland and associated buffer areas (200m) should be managed, and the density of the species should not increase above the mapped extent from the baseline assessment
					Quality	Sedimentation	Sedimentation of the Kommandodrift dam as a result of advancing headcut erosional features	Headcut erosional features are threatening not only the integrity of the wetlands and engineered structures but also the Kommandodrift Dam. Should the engineered structures fail as a result of the erosional features, a substantial volume of sediments will be mobilised.
12. IUA_R02								
WRU15	eDrayini	Floodplain	C	C	Habitat	Geomorphology	Extent to which headcut erosion has advanced within the wetland.	The headcut erosion within the wetland should not be allowed to progress any further upstream than where they were noted in the baseline assessment.
					Habitat	Vegetation	Extent of IAPs and woody terrestrial species within the wetland relative to the extent recorded in the baseline assessment.	IAPs and woody terrestrial species extent should be managed to ensure they are cleared and maintained at a level that will not pose a threat to the habitat integrity of the eDrayini wetland (2.5%)
WRU26	KwaMasele	Valley-bottom/Seep	C	C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the KwaMasele Wetlands.	The PES of the wetland complex should not fall below the REC of C.
					Habitat	Wise-use	Extent of the subsistence farming lands and grazing in the wetland in relation to the extent recorded in the baseline assessment	Describe in much more detail the impacts that cattle grazing, and agriculture are currently having on the wetland. The extent of subsistence farming should be managed to ensure it does not increase above

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
								the extent mapped in the baseline assessment, and that wise-use practices have been adopted to ensure the REC category of C is maintained.
					Biota	Vulnerable <i>Arctotis debensis</i>	A sustained population of <i>Arctotis debensis</i>	Maintain the population of <i>Arctotis debensis</i> in the wetlands through the establishment of formal protection of the KwaMasele wetland, especially in terms of encroachment of the wetland by human settlement and cultivation.
13. IUA_S01								
WRU18	Cala	Valley-bottom	C	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Cala valley-bottom wetland.	The PES of the Cala valley-bottom wetland should not fall below the BAS – B category
					Habitat	Management of state forests	The abandoned/defunct state forests should be excised from the wetland habitat and its associated buffer area (200m).	The removal of the abandoned state plantations and active vegetation management of the excised areas should be carefully managed to prevent the encroachment of IAPs into the wetland and buffer zone.
		Seep	C	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Cala seepage wetland.	The PES of the Cala seepage wetland should not fall below the BAS – B category
					Habitat	Wise-use	Extent of the subsistence farming lands in the wetland in relation to the extent recorded in the baseline assessment.	The extent and land use practices should be managed to ensure it does not increase above the extent mapped in the baseline assessment and that

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
								wise-use practices have been adopted to ensure the BAS – B category is maintained.
WRU21	Mbokotwa	Floodplain	D	C/D	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Mbokotwa wetland complex.	The PES of the Mbokotwa wetland should not fall below the BAS – B category
					Habitat	Invasive Alien Plants	Extent of IAPs within the wetland in relation to the extent recorded in the baseline assessment.	IAPs extent should be managed to ensure it does not increase above the extent mapped in the baseline assessment.
					Quality	Water Quality	River indicators apply (see water quality related river indicators)	River RQOs apply (see RQO).
					Quantity	Flow volumes	The volume of inflows, throughflows, and outflows of the wetland, to ensure some degree of flooding occurs within the floodplain habitat.	The flooding of floodplain wetlands is essential for the overall functionality and integrity of these systems, and thus, some degree of flooding should be maintained within the system following the offtake of flows for agricultural purposes.
14. IUA_S02								
WRU12	Cairns	Unchannelled valley-bottom/Seep	B	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Cairns wetland complex.	The PES of the Cairns wetland complex should not fall below the REC of B.
					Habitat	Wetland Vegetation	Maintenance of a structurally and compositionally diverse wetland and grassland	Maintain a burning and grazing regime that is ecologically favourable, both for general wetland and grassland ecological functioning and for the Amathole Toad specifically

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Biota	<i>Vandijkophrynus amatolicus</i> (Amathole Toad)	Breeding population of <i>Vandijkophrynus amatolicus</i> (the Amathole Toad)	Maintain a viable breeding population of the Amathole Toad in the seep wetlands
WRU13	Hogsback	Seep (intact)	C	B/C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the intact seep wetlands in the Hogsback complex.	The PES of the intact seep wetlands should not fall below the REC of B/C.
					Biota	<i>Vandijkophrynus amatolicus</i> (Amathole Toad)	Breeding population of <i>Vandijkophrynus amatolicus</i> (the Amathole Toad)	Maintain a viable breeding population of the Amathole Toad in the seep wetlands
					Habitat	Wise use and grazing	Frequency of fires in the wetlands and the quality of wetland habitat	A burning and grazing regime needs to be followed, which is ecologically favourable, both for general wetland/grassland ecological functioning and for the Amathole toad specifically.
		Seep (degraded)	D	D	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the intact seep wetlands in the Hogsback complex.	The PES of the intact seep wetlands should not fall below the REC of D
					Habitat	Invasive Alien Plants	Extent of American bramble within the seep wetlands and their catchments	The extent of American bramble and other IAPs within the wetland and the catchment of the seep wetlands should not increase in extent and should ideally be reduced.
					Habitat	Ecological connectivity	Extent of plantations within the seep wetlands	Two areas of plantation should be excised from the seep wetlands to provide key ecological connectivity and gene flow between them and neighbouring sites

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Habitat	Wise use and grazing	Frequency of fires in the wetlands and the quality of wetland habitat	A burning and grazing regime needs to be followed, which is ecologically favourable, both for general wetland/grassland ecological functioning and for the Amathole toad specifically.
		Unchannelled Valley-bottom	C	B/C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the intact seep wetlands in the Hogsback complex.	The PES of the unchannelled valley-bottom wetlands should not fall below the REC of B/C
					Habitat	Invasive Alien Plants	Extent of self-seeded pine trees within the catchment to the northeast of the unchannelled valley-bottom wetland.	The extent of pine trees and other IAPs within the catchment of the unchannelled valley-bottom should not increase in extent and should ideally be reduced.
		Floodplain	C	B/C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the intact seep wetlands in the Hogsback complex.	The PES of the floodplain wetlands should not fall below the REC of B/C
					Habitat	Geomorphology	The risk of channel avulsion in the floodplain wetland.	The rehabilitation structures within the floodplain need to be reviewed, and the integrity of the channel and the geomorphic functioning of the floodplain wetland need to be monitored.
		16. IUA_T01						
WRU22	Elliot/Khowa	Seep (Tributaries)	D	C/C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Khowa seepage wetland.	The PES of the Khowa seepage wetland should not fall below the BAS – C/D category
		Floodplain (east)	D	C/C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Khowa floodplain (east) wetland.	The PES of the Khowa floodplain (east) wetland should not fall below the BAS – C/D category

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
							assessment undertaken for the Khowa floodplain (east) wetland.	
					Habitat	Invasive Plants Alien	Extent of IAPs within the wetland in relation to the extent recorded in the baseline assessment.	IAPs extent should be managed to ensure it does not increase above the extent mapped in the baseline assessment.
		Channelled valley-bottom (west)	D	C	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Khowa channelled valley-bottom (west) wetland.	The PES of the Khowa channelled valley-bottom (west) wetland should not fall below the BAS – C/D category
					Quality	Water Quality	River indicators apply (see water quality related river indicators)	River RQOs apply (see RQO).
					Quantity	Flow volumes	The volume of inflows, throughflows, and outflows of the wetland, to ensure the downstream floodplain (lower) receives sufficient flows to maintain its natural hydrological regime.	The hydrological regime of the downstream floodplain (lower) is largely maintained by the upstream activities, and therefore, any abstraction activities should be suitably managed.
					Habitat	Wise-use	Extent of the grazing and farming practices in the wetland relative to the extent recorded in the baseline assessment.	The extent and land use practices should be managed to ensure it does not increase above the extent mapped in the baseline assessment and that wise-use practices have been adopted to ensure the BAS – C category is maintained.
		Floodplain (upper)	E	D	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Khowa floodplain (upper) wetland.	The PES of the Khowa floodplain (upper) wetland should not fall below the BAS – D category

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Quality	Water Quality	River indicators apply (see water quality related river indicators)	River RQOs apply (see RQO).
					Quantity	Flow volumes	The volume of inflows, throughflows, and outflows of the wetland, to ensure the downstream floodplain (lower) receives sufficient flows to maintain its natural hydrological regime.	The hydrological regime of the downstream floodplain (lower) is largely maintained by the upstream activities, and therefore, any abstraction or discharge activities should be suitably managed.
					Biota	Crowned cranes	Breeding pair of <i>Balearica regulorum</i> (Crowned Crane)	Maintain suitable habitat within the area for the breeding and foraging Crowned Cranes in the wetland.
		Floodplain (lower)	C	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Khowa floodplain (lower) wetland.	The PES of the Khowa floodplain (lower) wetland should not fall below the BAS – B category
					Biota	Crowned cranes	Breeding pair of <i>Balearica regulorum</i> (Crowned Crane)	Maintain suitable habitat within the area for the breeding and foraging Crowned Cranes in the wetland.
					Quality	Groundwater	Monitoring of the groundwater resource	Groundwater RQOs apply (see RQO).
19. IUA_T04								
WRU24	Sikombe	Channelled valley	B	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Sikombe wetland.	The PES of the Sikombe wetland should not fall below the REC – B category

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
					Habitat	Geomorphology	Extent to which headcut erosion has advanced upstream of the wetland.	The headcut erosion upstream of the wetland should not be allowed to progress any further upstream than where they were noted in the baseline assessment.
					Habitat	Wetland Vegetation	Extent and overall health of the <i>Prionium serratum</i> (Palmiet) and other unique flora species, e.g., orchids, population within the wetland.	Maintain a viable Palmiet population and other unique flora species communities within the Sikombe wetland.
	Xolobeni	Channelled valley-bottom	C	B	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Sikombe wetland.	The PES of the Xolobeni wetland should not fall below the REC – B category
					Habitat	Management of plantations/wood lots	Extent of the plantations/wood lots in the wetland in relation to the extent recorded in the baseline assessment.	The plantation/wood lot extent should be managed to ensure it does not increase above the extent mapped in the baseline assessment.
					Habitat	Wise-use	Extent of the subsistence farming lands in the wetland in relation to the extent recorded in the baseline assessment.	The extent and land use practices should be managed to ensure it does not increase above the extent mapped in the baseline assessment and that wise-use practices have been adopted to ensure the BAS – B category is maintained.
					Habitat	Invasive Alien Plants	Extent of IAPs within the wetland and its associated buffer in relation to the extent recorded in the baseline assessment.	IAPs extent should be managed to ensure it does not increase above the extent mapped in the baseline assessment.
					Habitat	Geomorphology	Extent to which headcut erosion has advanced within the wetland.	The headcut erosion within the wetland should not be allowed to progress any further upstream than where they were noted in the baseline assessment. Ideally, rehabilitation interventions must be implemented as a matter of urgency to protect the pipeline, pump house and overall water resource.

RU	Wetland	Type	PES	REC/ BAS	Component	Sub- Component	Indicator	Narrative RQO
WRU25	Ludeke Halt	Seep/valley bottom	D	C/D	Habitat	Ecological Condition	Desktop and field verified PES category based on a Level 1B WET-Health assessment undertaken for the Ludeke Halt wetland complex.	The PES of the Ludeke Halt wetland complex should not fall below the BAS – C/D category
					Habitat	Wise-use	Extent of the subsistence farming lands in the wetland in relation to the extent recorded in the baseline assessment.	The extent and land use practices should be managed to ensure it does not increase above the extent mapped in the baseline assessment and that wise-use practices have been adopted to ensure the BAS – C/D category is maintained.
					Habitat	Geomorphology	Extent to which headcut erosion has advanced within the wetland.	The headcut erosion within the wetland should not be allowed to progress any further upstream than where they were noted in the baseline assessment.

13. CONCLUSION

Through this study, 19 Integrated Units of Analysis (IUAs) were delineated across the Keiskamma, Fish to Tsitsikamma catchment areas. Using extensive existing and modelled data, scenario assessments, and stakeholder consultation, proposed water resource classes were determined. Among the IUAs, only IUA_T04 (Pondoland) was classified as Class I, the majority as Class II, and IUA_T03 (Mthatha), M01 (Swartkops), and IUA_KL01 (Gamtoos) as Class III. Resource Quality Objectives (RQOs) were established based on these classifications, with more stringent RQOs developed for priority Class III resources requiring additional protection to ensure long-term sustainability.

The process also delineated 229 resource units, prioritised as 145 river units, 24 dams, 26 estuaries, 17 wetlands, and 17 priority groundwater units. Following prioritisation, the Department of Water and Sanitation (DWS) RQO tool was used to select components, sub-components, and indicators, forming the foundation for RQO and numerical limit development. Step 5 of the RQO determination procedure involved drafting and refining the proposed RQOs over a five-day workshop (2–6 June 2025) held in East London and Gqeberha, followed by further discussion at Project Steering Committee Meeting 4 (24 June 2025). Feedback from these sessions and written submissions has been incorporated into this updated draft.

The report presents narrative and, where applicable, numerical RQOs for rivers, dams, estuaries, wetlands, and groundwater. Numerical limits translate the qualitative RQOs into measurable targets for monitoring and compliance. The accompanying sections provide contextual, methodological, and rationale-based support for the proposed RQOs.

Seasonality and climate variability are key considerations, particularly for fish and macroinvertebrates. Non-compliance should therefore be interpreted in light of preceding hydrological events such as floods or droughts, recognising that certain species may temporarily disappear and return once flow conditions normalise. Compliance assessment should thus serve as an indicator of ecosystem change rather than a simple checklist exercise.

While not exhaustive, the proposed RQOs are relevant to the Keiskamma–Fish–Tsitsikamma system and will provide valuable insight into the sustainable use of its water resources. Although these RQOs have undergone stakeholder consultation, further opportunities for review and input will be provided.

The development of a Monitoring Programme to support the RQOs and Reserve Implementation is the next key deliverable for this study. This programme will be structured around the inputs received during this phase, ensuring a tailored and practical approach to monitoring. The primary objective of the Monitoring Programme is to provide a detailed plan that will enable the Department to effectively collaborate with other relevant Government Departments, local authorities, Catchment Management Agencies and other external organisations operating within the Keiskamma, Fish, and Tsitsikamma catchment areas. The programme will focus on fostering coordinated efforts aimed at achieving the RQOs while addressing any existing gaps in data, capacity, or implementation. Specific goals include:

- Establishing clear roles and responsibilities among collaborating entities;
- Identifying and prioritising key monitoring sites within the catchment areas;

- Developing robust data collection and reporting protocols to track progress toward meeting the RQOs; and
- Integrating the monitoring activities with ongoing initiatives to optimise resources and ensure consistency.

Additionally, specific implementation guidance will be provided per IUA and where appropriate per river/ estuarine/ wetland or groundwater system within an IUA.

Ultimately, the Monitoring Programme will serve as a critical tool to ensure that the quantity, quality and ecological goals of all the water resources defined in the RQOs are met. It will also provide a mechanism for adaptive management, allowing for adjustments to strategies based on emerging data and challenges. By promoting collaboration and addressing existing gaps, the programme aims to support sustainable water resource management in the region.

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15. APPENDIX A: PRIORITISATION OF GROUNDWATER RESOURCE UNITS AND THEIR ASSOCIATED SCORING

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
IUA_K01	K80A	GW_RU01	1	4	1	1	1	4	5	17	48.6	2	1
	K80B		1	2	1	1	1	4	5	15	42.9	2	
	K80C		4	2	3	1	1	4	5	20	57.1	1	
	K80D		5	2	3	3	1	4	5	23	65.7	1	
	K80E		5	2	3	4	1	4	4	23	65.7	1	
	K80F		5	2	3	5	1	3	4	23	65.7	1	
	K90A		3	2	1	2	1	4	4	17	48.6	2	
	K90B		3	2	1	2	1	1	4	14	40.0	2	
IUA_KL01	K90E	GW_RU02	5	1	1	5	1	3	3	19	54.3	1	1
	K90F		5	1	3	5	1	3	3	21	60.0	1	

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
	K90G		5	1	3	5	1	4	3	22	62.9	1	
IUA_L01	L82B	GW_RU03	4	3	1	3	1	5	3	20	57.1	1	1
	L82D		4	2	2	3	1	5	2	19	54.3	1	
IUA_LN01	N12A	GW_RU12	3	5	1	1	1	1	1	13	37.1	2	1
	N12B		3	5	1	2	1	1	1	14	40.0	2	
	N12C		4	5	2	5	1	3	1	21	60.0	1	
	N13A	GW_RU13	4	5	2	3	1	3	1	19	54.3	1	1
	N13B		5	2	2	5	1	4	1	20	57.1	1	
	N13C		3	2	2	3	1	2	1	14	40.0	2	
	N14A	GW_RU14	2	1	2	5	1	3	1	15	42.9	2	1

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
	N14B		4	1	2	2	1	2	1	13	37.1	2	
	N14C		4	1	2	5	1	4	1	18	51.4	1	
IUA_M01	M10A	GW_RU04	1	5	2	1	4	3	2	18	51.4	1	1
	M10B		1	3	2	3	2	3	2	16	45.7	2	
	M10C	GW_RU05	5	5	3	5	5	3	2	28	80.0	1	1
	M10D		1	5	3	1	5	3	1	19	54.3	1	
	M20A	GW_RU06	5	1	2	5	2	3	1	19	54.3	1	1
	M20B		4	2	2	5	1	3	3	20	57.1	1	
	M30A		5	5	2	5	1	3	1	22	62.9	1	
	M30B		4	4	1	5	1	1	1	17	48.6	2	

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
IUA_Q01	Q14A	GW_RU20	4	5	3	5	1	5	1	24	68.6	1	1
	Q14B		5	5	3	5	1	5	1	25	71.4	1	
	Q14C		4	2	3	5	1	4	1	20	57.1	1	
	Q14D		3	1	3	3	1	4	1	16	45.7	2	
IUA_S01	S20C	GW_RU35	3	1	2	1	1	4	3	15	42.9	2	1
	S20D		4	1	2	3	1	4	3	18	51.4	1	
IUA_T01	T11A	GW_RU40	1	1	2	1	1	5	3	14	40.0	2	1
	T11C		1	3	1	1	1	4	4	15	42.9	2	
	T11D		1	3	2	1	1	5	4	17	48.6	2	
	T11E		1	5	2	1	1	5	4	19	54.3	1	

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
	T11F		1	5	2	1	1	5	4	19	54.3	1	
	T11G		2	2	2	1	1	5	3	16	45.7	2	
	T11H		1	1	2	1	1	5	3	14	40.0	2	
	T20A	GW_RU42	1	5	2	1	1	5	5	20	57.1	1	1
IUA_T03	T20B	GW_RU44	1	4	2	1	1	5	5	19	54.3	1	1
	T20C		1	1	2	1	1	3	4	13	37.1	2	
	T20D		3	1	2	1	1	3	4	15	42.9	2	
	T20E		1	1	2	1	1	5	4	15	42.9	2	
	T20F		1	1	2	1	1	5	4	15	42.9	2	

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
	T20G		1	2	1	1	1	4	4	14	40.0	2	
IUA_T04	T60A	GW_RU45	1	1	2	1	1	5	4	15	42.9	2	1
	T60B		1	2	2	1	1	5	4	16	45.7	2	
	T60C		1	2	2	1	1	5	5	17	48.6	2	
	T60D		1	2	2	1	1	5	5	17	48.6	2	
	T60E		1	2	2	1	1	5	4	16	45.7	2	
	T60F		1	3	2	1	1	5	5	18	51.4	1	
	T60G		1	2	2	1	1	5	5	17	48.6	2	
	T60H		1	2	2	1	1	5	5	17	48.6	2	
	T60J		1	5	2	1	1	5	5	20	57.1	1	

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
	T60K		1	4	2	1	1	4	5	18	51.4	1	
	T70A	GW_RU46	1	2	2	1	1	5	4	16	45.7	2	1
	T70B		1	4	2	1	1	3	4	16	45.7	2	
	T70C		1	3	2	1	1	5	4	17	48.6	2	
	T70D		1	2	2	1	1	3	5	15	42.9	2	
	T70E		1	1	2	1	1	5	4	15	42.9	2	
	T70F		1	1	2	1	1	4	4	14	40.0	2	
	T70G		1	1	2	1	1	4	4	14	40.0	2	
	T90A	GW_RU48	1	1	2	1	1	4	3	13	37.1	2	1
	T90D		1	2	2	1	1	4	4	15	42.9	2	

IUA	QUAT	GWRU	GW use (WARMS)	Strat GW areas	GW Dependency	Stress	Govt Control Areas	GW Quality - (EC)	Eco reliance on GW (Baseflow)	Overall score (total 35)	% score	Priority (1-3)	Overall GWRU Priority
	T90G		3	5	3	1	1	4	4	21	60.0	1	

Ratings 1 – 5, 1 being low impact and 5 being high impact

16. APPENDIX B: BROAD RQOS FOR ESTUARIES IN NATURAL/NEAR-NATURAL CONDITIONS AND OR OF IMPORTANCE FOR BIODIVERSITY PER IUA WHERE RELEVANT

IUA_K01

Natural (A - A/B)	Fish Nursery	Mangroves	Eelgrass	Rare species	NAME	PES	Trajectory	REC	TEC	Hydrology	Hydrodynamics	Water Quality: Salinity	Water Quality: General	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
X					Lottering	A/ B		A- A/B	A- A/B	B	A	A	A	A	A	A	A	B	B
X					Elandsbos	A/ B		A- A/B	A- A/B	B	A	A	A	A	A	A	A	B	B
X					Storms	A/ B		A- A/B	A- A/B	B	A	A	A	A	A	A	A	B	B
X					Elands	A/ B		A- A/B	A- A/B	B	A	A	B	A	B	A	A	B	B
X					Groot (Oos)	A/ B		A- A/B	A- A/B	A	A	A	B	A	B	B	A	B	B

IUA_M01

A - A/B	Fish Nursery	Mangroves	Eelgrass	Rare species	NAME	PES	Trajectory	REC	TEC	Hydrology	Hydrodynamics	Water Quality: Salinity	Water Quality: General	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
X					Van Stadens	B	↓	A/ B	A/ B	C	B	B	↑ C	B	↑ C	B	B	B	B
					Maitland	B/ C	↓	B	B	C	B	B	↑ C	B	↑ C	B	↑ C	↑ C	B
					Baakens	E/F	↓	E	E	D	E	E	↑ F	F	↑ E	F	↑ F	↑ F	↑ F
					Papkuils	F	↓	E/F	E/F	D	F	F	↑ F	F	↑ E	F	↑ F	↑ F	↑ F
					Coega (Nggurha)	E/F	↓	D	D	D	F	F	↑ C	F	D	↑ F	F	↑ F	↑ E

IUA_P01

A - A/B	NB Fish Nursery	Mangroves	Eelgrass	Rare species	NAME	PES	Trajectory	REC	TEC	Hydrology	Hydrodynamics	Water Quality: Salinity	Water Quality: General	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
					Boknes	C	↔	C	C	E	C	B	D	B	D	B	C	C	B
					Grant's	C	↔	C	C	D	C	C	C	C	C	C	C	C	C
X				X	Kasouga	B	↔	B	B	B	A	A	C	B	B	B	B	B	B
					Rufane	C	↔	C	C	D	C	B	C	D	C	C	C	C	B
X					Riet	B		B	B	B	B	B	B	B	B	B	B	B	B

IUA_R01

A - A/B	NB Fish Nursery	Mangroves	Eelgrass	Rare species	NAME	PES	Trajectory	REC	TEC	Hydrology	Hydrodynamics	Water Quality: Salinity	Water Quality: General	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
					Old Woman's	B/C		B/C	B/C	C	B	B	B	C	B	C	C	C	C
X					Mpekweni	B		B	B	C	B	B	B	B	B	B	C	B	B
X					Mtati (Mthathi)	B		B	B	C	B	B	B	B	B	B	B	B	B
X					Mgwalana	B		A/B	A/B	C	B	B	B	B	B	B	B	B	B
X					Bira (Bhirha)	B		A/B	A/B	C	B	B	B	B	B	B	B	B	B
X					Gqutywa	B		B	B	B	B	B	B	B	B	B	B	B	B
X					Ngculura (Ngculurha)	B		A/B	A/B	C	B	B	B	B	B	B	B	↑C	B
X					Mtana	B		B	B	B	B	B	B	A	B	A	B	B	B
X					Nqinisa	A/B		A-A/B	A-A/B	A	A	A	B	A	B	B	B	B	B
X					Kiwane (Khiwane)	A/B		A-A/B	A-A/B	A	A	A	B	A	B	B	B	B	B
					Shelberts-stroom	B/C	↓	B/C	B/C	B	B	B	C	D	B	B	B	C	B
X					Lilyvale	B	↓	B	B	B	C	B	C	B	C	B	B	B	B
X					Ross' Creek	B	↓	B	B	A	A	A	C	B	B	B	B	B	B
X					Ncera (Ncerha)	B		B	B	B	B	B	A	B	B	B	B	B	B
					Mlele	B/C	↓	B/C	B/C	B	B	B	C	D	B	B	B	C	B
					Mcantsi	C	↓	B	B	B	C	B	↑F	C	↑D	B	↑C	↑C	B
					Gxulu	B/C	↓	B/C	B/C	B	C	B	C	C	C	C	C	C	B
X					Goda	B	↓	A/B	A/B	B	B	B	↑C	B	B	B	B	B	B
X					Hlozi	B	↓	B	B	B	B	B	C	B	B	B	B	B	B
					Hickman's	C	↓	C	C	C	C	B	↑E	B	D	C	C	C	B

IUA_R02

A - A/B	Fish Nursery	Mangroves	Eelgrass	Rare species	Estuary	PES	Trajectory	REC	TEC	Hydrology	Hydrodynamics	Water Quality: Salinity	Water Quality: General	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
					Blind	D	↔	D	D	D	C	C	↑F	D	D	C	D	D	D
					Hlaze (iHlanze)	D	↓	D	D	E	D	D	↑F	B	E	C	D	D	C
X					Qinira (Quinirha)	B	↓	B	B	A	B	B	↑C	C	B	B	C	D	C
			X		Gqunube	B/C	↓	B	B	B	A	A	↑C	B	↑C	B	↑C	↑D	↑C
X		X	X		Kwelerha (Kwelerha)	B		A/B	A/B	B	A	A	B	B	B	B	↑C	↑C	B
X					Bulura (Bulurha)	B		B	B	A	A	A	A	B	A	B	C	C	B
X					Cunge	A/B		A/B	A/B	A	A	A	B	B	B	B	B	B	B
X					Cintsa	B		B	B	B	B	A	B	C	B	C	B	C	B
X					Cefane	B		B	B	B	A	A	B	B	B	B	B	B	B
X					Kwenxura (Kwenxurha)	A/B		A-A/B	A-A/B	A	A	A	A	B	A	B	B	B	B
X					Nyara (Nyarha)	A/B		A-A/B	A-A/B	A	A	A	B	B	B	A	B	B	B
X					Imtwendwe (Mtwendwe)	A/B		A-A/B	A-A/B	A	A	A	A	B	A	B	B	B	B
X					Haga-haga	B		B	B	A	A	A	B	B	B	B	B	B	B
X					Mtendwe	A/B		A-A/B	A-A/B	A	A	A	B	B	B	B	B	B	B
X					Quko	A/B		A-A/B	A-A/B	A	A	A	B	A	B	A	A	B	B
X					Morgan	B		B	B	A	B	B	B	B	B	B	C	C	B
X					Cwili	B		B	B	A	B	B	A	C	A	B	B	B	B

IUA_T04

A - A/B	NB Fish Nursery	Mangroves	Elgrass	Rare species	Estuary	PES	Trajectory	REC	TEC	Hydrology	Hydrodynamics	Water Quality: Salinity	Water Quality: General	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
X					Gxara (Gxarha)	A/B		A-A/B	A-A/B	A	B	A	B	A	B	A	B	B	B
X					Ngogwane	B		B	B	B	B	A	B	B	B	B	B	B	B
X					Qolora (Qolorha)	B		B	B	A	B	B	A	B	B	B	B	B	B
X					Ncizele	A/B		A-A/B	A-A/B	A	A	A	A	B	A	B	B	B	B
X					Timba	B		B	B	B	B	B	B	B	B	B	B	B	B
X		X	X		Kobonqaba (Khubonqaba)	B		A/B	A/B	A	B	B	B	B	B	↑C	B	B	B
X		X			Nxaxo/Nggqusi	B		A/B	A/B	A	A	A	B	C	B	↑C	↑C	↑C	B
X					Cebe	A/B		A-A/B	A-A/B	A	A	A	B	B	B	A	A	B	B
X					Gqunge	A/B		A-A/B	A-A/B	A	A	A	B	B	B	A	A	B	B
X					Zalu	B		B	B	A	B	A	B	B	B	B	B	B	B
X					Ngqwara (Nggwarha)	A/B		A-A/B	A-A/B	A	A	A	B	B	B	B	B	B	B
X					Sihlontlweni	A/B		A-A/B	A-A/B	B	A	A	B	B	B	A	A	B	B
X					Nebelele	A/B		B	B	B	A	A	B	B	B	A	A	B	B
X		X	X		Qora (Qhorha)	B		A/B	A/B	B	A	A	B	B	B	B	B	↑C	B
X					Jujura (Jujurha)	B		B	B	B	B	B	B	B	B	A	B	B	B
X					Ngadla	A/B		A-A/B	A-A/B	A	A	A	B	B	B	A	A	B	B
X					Shixini	A/B		A-A/B	A-A/B	A	A	A	A	B	A	B	B	B	B
X					Beechamwood	B		B	B	A	A	A	B	C	B	A	A	B	B
X					Kwazelitsha (Kwazwedala)	A/B		A-A/B	A-A/B	A	A	A	B	B	B	A	A	B	B
X					Kwa-Gogo	A/B		A-A/B	A-A/B	B	A	A	B	B	B	A	A	B	B
X					Ku-Nocekedwa	A/B		A-A/B	A-A/B	A	A	A	B	B	B	A	A	B	B
X		X			Nqabara/Nqabar ana	B		A/B	A/B	A	A	A	B	B	B	B	B	B	B
X					Ngomane (East)	B		B	B	A	B	A	B	B	B	C	B	B	B
X					Ngoma/ Kobule	A/B		A-A/B	A-A/B	A	A	A	A	B	A	B	B	B	B
X					Mendu	A/B		A-A/B	A-A/B	A	A	A	B	B	B	A	B	B	B
X					Mendwana	A/B		A-A/B	A-A/B	A	A	A	A	B	A	A	B	B	B
X					Ku-Mpenzu	A/B		A-A/B	A-A/B	A	B	A	B	B	B	A	B	B	B
X					Ku-Bhula (Mbhanyana)	A/B		A-A/B	A-A/B	A	B	A	A	B	A	A	B	C	B
X					Kwa-Suku	A/B		A-A/B	A-A/B	A	A	A	B	A	B	A	B	B	B
X					Ntlonyane	B		A/B	A/B	A	B	B	B	B	B	B	↑C	↑C	B
X					Nkanya	B		A/B	A/B	A	B	A	B	B	B	B	B	B	B
X					Sundwana	A/B		A-A/B	A-A/B	A	A	A	A	B	A	A	B	B	B
X					Bulungula	B		A/B	A/B	A	B	A	B	B	B	B	B	B	B
X					Ku-Amanzimu-zama	A/B		A-A/B	A-A/B	A	A	A	B	A	B	A	A	B	B
X					Nqakanqa	B		B	B	B	B	B	B	C	B	B	B	B	B
X					Mdikana	B		B	B	B	B	B	B	A	B	A	A	B	B
X					Mncwasa	B		B	B	A	B	A	B	B	B	B	B	B	B
X					Mpako	B		B	B	A	A	A	B	B	B	B	B	C	C
					Nenga	C	↓	C	C	A	B	A	B	D	B	D	D	C	D
X					Mapuzi	B		B	B	A	A	A	B	B	B	B	B	C	B
X					Thsani	B		B	B	A	B	A	B	C	C	B	B	C	B
X		X			Mdumbi	B		A/B	A/B	A	A	B	B	B	B	B	B	↑C	B
X					Lwandilana	B		B	B	A	B	B	B	B	B	B	B	B	B
X					Lwandile	A/B		A-A/B	A-A/B	A	B	A	B	A	B	A	B	B	B
X		X	X		Mtakatye	B		A/B	A/B	A	A	A	B	B	B	B	B	↑C	B
X					Hluleka	B		A/B	A/B	A	A	A	B	B	B	B	B	B	B
X					Mnenu	A/B		A/B	A/B	A	B	A	B	A	B	A	B	B	B
					Mtonga	C	↓	A/B	A/B	A	↑E	↑D	↑C	↑D	↑C	B	↑C	↑C	↑C
X					Mpande	A/B		A-A/B	A-A/B	A	B	A	B	B	B	B	A	B	B
X					Sinangwana	B		B	B	A	B	A	B	B	B	B	B	B	B

X				Gxwaleni	A/B		A-A/B	A-A/B	B	B	A	A	A	A	A	A	A	B	B
X				Bulolo	B		B	B	B	B	B	B	C				B	C	C
X				Mtumbane	B		B	B	B	B	B	B	C				C	C	C
X	X			Mzimvubu	B	↓	B	B	A	A	A	C	A				D	D	C
X				Ntlupeni	A/B		A-A/B	A-A/B	A	A	A	B	B				B	B	B
X				Nkodusweni	B		A/B	A/B	A	A	A	B	B				B	B	B
X		X		Mntafufu	B		A/B	A/B	A	A	A	B	B				↑C	B	B
X				Ingo	A/B		A-A/B	A-A/B	B	A	A	B	A				B	B	B
X				Mzimpunzi	B		A/B	A/B	B	B	B	B	B				B	B	B
X				Kwanyam-balala	B		B	B	A	B	B	A	B				C	C	B
X				Mbotyi	B		B	B	B	B	B	A	B				C	C	B
X				Mkozi	A/B		A-A/B	A-A/B	B	B	B	B	B				B	B	B
X				Sikatsha	A/B		A-A/B	A-A/B	B	B	A	A	A				A	B	B
X				Lupatana	A/B		A-A/B	A-A/B	B	B	A	A	B				A	B	B
X				Mkweni	A/B		A-A/B	A-A/B	A	A	A	A	A				A	B	B
X				Msikaba	A/B		A-A/B	A-A/B	B	A	B	A	B				A	C	B
X				Mgwegwe	A		A	A	A	A	A	A	A				A	B	B
X				Mgwetyana	A		A	A	A	A	A	A	A				A	B	B
X				Sikombe	A/B		A-A/B	A-A/B	A	A	A	B	B				B	B	B
X				Kwanyana	A/B		A-A/B	A-A/B	A	A	A	B	B				B	B	B
X				Mtolane	A/B		A-A/B	A-A/B	A	A	A	B	B				A	B	B
X		X	X	Mnyameni	A/B		A-A/B	A-A/B	A	A	B	B	B				B	B	B
X				Mpahlanyana	B		A/B	A/B	B	B	B	B	B				B	B	B
X				Mpahlane	B		A/B	A/B	B	B	B	B	B				B	B	B
X		X		Mzamba	B		A/B	A/B	B	A	B	B	B				B	↑C	B
				Mtentwana	B/C	↓	B	B	B	B	B	↑C	↑C				↑C	↑C	↑C

17. APPENDIX C: ESTUARINE HABITAT BASELINE 2024/25 (HA)

Source: Nelson Mandela University National Botanical Database

#	Estuary	Intertidal salt marsh	Supratidal salt marsh	Submerged macrophytes	Reeds & sedges	Mangroves	Swamp Forest	Rocks	Sand and mudbanks	Open water
1	Lottering	0	0	0	0	0	0	0	0.4	1.7
2	Elandsbos	0	0	0	0	0	0	0	3	2.1
3	Storms	0	0	0	0	0	0	2	0.1	5.4
4	Elands	0	0.3	1.2	0	0	0	4	0	22.4
5	Groot (Oos)	0	0	0	1.5	0	0	0	0.9	8.7
6	Tsitsikamma	0	0.4	0	1.5	0	0	0	0.5	4.5
7	Klipdrif (Oos)	0	0	0	0	0	0	0	0	0.5
8	Slang	0	0	0	0	0	0	0	0	0
9	Kromme	68.1	36.2	41.7	13	0	0	0	89.7	189.3
10	Seekoei	0	8.5	27.1	26.4	0	0	12.6	22.8	77.9
11	Kabeljous	0.2	34.15	0.6	36.9	0	0	0	30.6	42.5
12	Gamtoos	92.9	84.2	4.2	61	0	0	0.2	103.9	547
13	Van Stadens	0	0	0	5.7	0	0	0	1.1	17.4
14	Maitland	0	0	0	4.5	0	0	2.5	0.3	11.4
15	Baakens	0	0	0	0	0	0	0	0	0
16	Papkuils	0	0	0	0	0	0	0	0	0
17	Swartkops	209	338	53.6	11.3	0	0	0	120.9	143
18	Coega (Ngqurha)	1.3	19.6	1.2	4.3	0	0	0	0	2.3
19	Sundays	2.2	19.4	0	31.5	0	0	0	118.4	314
20	Boknes	0	1.5	0.5	6	0	0	0	0.5	6.5
21	Bushmans	118.3	0	15.74	20.9	0	0	0	0	161.9
22	Kariega	36.05	15.07	25.1	0	0	0	4.7	27.7	110.8
23	Grant's	0	0	0	0	0	0	0	0	0
24	Kasouga	0	20.9	0	2.5	0	0	2.3	0.1	27.4
25	Kowie	35.2	26.47	24.35	6.4	0	0	0	29.7	129.5
26	Rufane	0	0	0	0.8	0	0	0	0	0
27	Riet	0	3.9	0	1.2	0	0	0	0.9	3.1
28	West Kleinemonde	35.5	32.1	40.8	4.1	0	0	8.4	0.8	19.2
29	East Kleinemonde	3.4	14	14.5	1	0	0	0.1	11.6	14.5
30	Great Fish	133	65	0	17	0	0	0	3	150
31	Old Woman's	0	0	0	14.2	0	0	0.2	0.1	10.7
32	Mpekweni	0	8.6	2	0	0	0	0.3	3.5	0
33	Mtati (Mthathi)	8.2	10.1	11.6	1.3	0	0	0.5	10.7	0
34	Mgwalana	0	18.5	3	18.7	0	0	0	0	0
35	Bira (Bhirha)	0	7.1	5.3	15.2	0	0	0	18	122.5
36	Gqutywa	0	1.2	5.7	3.8	0	0	1.6	4.5	38.1
37	Ngculura (Ngculurha)	0	0	0	0.7	0	0	0	1.2	0.5
38	Mtana	0	6.3	2.9	1.3	0	0	2.2	0.2	7.1
39	Keiskamma	189.8	205.8	27.7	7.7	0	0	4.5	26.5	135.9
40	Nqinisa	0	0	0	2.3	0	0	1.2	0.1	9.1
41	Kiwane (Khiwane)	0	0	3.6	4.6	0	0	1.6	0.2	9
42	Tyolomnqa	29	13.2	5.4	21.6	0.6	0	1.2	20.6	85.7
43	Shelbertsstroom	0	0	0	0	0	0	0	0	0.5
44	Lilyvale	0	0	0	0.5	0	0	0	0	1.8
45	Ross' Creek	0	0	0	0.1	0	0	0	0	1
46	Ncera (Ncerha)	0	2.9	1.6	0.9	0	0	0	6.7	16.9
47	Mlele	0	0.4	0	0.5	0	0	0	0	2.7
48	Mcantsi	0	0.5	0	4	0	0	0	0.5	4
49	Gxulu	1	11.9	0	0.6	0	0	0	4	31
50	Goda	0	1.9	0	1.1	0	0	0	0.6	13.6
51	Hlozi	0	0	0	0.3	0	0	0	0	0.4
52	Hickman's	0	0.8	0	0.4	0	0	0	0	3.1
53	Buffalo	0	0.1	0	0.2	0	0	0	0	97.7
54	Qora	0	0.1	0	0	0	0	0	0	0.4
55	Hlaze (iHlanze)	0	0.1	0	0.7	0	0	0	0	0.7
56	Nahoon	4.27	0	2.3	0.2	3.7	0	0	10.9	49.6

#	Estuary	Intertidal salt marsh	Supratidal salt marsh	Submerged macrophytes	Reeds & sedges	Mangroves	Swamp Forest	Rocks	Sand and mudbanks	Open water
57	Qinira (Quinirha)	16.8	5.7	0	15.2	0	0	0	0	34.4
58	Gqunube	3.7	2.2	9	0.4	0	0	0.5	6.3	40
59	Kwelerha (Kwelerha)	9.3	7.2	5.55	0.3	0.5	0	0	4.4	26.6
60	Bulura (Bulurha)	2.8	5.6	0.8	2.7	0	0	0	4.6	19.4
61	Cunge	0	0	0	0	0	0	0	0	0.4
62	Cintsa	6.2	2.9	0	1	0	0	0	1.6	12.6
63	Cefane	28	21.4	5.9	1.9	0	0	0	8.8	22.5
64	Kwenxura (Kwenxurha)	0	3.3	0	2.6	0	0	0	5	18.2
65	Nyara (Nyarha)	1.1	6.3	0	0.6	0	0	0	1.7	7.4
66	Imtwendwe (Mtwendwe)	0	0	0	0	0	0	0	0	0.3
67	Haga-haga	0	0.3	0	0.4	0	0	0	1.4	1.3
68	Mtendwe	0	0	0	0	0	0	0	0	0.2
69	Quko	3.9	0	0	1.2	0	0	0	0.1	31
70	Morgan	0	2	0	1	0	0	0	1	20
71	Cwili	0	0	0	0.6	0	0	0	0	0.6
72	Great Kei	5.3	45.6	0	53.5	1.6	0	3.5	42	153.1
73	Gxara (Gxarha)	0	1.9	0	6.3	0	0	0	1.5	14.2
74	Ngogwane	0	0	0	2.4	0	0	0	2.1	4.7
75	Qolora (Qolorha)	0	0	0	8.7	0	0	5.6	1.2	7.4
76	Ncizele	0	0	0	1.2	0	0	0	0	5.4
77	Timba	0	0	0	0	0	0	0	0	0
78	Kobongaba (Khobongaba)	2.3	4.5	2.59	2.4	0.1	0	0	4.6	11.1
79	Nxaxo/Nggusi	4.3	3.3	0.59	4.7	16.4	0	0	6.6	124.3
80	Cebe	0	0	0	7.6	0	0	0	1.4	7.5
81	Gqunqe	0	0	6.6	9.2	0	0	0	0.9	7.9
82	Zalu	0	0		5.2	0	0	0	0	7.1
83	Ngqwara (Ngqwarha)	0	2.3	0	4.7	0	0	0	2.1	10.2
84	Sihlontlweni	0	0	0	2.6	0	0	0	0.1	8.4
85	Nebelele	0	0	0	0	0	0	0	0	0
86	Qora (Qhorha)	0	1	2.37	5.7	1.1	0	0	10.2	65.2
87	Jujura (Jujurha)	0	0	0	1.2	0	0	0	0.1	3.5
88	Ngadla	0	0	0	5.2	0	0	0	0	8.7
89	Shixini	0	0	0	5.6	0	0	0	5.2	11.2
90	Beechamwood	0	0	0	0	0	0	0	0	0
91	Kwazilelitsha (Kwazwedala)	0	0	0	0	0	0	0	0	0
92	Kwa-Gogo	0	0	0	0	0	0	0	0	0
93	Ku-Nocekedwa	0	0	0	0	0	0	0	0	0
94	Nqabara/Nqabarana	0.1	0	1.4	4.6	11.8	1.2	0	4.6	89.5
95	Ngomane (East)	0	0	0	0	0	0	0	0	0
96	Ngoma/Kobule	0	0	0	0	0	0	0	0	0
97	Mendu	0	0	0	9.5	0	0	0	0	14.3
98	Mendwana	0	0	0	0	0	0	0	0	0
99	Mbashe	8.3	16.9	1.5	5.7	7.6	0	0.1	71.8	136.1
100	Ku-Mpenzu	0	0	0	4.3	0	0	1.3	1.2	6.5
101	Ku-Bhula (Mbanyana)	0	0	0	2.7	0	0	2.3	0	2.6
102	Kwa-Suku	0	0	0	7.6	0	0	0	0	8.2
103	Ntlongwane	0	0	0	8	0	0	0	3.9	29.5
104	Nkanya	0	0	0	7.4	0	0	0.5	0.1	7.5
105	Sundwana	0	0	0	2.3	0	0	0	0	4.3
106	Xora	13.6	0	0.1	9	22.5	0	0	13.5	122.8
107	Bulungula	0.1	2.3	2.8	4.7	0	0	0	2.5	8.9
108	Ku-Amanzimuzama	0	0	0	1.2	0	0	0	1.1	1.4
109	Nqakanqa	0	0	0	0	0	0	0	0	0
110	Mdikana	0	0	0	0	0	0	0	0	0
111	Mncwasa	0	0	0	3.7	0	0	0	0.2	15.4
112	Mpako	0	0	0	5.1	0	0	0	1	7.4
113	Nenga	0	0	0	2.1	0	0	0	2.2	5.7
114	Mapuzi	0	0	0	7.5	0	0	0	0	8.5
115	Mtata	0	24.3	0	6.2	29.3	0	0	5.6	102.4
116	Thsani	0	0	0	1.2	0	0	0	0	2.8
117	Mdumbi	4	8.2	0	7.9	4.7	0	0	13.9	45.6
118	Lwandilana	0	0	0	2.4	0	0	0	0.1	7.2
119	Lwandile	0	0	0	7.4	0	0	0	2.4	12.4

#	Estuary	Intertidal salt marsh	Supratidal salt marsh	Submerged macrophyte s	Reeds & sedges	Mangroves	Swamp Forest	Rocks	Sand and mudbanks	Open water
120	Mtakatye	2.7	0	3.2	0	10.9	0	0	0	0
121	Hluleka	0	0	0	2.4	0	0	0	4.1	8.5
122	Mnenu	0	0	0	44	0	0	0	0.1	46.4
123	Mtonga	0	0	0	15.6	0	0	0	1.2	15.4
124	Mpande	0	0	0	6.7	0	0	0	0.5	7.8
125	Sinangwana	0	0	0	7.4	0	0	0	0	5.8
126	Mngazana	5.9	20.7	10.5	11.4	147	7.8	0	87.9	76.4
127	Mngazi	2.3	13.9	4	4.5	0	0	0.7	36.5	71.4
128	Gxwaleni	0	0	0	5.6	0	0	0	0	4.5
129	Bulolo	0	0	0	6.3	0	0	0	0	6.3
130	Mtumbane	0	0	0	5.4	0	0	0	0.1	5.4
131	Mzimvubu	0.1	0	0	16	0	5	0	26	345
132	Ntlupeni	0	0	0	0	0	0	0	0	0
133	Nkodusweni	0	0	0	4.7	0	0	0	5.5	22.4
134	Mntafufu	14	0	0	1.5	12	0.5	0	0.8	7.7
135	Ingo	0	0	0	0	0	0	0	0	0
136	Mzintlava	0.1	0	0	3.1	3	0.4	0	2.9	14.4
137	Mzimpunzi	0	0	0	1.4	0	0	0	0.6	3.1
138	Kwanyambalala	0	0	0	0	0	0	0	0	0
139	Mbotyi	0	0	0	0	0	0	0	0	0.6
140	Mkozi	0	0	0	0.5	0	0	0	0.1	2.1
141	Sikatsha	0	0	0	0	0	0	0	0	0
142	Lupatana	0	0	0	0.2	0	0.5	0	0.2	2.7
143	Mkweni	0	0	0	0.34	0	1.32	0	0.15	5.19
144	Msikaba	0	0	0	0	0	0	0	0	0
145	Mgwegwe	0	0	0	0.15	0	4.45	0	0.8	3.39
146	Mgwetyana	0	0	0	0.27	0	0	0	0.56	2.45
147	Mtentu	0.1	0	0	4.76	0.5	3.67	0	8.08	34.95
148	Sikombe	0	0	0	0.3	0	1.18	0	0.79	9.21
149	Kwanyana	0	0	0	0.71	0	0	0	0.1	6.32
150	Mtolane	0	0	0	0	0	0	0	0.14	1.15
151	Mnyameni	7.4	0	2.62	8.46	3.5	0.01	0	2.34	17.11
152	Mpahlanyana	0	0	0	0.74	0	0	0	0.1	3.01
153	Mpahlane	0	0	0	0.66	0	0	0	0.29	2.97
154	Mzamba	1.81	0	0	24.11	0.4	4.74	0	3.97	37.87
155	Mtentwana	0	0	0	0	0	0	0	1.22	10.21
156	uMthavuna	0	0	0	7.1	0.2	0.1	0	11.6	76.9

18. APPENDIX D: SUMMARY OF ESTUARINE RQOS FOR ABIOTIC AND BIOTIC COMPONENTS IN SUPPORT OF BROAD RQOS

18.1 Estuarine – Abiotic Components RQOs

Name	PES	Trajectory	REC	TEC	Hydrology	nMAR	% nMAR	Hydrodynamics	Maintain hydrodynamics for dependent biotic components of TEC category:	Mouth open %	Water Quality: Salinity	Maintain salinity regime appropriate for dependent biotic components of TEC category:	Salinity	Water Quality: General	Maintain Water quality appropriate for dependent biotic components of TEC category:	Estuary: Average Dissolved Oxygen (mg/l)	Estuary: pH between 7.5<8.5	Estuary: low flow turbidity (NTU) (should decrease with increasing salinity)	River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	Estuary: Metal & agrochemical concentrations not exceed values per SA WQ Guidelines for coastal waters (DWAF 1995 or updates) or Quality Guidelines for Western Indian Ocean / IINEP et al 2022)	Estuary: Pesticides/herbicides (Marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR: 2009 or official future updates thereof)	Estuary: Recreational use areas (DEA, 2012): Enterococci < 185 counts per 100 ml (90 percentile) & E. coli < 500 counts per 100 ml (90 percentile).	Physical habitat	Maintain Physical habitat for dependent biotic components of TEC category:	River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)	Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)	Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).	
IUA K01																													
Lottering	A/B		A-A/B	A-A/B	B	19	91	A	≥93	100	A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	A	≥93	●	●	●	
Elandsbos	A/B		A-A/B	A-A/B	B	27	91	A	≥93	100	A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	A	≥93	●	●	●	
Storms	A/B		A-A/B	A-A/B	B	54	89	A	≥93	100	A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	A	≥93	●	●	●	
Elands	A/B		A-A/B	A-A/B	B	52	90	A	≥93	100	A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●	
Groot (Oos)	A/B		A-A/B	A-A/B	A	47	94	A	≥93	100	A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●	
IUA M01																													
Van Stadens	B	↓	A/B	A/B	C	17	91	B	≥88		B	≥88	0-35	↑C	≥63	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Maitland	B/C	↓	B	B	C	13	91	B	≥88		B	≥88	0-35	↑C	≥63	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Baakens	E/F	↓	E	E	D	4	88	E	≥23		E	≥23	0-35	↑F	≥18	>4*	●	<15	≤0.35	≤0.03	●	●	●	F	≥13	●	●	●	
Papkuils	F	↓	E/F	E/F	D	3	99	F	≥13		F	≥13	0-35	↑F	≥18	>4*	●	<15	≤0.35	≤0.03	●	●	●	F	≥13	●	●	●	

Name	PES	Trajectory	REC	TEC	Hydrology	nMAR	% nMAR	Hydrodynamics	Maintain hydrodynamics for dependent biotic components of TEC category:	Mouth open %	Water Quality: Salinity	Maintain salinity regime appropriate for dependent biotic components of TEC category:	Salinity	Water Quality: General	Maintain Water quality appropriate for dependent biotic components of TEC category:	Estuary: Average Dissolved Oxygen (mg/l)	Estuary: pH between 7.5<8.5	Estuary: low flow turbidity (NTU) (should decrease with increasing salinity)	River: Median Dissolved Inorganic Nitrogen (DIN) (mg/l)	River: Median Dissolved Inorganic Phosphate (DIP) (mg/l)	Estuary: Metal & agrochemical concentrations not exceed values per SA WQ Guidelines for coastal waters (DWAF 1995 or updates) or Quality Guidelines for Western Indian Ocean (IINEP et al 2022)	Estuary: Pesticides/herbicides (Marine water quality guidelines, e.g. Nairobi Convention Secretariat and CSIR: 2009 or official future updates thereof)	Estuary: Recreational use areas (DEA, 2012): Enterococci < 185 counts per 100 ml (90 percentile) & E. coli < 500 counts per 100 ml (90 percentile).	Physical habitat	Maintain Physical habitat for dependent biotic components of TEC category:	River: Suspended sediment concentration deviates by <20 % (sediment load-discharge relationship to be determined as part of baseline studies)	Estuary: Changes in sediment deposition and erosion patterns in the estuary <0.25 m (bathymetric & topographic surveys)	Estuary: Sand/mud distribution change by < 20% from present (baseline - 2024).	
Coega (Ngqurha)	E/F	↓	D	D	D	10	85	F	≥13		F	≥13		↑C	≥63	>6	●	<10	≤0.125	≤0.015	●	●	●	F	≥13	●	●	●	
IUA P01																													
Boknes	C	↓	C	C	E	14	100	C	≥73		B	≥88	0-35	D	≥43	>4*	●	<15	≤0.35	≤0.03	●	●	●	B	≥88	●	●	●	
Grant's	C	↓	C	C	D	2	93	C	≥73		C	≥73	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	C	≥73	●	●	●	
Kasouga	B	↓	B	B	B	4	99	A	≥93		A	≥93	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	B	≥88	●	●	●	
Rufane	C	↓	C	C	D	1	94	C	≥73		B	≥88	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	D	≥43	●	●	●	
Riet	B		B	B	B	2	0	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●	
IUA R01																													
Old Woman's	B/C		B/C	B/C	C	1	85	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	C	≥73	●	●	●	
Mpekweni	B		B	B	C	2	85	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●	
Mtati (Mthathi)	B		B	B	C	6	85	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●	
Mgwalana	B		A/B	A/B	C	10	85	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●	
Bira (Bhirha)	B		A/B	A/B	C	12	83	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●	
Gqutywa	B		B	B	B	4	84	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●	
Ngculura (Ngculurha)	B		A/B	A/B	C	1	86	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●	
Mtana	B		B	B	B	1	84	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	A	≥93	●	●	●	
Nqinisa	A/B		A-A/B	A-A/B	A	1	99	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	A	≥93	●	●	●	

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Kiwane (Khiwane)	A/B		A-A/B	A-A/B	A	5	100	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●	
Shelbertsstroom	B/C	↓	B/C	B/C	B	1	99	B	≥88		B	≥88	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	D	≥43	●	●	●	
Lilyvale	B	↓	B	B	B	1	91	C	≥73		B	≥88	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	B	≥88	●	●	●	
Ross' Creek	B	↓	B	B	A	1	99	A	≥93		A	≥93	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	B	≥88	●	●	●	
Ncera (Ncerha)	B		B	B	B	11	93	B	≥88		B	≥88	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●	
Mlele	B/C	↓	B/C	B/C	B	2	93	B	≥88		B	≥88	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	D	≥43	●	●	●	
Mcantsi	C	↓	B	B	B	3	93	C	≥73		B	≥88	0-35	↑F	≥18	>4*	●	<15	≤0.35	≤0.03	●	●	●	C	≥73	●	●	●	
Gxulu	B/C	↓	B/C	B/C	B	16	93	C	≥73		B	≥88	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	C	≥73	●	●	●	
Goda	B	↓	A/B	A/B	B	6	93	B	≥88		B	≥88	0-35	↑C	≥63	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Hlozi	B	↓	B	B	B	2	93	B	≥88		B	≥88	0-35	C	≥73	>5	●	<10	≤0.2	≤0.02	●	●	●	B	≥88	●	●	●	
Hickman's	C	↓	C	C	C	1	93	C	≥73		B	≥88	0-35	↑E	≥38	>4*	●	<15	≤0.35	≤0.03	●	●	●	B	≥88	●	●	●	
IUA R02																													
Blind	D	↓	D	D	D	1	58	C	≥73		C	≥73	0-35	↑F	≥18	>4*	●	<15	≤0.35	≤0.03	●	●	●	D	≥43	●	●	●	
Hlaze (iHlanze)	D	↓	D	D	E	0	40	D	≥43		D	≥43	0-35	↑F	≥18	>4*	●	<15	≤0.35	≤0.03	●	●	●	B	≥88	●	●	●	
Qinira (Quinirha)	B	↓	B	B	A	8	98	B	≥88		B	≥88	0-35	↑C	≥63	>4	●	<10	≤0.12 5	≤0.015	●	●	●	C	≥73	●	●	●	
Gqunube	B/C	↓	B	B	B	34	94	A	≥93	100	A	≥93	0-35	↑C	≥63	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Kwelera (Kwelerha)	B		A/B	A/B	B	35	94	A	≥93	100	A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Bulura (Bulurha)	B		B	B	A	4	94	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●	
Cunge	A/B		A/B	A/B	A	0	97	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Cintsa	B		B	B	B	4	94	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	C	≥73	●	●	●	

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Cefane	B		B	B	B	4	81	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Kwenxura (Kwenxurha)	A/B		A-A/B	A-A/B	A	17	98	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●	
Nyara (Nyarha)	A/B		A-A/B	A-A/B	A	4	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Imtwendwe (Mtwendwe)	A/B		A-A/B	A-A/B	A	1	98	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●	
Haga-haga	B		B	B	A	2	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Mtendwe	A/B		A-A/B	A-A/B	A	1	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Quko	A/B		A-A/B	A-A/B	A	17	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●	
Morgan	B		B	B	A	3	98	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Cwili	B		B	B	A	1	98	B	≥88		B	≥88	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01		●	●	C	≥73	●	●	●	
IUA T04																													
Gxara (Gxarha)	A/B		A-A/B	A-A/B	A	3	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●	
Ngogwane	B		B	B	B	1	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Qolora (Qolorha)	B		B	B	A	9	98	B	≥88		B	≥88	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●	
Ncizele	A/B		A-A/B	A-A/B	A	1	98	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●	
Timba	B		B	B	B	0	98	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	
Kobonqaba (Khobonqaba)	B		A/B	A/B	A	36	98	B	≥88	100	B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●	

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Nxaxo/Ngqusi	B		A/B	A/B	A	23	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	C	≥73	●	●	●
Cebe	A/B		A-A/B	A-A/B	A	6	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Gqunqe	A/B		A-A/B	A-A/B	A	7	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Zalu	B		B	B	A	2	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Ngqwara (Ngqwarha)	A/B		A-A/B	A-A/B	A	5	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Sihlontlweni	A/B		A-A/B	A-A/B	B	2	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Nebelele	A/B		B	B	B	1	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Qora (Qhorha)	B		A/B	A/B	B	79	92	A	≥93	100	A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Jujura (Jujurha)	B		B	B	B	11	91	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Ngadla	A/B		A-A/B	A-A/B	A	2	97	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Shixini	A/B		A-A/B	A-A/B	A	42	97	A	≥93	100	A	≥93	0-35	A	≥93	>6	●	<10	≤0.1 5	≤0.01	●	●	●	B	≥88	●	●	●
Beechamwood	B		B	B	A	1	97	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	C	≥73	●	●	●
Kwazilelitsha (Kwazwedala)	A/B		A-A/B	A-A/B	A	1	97	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Kwa-Goqo	A/B		A-A/B	A-A/B	B	1	97	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Ku-Nocekedwa	A/B		A-A/B	A-A/B	A	1	97	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●

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Nqabara/Nqabarana	B		A/B	A/B	A	76	99	A	≥93	100	A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Ngomane (East)	B		B	B	A	1	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Ngoma/Kobule	A/B		A-A/B	A-A/B	A	6	98	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1 5	≤0.01	●	●	●	B	≥88	●	●	●
Mendu	A/B		A-A/B	A-A/B	A	5	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Mendwana	A/B		A-A/B	A-A/B	A	1	98	A	≥93	100	A	≥93	0-35	A	≥93	>6	●	<10	≤0.1 5	≤0.01	●	●	●	B	≥88	●	●	●
Ku-Mpenzu	A/B		A-A/B	A-A/B	A	1	97	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Ku-Bhula (Mbhanyana)	A/B		A-A/B	A-A/B	A	9	97	B	≥88		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1 5	≤0.01	●	●	●	B	≥88	●	●	●
Kwa-Suku	A/B		A-A/B	A-A/B	A	1	97	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●
Ntlonyane	B		A/B	A/B	A	14	97	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Nkanya	B		A/B	A/B	A	3	97	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Sundwana	A/B		A-A/B	A-A/B	A	1	97	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1 5	≤0.01	●	●	●	B	≥88	●	●	●
Bulungula	B		A/B	A/B	A	8	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Ku-Amanzimuzama	A/B		A-A/B	A-A/B	A	2	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●
Nqakanqa	B		B	B	B	1	98	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	C	≥73	●	●	●
Mdikana	B		B	B	B	0	100	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●
Mncwasa	B		B	B	A	27	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●

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Mpako	B		B	B	A	22	99	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Nenga	C	↓	C	C	A	9	99	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	D	≥43	●	●	●
Mapuzi	B		B	B	A	6	99	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Thsani	B		B	B	A	1	97	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	C	≥73	●	●	●
Mdumbi	B		A/B	A/B	A	37	97	A	≥93	100	B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Lwandilana	B		B	B	A	1	98	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Lwandile	A/B		A-A/B	A-A/B	A	3	97	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●
Mtakatye	B		A/B	A/B	A	63	97	A	≥93	100	A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Hluleka	B		A/B	A/B	A	4	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Mnenu	A/B		A/B	A/B	A	20	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●
Mtonga	C	↓	A/B	A/B	A	4	98	↑E	≥38		↑D	≥58	0-35	↑C	≥63	>6	●	<10	≤0.12 5	≤0.015	●	●	●	↓D	≥58	●	●	●
Mpande	A/B		A-A/B	A-A/B	A	5	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Sinangwana	B		B	B	A	12	98	B	≥88		A	≥93	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	B	≥88	●	●	●
Gxwaleni	A/B		A-A/B	A-A/B	B	2	97	B	≥88		A	≥93	0-35	A	≥93	>6	●	<10	≤0.12 5	≤0.015	●	●	●	A	≥93	●	●	●
Bulolo	B		B	B	B	2	97	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.12 5	≤0.015	●	●	●	C	≥73	●	●	●

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Mtumbane	B		B	B	B	1	98	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	C	≥73	●	●	●
Ntlupeni	A/B		A-A/B	A-A/B	A	4	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Nkodusweni	B		A/B	A/B	A	8	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Mntafufu	B		A/B	A/B	A	45	98	A	≥93	100	A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Ingo	A/B		A-A/B	A-A/B	B	5	96	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	A	≥93	●	●	●
Mzimpunzi	B		A/B	A/B	B	9	93	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Kwanyam-balala	B		B	B	A	4	93	B	≥88		B	≥88	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●
Mbotyi	B		B	B	B	11	93	B	≥88		B	≥88	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●
Mkozi	A/B		A-A/B	A-A/B	B	16	93	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Sikatsha	A/B		A-A/B	A-A/B	B	2	93	B	≥88		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	A	≥93	●	●	●
Lupatana	A/B		A-A/B	A-A/B	B	7	93	B	≥88		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●
Mkwani	A/B		A-A/B	A-A/B	A	18	93	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	A	≥93	●	●	●
Msikaba	A/B		A-A/B	A-A/B	B	212	94	A	≥93	100	B	≥88	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	B	≥88	●	●	●
Mgwegwe	A		A	A	A	1	98	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	A	≥93	●	●	●
Mgwetyana	A		A	A	A	2	98	A	≥93		A	≥93	0-35	A	≥93	>6	●	<10	≤0.1	≤0.01	●	●	●	A	≥93	●	●	●
Sikombe	A/B		A-A/B	A-A/B	A	7	100	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Kwanyana	A/B		A-A/B	A-A/B	A	4	98	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Mtolane	A/B		A-A/B	A-A/B	A	2	100	A	≥93		A	≥93	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●

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Mnyameni	A/B		A-A/B	A-A/B	A	46	98	A	≥93		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Mpahlanyana	B		A/B	A/B	B	1	94	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Mpahlane	B		A/B	A/B	B	3	93	B	≥88		B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Mzamba	B		A/B	A/B	B	67	93	A	≥93	100	B	≥88	0-35	B	≥88	>6	●	<10	≤0.125	≤0.015	●	●	●	B	≥88	●	●	●
Mtentwana	B/C	↓	B	B	B	1	94	B	≥88		B	≥88	0-35	↑C	≥63	>6	●	<10	≤0.125	≤0.015	●	●	●	↑C	≥63	●	●	●

18.2 Estuarine primary producers (microalgae and macrophytes) RQOs

NAME	PES	Trajectory	REC	TEC
IUA K01				
Lottering	A/B		A-A/B	A-A/B
Elandsbos	A/B		A-A/B	A-A/B
Storms	A/B		A-A/B	A-A/B
Elands	A/B		A-A/B	A-A/B
Groot (Oos)	A/B		A-A/B	A-A/B
IUA M01				
Van Stadens	B	↓	A/B	A/B
Maitland	B/C	↓	B	B
Baakens	E/F	↓	E	E
Papkuils	F	↓	E/F	E/F
Coega (Ngqurha)	E/F	↓	D	D
IUA P01				
Boknes	C	↓	C	C
Grant's	C	↓	C	C
Kasouga	B	↓	B	B
Rufane	C	↓	C	C
Riet	B		B	B
IUA R01				
Old Woman's	B/C		B/C	B/C
Mpekweni	B		B	B
Mtati (Mthathi)	B		B	B
Mgwalana	B		A/B	A/B
Bira (Bhirha)	B		A/B	A/B
Gqutywa	B		B	B
Ngculura (Ngculurha)	B		A/B	A/B
Mtana	B		B	B
Nqinisa	A/B		A-A/B	A-A/B
Kiwane (Khiwane)	A/B		A-A/B	A-A/B
Shelbertsstroom	B/C	↓	B/C	B/C
Lilyvale	B	↓	B	B

Microalgae	Maintain phytoplankton and benthic microalgal assemblages of the TEC	Phytoplankton biomass (µg/l) for 90th %ile (entire estuary)	Average benthic microalgae biomass (mg/m2) (entire estuary)	Average benthic diatom diversity (H') (entire estuary)	Presence of bloom conditions	Presence of potentially HAB-forming taxa	Macrophytes	Maintain macrophyte composition representatives of a Target EC:	< % change in composition, distribution & abundance of macrophyte habitats	Mangrove extent (ha) maintained = canopy intact, no stumps & seedlings present	Sediment pH maintained at 7 in mangrove areas	Healthy <i>Zostera capensis</i> beds	Maintain saltmarsh integrity (no/limited evidence of trampling and overgrazing)	No invasive alien vegetation in EFZ	Protect/maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.	No land conversion on the floodplain from present (baseline - 2024)	Restored saltmarsh area (ha)
A	≥93	<5	<50	>3	0	0	A	≥93	20					•	•	•	
A	≥93	<5	<50	>3	0	0	A	≥93	20					•	•	•	
A	≥93	<5	<50	>3	0	0	A	≥93	20					•	•	•	
B	≥88	<5	<50	>3	0	0	A	≥93	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	20					•	•	•	
↑C	≥63	<10	<75	>2.5	0	0	B	≥88	20					•	•	•	
↑C	≥63	<10	<75	>2.5	0	0	B	≥88	20					•	•	•	
↑E	≥38	<60	<150	1-2	0	0	F	≥13	20					•	•	•	
↑E	≥38	<60	<150	1-2	0	0	F	≥13	20					•	•	•	
D	≥43	<60	<150	1-2	0	0	↑F	≥18	20				•	•	•	•	
D	≥43	<20	<100	2-3	0	0	B	≥88	20					•	•	•	
C	≥73	<20	<100	2-3	0	0	C	≥73	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	10				•	•	•	•	
C	≥73	<20	<100	2-3	0	0	C	≥73	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	20					•	•	•	
B	≥88	<5	<50	>3	0	0	C	≥73	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	10					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	10				•	•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	20					•	•	•	
B	≥88	<5	<50	>3	0	0	A	≥93	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	20					•	•	•	
B	≥88	<5	<50	>3	0	0	B	≥88	20					•	•	•	
C	≥73	<20	<100	2-3	0	0	B	≥88	20					•	•	•	

NAME	PES	Trajectory	REC	TEC
Ross' Creek	B	↘	B	B
Ncera (Ncerha)	B	↘	B	B
Mlele	B/C	↘	B/C	B/C
Mcantsi	C	↘	B	B
Gxulu	B/C	↘	B/C	B/C
Goda	B	↘	A/B	A/B
Hlozi	B	↘	B	B
Hickman's	C	↘	C	C
IUA R02				
Blind	D	↘	D	D
Hlaze (iHlanze)	D	↘	D	D
Qinira (Quinirha)	B	↘	B	B
Gqunube	B/C	↘	B	B
Kweler (Kwelerha)	B		A/B	A/B
Bulura (Bulurha)	B		B	B
Cunge	A/B		A/B	A/B
Cintsa	B		B	B
Cefane	B		B	B
Kwenxura (Kwenxurha)	A/B		A-A/B	A-A/B
Nyara (Nyarha)	A/B		A-A/B	A-A/B
Imtwendwe (Mtwendwe)	A/B		A-A/B	A-A/B
Haga-haga	B		B	B
Mtendwe	A/B		A-A/B	A-A/B
Quko	A/B		A-A/B	A-A/B
Morgan	B		B	B
Cwili	B		B	B
IUA T04				
Gxara (Gxarha)	A/B		A-A/B	A-A/B
Ngogwane	B		B	B
Qolora (Qolorha)	B		B	B
Ncizele	A/B		A-A/B	A-A/B
Timba	B		B	B
Kobongaba (Khobongqaba)	B		A/B	A/B
Nxaxo/Ngqusi	B		A/B	A/B

Microalgae	Maintain phytoplankton and benthic microalgal assemblages of the TEC	Phytoplankton biomass (µg/ℓ) for 90th %ile (entire estuary)	Average benthic microalgae biomass (mg/m2) (entire estuary)	Average benthic diatom diversity (H') (entire estuary)	Presence of bloom conditions	Presence of potentially HAB-forming taxa	Macrophytes	Maintain macrophyte composition representatives of a Target EC:	< % change in composition, distribution & abundance of macrophyte habitats	Mangrove extent (ha) maintained = canopy intact, no stumps & seedlings present	Sediment pH maintained at 7 in mangrove areas	Healthy <i>Zostera capensis</i> beds	Maintain saltmarsh integrity (no/limited evidence of trampling and overgrazing)	No invasive alien vegetation in EFZ	Protect/maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.	No land conversion on the floodplain from present (baseline - 2024)	Restored saltmarsh area (ha)
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
↑D	≥58	<20	<100	2-3	0	0	B	≥88	20					●	●	●	
C	≥73	<20	<100	2-3	0	0	C	≥73	20				●	●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
D	≥43	<60	100-150	1-2	0	0	C	≥73	20					●	●	●	
D	≥43	<60	100-150	1-2	0	0	C	≥73	20					●	●	●	
E	≥23	≥60	≥150	<1	0	0	C	≥73	20					●	●	●	
B	≥88	<10	<75	>2.5	0	0	B	≥88	20		●			●	●	●	
↑C	≥63	<10	<75	>2.5	0	0	B	≥88	10			●		●	●	●	1.5
B	≥88	<5	<50	>3	0	0	B	≥88	10	0.5		●	●	●	●	●	
A	≥93	<5	<50	>3	0	0	B	≥88	20			●		●	●	●	8
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	C	≥73	20					●	●	●	5
B	≥88	<5	<50	>3	0	0	B	≥88	10				●	●	●	●	50
A	≥93	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
A	≥93	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
A	≥93	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
B	≥88	<5	<50	>3	0	0	↑C	≥63	10	0.1		●		●	●	●	
B	≥88	<5	<50	>3	0	0	↑C	≥63	20	16.4		●		●	●	●	

NAME	PES	Trajectory	REC	TEC	Microalgae	Maintain phytoplankton and benthic microalgal assemblages of the TEC	Phytoplankton biomass (µg/ℓ) for 90th %ile (entire estuary)	Average benthic microalgae biomass (mg/m2) (entire estuary)	Average benthic diatom diversity (H') (entire estuary)	Presence of bloom conditions	Presence of potentially HAB-forming taxa	Macrophytes	Maintain macrophyte composition representatives of a Target EC:	< % change in composition, distribution & abundance of macrophyte habitats	Mangrove extent (ha) maintained = canopy intact, no stumps & seedlings present	Sediment pH maintained at 7 in mangrove areas	Healthy <i>Zostera capensis</i> beds	Maintain saltmarsh integrity (no/limited evidence of trampling and overgrazing)	No invasive alien vegetation in EFZ	Protect/maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.	No land conversion on the floodplain from present (baseline - 2024)	Restored saltmarsh area (ha)
Cebe	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Gqunqe	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Zalu	B		B	B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Ngqwara (Ngqwarha)	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Sihlontlweni	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Nebelele	A/B		B	B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Qora (Qhorha)	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	10	1.1		●		●	●	●	
Jujura (Jujurha)	B		B	B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Ngadla	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Shixini	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	B	≥88	10					●	●	●	
Beechamwood	B		B	B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Kwazilelitsha (Kwazwedala)	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Kwa-Gogo	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Ku-Nocekedwa	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Nqabara/Nqabarana	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	10	11.8		●		●	●	●	
Ngomane (East)	B		B	B	B	≥88	<5	<50	>3	0	0	C	≥73	20					●	●	●	
Ngoma/Kobule	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Mendu	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mendwana	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	10					●	●	●	
Ku-Mpenzu	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Ku-Bhula (Mbanyana)	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Kwa-Suku	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Ntlonyane	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Nkanya	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Sundwana	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Bulungula	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Ku-Amanzimuzama	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Nqakanqa	B		B	B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Mdikana	B		B	B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mncwasa	B		B	B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Mpako	B		B	B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Nenga	C	↓	C	C	B	≥88	<5	<50	>3	0	0	D	≥43	20					●	●	●	
Mapuzi	B		B	B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Thsani	B		B	B	C	≥73	<20	<100	2-3	0	0	B	≥88	20					●	●	●	

NAME	PES	Trajectory	REC	TEC	Microalgae	Maintain phytoplankton and benthic microalgal assemblages of the TEC category	Phytoplankton biomass (µg/ℓ) for 90th %ile (entire estuary)	Average benthic microalgae biomass (mg/m2) (entire estuary)	Average benthic diatom diversity (H') (entire estuary)	Presence of bloom conditions	Presence of potentially HAB-forming taxa	Macrophytes	Maintain macrophyte composition representatives of a Target EC:	< % change in composition, distribution & abundance of macrophyte habitats	Mangrove extent (ha) maintained = canopy intact, no stumps & seedlings present	Sediment pH maintained at 7 in mangrove areas	Healthy <i>Zostera capensis</i> beds	Maintain saltmarsh integrity (no/limited evidence of trampling and overgrazing)	No invasive alien vegetation in EFZ	Protect/maintain riparian zone integrity - buffer sediment & nutrient input from adjacent land-based activities.	No land conversion on the floodplain from present (baseline - 2024)	Restored saltmarsh area (ha)
Mdumbi	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	10	4.7		●	●	●	●	●	
Lwandilana	B		B	B	B	≥88	<5	<50	>3	0	0	B	≥88	20				●	●	●	●	
Lwandile	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20				●	●	●	●	
Mtakatye	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	10	10.9		●		●	●	●	
Hluleka	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20				●	●	●	●	
Mnenu	A/B		A/B	A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mtonga	C	↓	A/B	A/B	↑C	≥63	<10	<75	>2.5	0	0	B	≥88	20					●	●	●	
Mpande	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Sinangwana	B		B	B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Gxwaleni	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Bulolo	B		B	B	B	≥88	<5	<50	>3	0	0	C	≥73	20					●	●	●	
Mtumbane	B		B	B	B	≥88	<5	<50	>3	0	0	C	≥73	20					●	●	●	
Ntlupeni	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Nkodusweni	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Mntafufu	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	10	12.0			●		●	●	
Ingo	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mzimpunzi	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Kwanyambalala	B		B	B	A	≥93	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Mbotyi	B		B	B	A	≥93	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Mkozi	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Sikatsha	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Lupatana	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mkweni	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Msikaba	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	10					●	●	●	
Mgwegwe	A		A	A	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mgwetyana	A		A	A	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Sikombe	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20					●	●	●	
Kwanyana	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mtolane	A/B		A-A/B	A-A/B	A	≥93	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mnyameni	A/B		A-A/B	A-A/B	B	≥88	<5	<50	>3	0	0	B	≥88	20	3.5		●		●	●	●	
Mpahlanyana	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mpahlane	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	A	≥93	20					●	●	●	
Mzamba	B		A/B	A/B	B	≥88	<5	<50	>3	0	0	B	≥88	10	0.4				●	●	●	
Mtentwana	B/C	↓	B	B	↑C	≥63	<10	<75	>2.5	0	0	↑C	≥63	20					●	●	●	

18.3 Estuarine invertebrate, fish and bird RQOs

NAME	PES	Trajectory	REC	TEC	Invertebrates	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	No significant reduction in zooplankton species richness and biomass annually	No significant reduction in zoobenthos species richness and biomass annually	No significant reduction in mud and/or sand prawn biomass (3yr period)	Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness)	Presence & evidence of recruitment of mud crabs and mud prawns	Fish	Maintain fish composition, richness, and abundance representatives of a Target EC:	Number of fish species	Number of species making up 90% of abundance	Estuarine-associated marine composition	Juvenile predatory fish present (kob, grunter, estuarine bream)	Juvenile eelgrass-associated species (blacktail, strepie, etc.)	Soles and gobies throughout estuary	No fish kills due to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)	Eels present in estuary OR catchment in 2 or more consecutive summers	Birds	Maintain avifaunal community representatives of a Target EC:	No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <=	No significant reduction in Wader species (3 yr period), with change <=	Waterfowl (ducks and geese) numbers stable (3 yr period), with change <=	Tern and gull (roost at mouth) numbers stable (3 yr period), with change <=	Palaeartic migrants present in summer (stable over 3 yr period), with change <=	Resident Fish Eagle breeding pair	
IUA K01					A	≥93	<10%	<10%	<10%	●	●	B	≥88	>=2	~2	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	
Lottering	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●	●	B	≥88	>=2	~2	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	
Elandsbos	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●	●	B	≥88	>=2	~2	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	
Storms	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●	●	B	≥88	>=2	~2	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	
Elands	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●	●	B	≥88	>=2	~2	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	
Groot (Oos)	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●	●	B	≥88	>=2	~2	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	
IUA M01					B	≥88	<10%	<10%	<10%	●		B	≥88	>10	>3	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Van Stadens	B	↓	A/B	A/B	↑C	≥63	<10%	<10%	<10%	●		↑C	≥63	>10	>3	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Maitland	B/C	↓	B	B	↑F	≥18	<20%	<20%	<20%	●		↑F	≥18	>5	>2	>50					●		↑F	≥18	<20%	<20%	<20%	<20%	<20%	
Baakens	E/F	↓	E	E	↑F	≥18	<20%	<20%	<20%	●		↑F	≥18	>5	>2	>50					●		↑F	≥18	<20%	<20%	<20%	<20%	<20%	
Papkuils	F	↓	E/F	E/F	↑F	≥18	<20%	<20%	<20%	●		↑F	≥18	>5	>2	>50					●		↑F	≥18	<20%	<20%	<20%	<20%	<20%	
Coega (Ngqurha)	E/F	↓	D	D	F	≥13	<10%	<10%	<10%	●		↑F	≥18	>5	>2	>50					●		↑E	≥38	<10%	<10%	<10%	<10%	<10%	●
IUA P01					C	≥73	<20%	<20%	<20%	●		C	≥73	<>10	>3	<50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Boknes	C	↓	C	C	C	≥73	<20%	<20%	<20%	●		C	≥73	<>10	>3	<50					●		C	≥73	<20%	<20%	<20%	<20%	<20%	
Grant's	C	↓	C	C	B	≥88	<10%	<10%	<10%	●		B	≥88	>15	>=5	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Kasouga	B	↓	B	B	C	≥73	<20%	<20%	<20%	●		C	≥73	<>10	>3					●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Rufane	C	↓	C	C	B	≥88	<20%	<20%	<20%	●		B	≥88	<>10	>3					●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Riet	B		B	B	C	≥73	<20%	<20%	<20%	●		C	≥73	<>10	>3					●		B	≥88	<20%	<20%	<20%	<20%	<20%		
IUA R01					C	≥73	<10%	<10%	<10%	●		C	≥73	>=10	>=3	<50	●				●		C	≥73	<10%	<10%	<10%	<10%	<10%	●
Old Woman's	B/C		B/C	B/C	C	≥73	<10%	<10%	<10%	●		C	≥73	>=10	>=3	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mpekweni	B		B	B	B	≥88	<10%	<10%	<10%	●		B	≥88	>=10	>=3	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mtati (Mthathi)	B		B	B	B	≥88	<10%	<10%	<10%	●		B	≥88	>=10	>=3	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mgwalana	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	>=10	>=3	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Bira (Bhirha)	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	>=10	>=3	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Gqutywa	B		B	B	B	≥88	<10%	<10%	<10%	●		B	≥88	>=10	>=3	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●

NAME	PES	Trajectory	REC	TEC	Invertebrates	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	No significant reduction in zooplankton species richness and biomass annually	No significant reduction in zoobenthos species richness and biomass annually	No significant reduction in mud and/or sand prawn biomass (3yr period)	Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness)	Presence & evidence of recruitment of mud crabs and mud prawns	Fish	Maintain fish composition, richness, and abundance representatives of a Target EC:	Number of fish species	Number of species making up 90% of abundance	Estuarine-associated marine composition	Juvenile predatory fish present (kob, grunter, etc)	Juvenile eelgrass-associated species (blacktail, strepie, etc)	Small fish abundant in estuary	Soles and gobies throughout estuary	No fish kills due to low DO, pH, hypersalinity or ammonia toxicity (averaging temperature individual)	Eels present in estuary OR catchment in 2 or more consecutive surveys	Birds	Maintain avifaunal community representatives of a Target EC:	No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <=	No significant reduction in Wader species (3 yr period), with change <=	Waterfowl (ducks and geese) numbers stable (3 yr period), with change <=	Tern and gull (roost at mouth) numbers stable (3 yr period), with change <=	Palearctic migrants present in summer (stable over 3 yr period), with change <=	Resident Fish Eagle breeding pair
Ngculura (Ngculurha)	B		A/B	A/B	B	≥88	<20%	<20%	<20%	●		↑C	≥63	≥10	≥2	<50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mtana	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥2	<50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Nqinisa	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥2	<50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Kiwané (Khiwane)	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥10	≥3	<50	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Shelbertsstroom	B/C	↓	B/C	B/C	B	≥88	<20%	<20%	<20%	●		C	≥73	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Lilyvale	B	↓	B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Ross' Creek	B	↓	B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Ncera (Ncerha)	B		B	B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥4						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mlele	B/C	↓	B/C	B/C	B	≥88	<20%	<20%	<20%	●		C	≥73	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mcantsi	C	↓	B	B	↑C	≥63	<20%	<20%	<20%	●		↑C	≥63	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Gxulu	B/C	↓	B/C	B/C	C	≥73	<10%	<10%	<10%	●		C	≥73	≥15	≥5						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Goda	B	↓	A/B	A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Hlozi	B	↓	B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Hickman's IUA R02	C	↓	C	C	C	≥73	<20%	<20%	<20%	●		C	≥73	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Blind	D	↓	D	D	D	≥43	<20%	<20%	<20%	●		D	≥43	≥10	≥4						●		D	≥43	<20%	<20%	<20%	<20%	<20%	
Hlaze (iHlanze)	D	↓	D	D	D	≥43	<20%	<20%	<20%	●		D	≥43	≥10	≥4						●		C	≥73	<20%	<20%	<20%	<20%	<20%	
Qinira (Quinirha)	B	↓	B	B	C	≥73	<10%	<10%	<10%	●		D	≥43	≥15	≥5		●				●		C	≥73	<10%	<10%	<10%	<10%	<10%	●
Gqunube	B/C	↓	B	B	↑C	≥63	<10%	<10%	<10%	●	●	éD	≥58	>20	≥5	<50		●	●	●	●		↑C	≥63	<10%	<10%	<10%	<10%	<10%	●
Kwelerha (Kwelerha)	B		A/B	A/B	↑C	≥63	<10%	<10%	<10%	●	●	↑C	≥63	>20	≥5		●	●	●	●	●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Bulura (Bulurha)	B		B	B	C	≥73	<10%	<10%	<10%	●		C	≥73	≥15	≥5	<50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Cunge	A/B		A/B	A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Cintsa	B		B	B	B	≥88	<10%	<10%	<10%	●		C	≥73	≥15	≥5						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Cefane	B		B	B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Kwenxura (Kwenxurha)	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Nyara (Nyarha)	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Imtwendwe (Mtwendwe)	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Haga-haga	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%	

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Mtendwe	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Quko	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●		B	≥88	≥15	≥5	<50	●					●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Morgan	B		B	B	C	≥73	<10%	<10%	<10%	●		C	≥73	≥15	≥5						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Cwili	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
IUA T04																															
Gxara (Gxarha)	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥4						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Ngogwane	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Qolora (Qolorha)	B		B	B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥4		●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Ncizele	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Timba	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Kobongqaba (Khobongqaba)	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●	●	B	≥88	≥20	≥4			●	●		●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Nxaxo/Nggusi	B		A/B	A/B	↑C	≥63	<10%	<10%	<10%	●		↑C	≥63	≥15	≥4						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Cebe	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●		B	≥88	≥15	≥4						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Gqunqe	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●		B	≥88	≥15	≥4						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Zalu	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥15	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Ngqwara (Ngqwarha)	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥10	≥4						●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Sihlontlweni	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Nebelele	A/B		B	B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Qora (Qhorha)	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●	●	↑C	≥63	≥20	≥4		●	●	●		●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Jujura (Jujurha)	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Ngadla	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4		●				●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Shixini	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●	●	B	≥88	≥20	≥4				●		●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Beechamwood	B		B	B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Kwazilelitsha (Kwazwedala)	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Kwa-Goqo	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Ku-Nocekedwa	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		
Nqabara/Nqabarana	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●	●	B	≥88	≥20	≥4		●		●		●		B	≥88	<10%	<10%	<10%	<10%	<10%	●	
Ngomane (East)	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4						●		B	≥88	<20%	<20%	<20%	<20%	<20%		

NAME	PES	Trajectory	REC	TEC	Invertebrates	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	No significant reduction in zooplankton species richness and biomass annually	No significant reduction in zoobenthos species richness and biomass annually	No significant reduction in mud and/or sand prawn biomass (3yr period)	Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness)	Presence & evidence of recruitment of mud crabs and mud prawns	Fish	Maintain fish composition, richness, and abundance representatives of a Target EC:	Number of fish species	Number of species making up 90% of abundance	Estuarine-associated marine composition	Juvenile predatory fish present (kob, grunter, etc)	Juvenile eelgrass-associated species (blacktail, strepie, etc)	Small fish abundant in estuary	Soles and gobies throughout estuary	No fish kills due to low DO, pH, hypersalinity or ammonia toxicity (averaging temperature individual)	Eels present in estuary OR catchment in 2 or more consecutive surveys	Birds	Maintain avifaunal community representatives of a Target EC:	No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change <=	No significant reduction in Wader species (3 yr period), with change <=	Waterfowl (ducks and geese) numbers stable (3 yr period), with change <=	Tern and gull (roost at mouth) numbers stable (3 yr period), with change <=	Palearctic migrants present in summer (stable over 3 yr period), with change <=	Resident Fish Eagle breeding pair
Ngoma/Kobule	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4				●	●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	●
Mendu	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥4				●	●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Mendwana	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●	●	B	≥88	≥20	≥4				●	●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Ku-Mpenzu	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4					●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Ku-Bhula (Mbhanyana)	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		C	≥73	≥10	≥4					●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Kwa-Suku	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥4							B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Ntlonyane	B		A/B	A/B	↑C	≥63	<10%	<10%	<10%	●		↑C	≥63	≥15	≥4		●					B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Nkanya	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥4					●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Sundwana	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4							B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Bulungula	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥4					●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Ku-Amanzimuzama	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4					●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Nqakanqa	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥4					●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Mdikana	B		B	B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥4					●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Mncwasa	B		B	B	B	≥88	<10%	<10%	<10%	=		B	≥88	≥15	≥4					=		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Mpako	B		B	B	B	≥88	<20%	<20%	<20%	●		C	≥73	≥10	≥4					●		C	≥73	<20%	<20%	<20%	<20%	<20%	<20%	
Nenga	C	↓	C	C	D	≥43	<20%	<20%	<20%	●		C	≥73	≥10	≥4					●		D	≥43	<20%	<20%	<20%	<20%	<20%	<20%	
Mapuzi	B		B	B	B	≥88	<10%	<10%	<10%	●		C	≥73	≥15	≥4		●			●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Thsani	B		B	B	B	≥88	<20%	<20%	<20%	●		C	≥73	≥10	≥4					●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Mdumbi	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●	●	↑C	≥63	≥20	≥4		●			●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Lwandilana	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50				●		B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Lwandile	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5					●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Mtakatye	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●	●	↑C	≥63	>20	≥6	>40	●	●	●	●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Hiuleka	B		A/B	A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●	B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Mnenu	A/B		A/B	A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5					●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Mtonga	C	↓	A/B	A/B	↑C	≥63	<10%	<10%	<10%	●		↑C	≥63	≥15	≥5					●		↑C	≥63	<10%	<10%	<10%	<10%	<10%	<10%	●
Mpande	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5					●		B	≥88	<10%	<10%	<10%	<10%	<10%	<10%	●
Sinangwana	B		B	B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●	B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	
Gxwaleni	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●	B	≥88	<20%	<20%	<20%	<20%	<20%	<20%	

NAME	PES	Trajectory	REC	TEC	Invertebrates	Maintain invertebrate composition, richness, and abundance representatives of a Target EC:	No significant reduction in zooplankton species richness and biomass annually	No significant reduction in zoobenthos species richness and biomass annually	No significant reduction in mud and/or sand prawn biomass (3yr period)	Annelids should not be dominant in sediment (entire estuary - 2 survey periods: <50% total species richness)	Presence & evidence of recruitment of mud crabs and mud prawns	Fish	Maintain fish composition, richness, and abundance representatives of a Target EC:	Number of fish species	Number of species making up 90% of abundance	Estuarine-associated marine composition	Juvenile predatory fish present (kob, grunter, etc)	Juvenile eelgrass-associated species (blacktail, strepie, etc)	Minifish abundance in reference beds	Soles and gobies throughout estuary	No fish kills due to low DO, pH, hypersalinity or ammonia toxicity (excluding temperature induced)	Eels present in estuary OR catchment in 2 or more consecutive surveys	Birds	Maintain avifaunal community representatives of a Target EC:	No significant reduction in Piscivorous birds (cormorants and/or herons/egrets) (3 yr period), with change >0%	No significant reduction in Wader species (3 yr period), with change <0%	Waterfowl (ducks and geese) numbers stable (3 yr period), with change <0%	Tern and gull (roost at mouth) numbers stable (3 yr period), with change <0%	Palearctic migrants present in summer (stable over 3 yr period), with change <0%	Resident Fish Eagle breeding pair
Bulolo	B		B	B	C	≥73	<20%	<20%	<20%	●		D	≥43	≥10	≥5	>50					●		C	≥73	<20%	<20%	<20%	<20%	<20%	
Mtumbane	B		B	B	A	≥93	<20%	<20%	<20%	●		C	≥73	≥10	≥5	>50					●		C	≥73	<20%	<20%	<20%	<20%	<20%	
Mzimvubu	B	↓	B	B	D	≥43	<10%	<10%	<10%	●	●	D	≥43	>20	≥6	>40					●	●	C	≥73	<10%	<10%	<10%	<10%	<10%	●
Ntlupeni	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Nkodusweni	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5	>50					●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mntafufu	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●	●	↑C	≥63	>20	≥6	>40	●				●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Ingo	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mzimpunzi	B		A/B	A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Kwanyambalala	B		B	B	C	≥73	<20%	<20%	<20%	●		C	≥73	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mbotyi	B		B	B	C	≥73	<20%	<20%	<20%	●		C	≥73	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mkozi	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Sikatsha	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Lupatana	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mkweni	A/B		A-A/B	A-A/B	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Msikaba	A/B		A-A/B	A-A/B	A	≥93	<10%	<10%	<10%	●	●	C	≥73	>20	≥6	>40	●		●		●	●	B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mgwegwe	A		A	A	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mgwetyana	A		A	A	A	≥93	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Sikombe	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Kwanyana	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mtolane	A/B		A-A/B	A-A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mnyameni	A/B		A-A/B	A-A/B	B	≥88	<10%	<10%	<10%	●		B	≥88	≥15	≥5	>50		●			●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mpahlanganyana	B		A/B	A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mpahlane	B		A/B	A/B	B	≥88	<20%	<20%	<20%	●		B	≥88	≥10	≥5	>50					●		B	≥88	<20%	<20%	<20%	<20%	<20%	
Mzamba	B		A/B	A/B	B	≥88	<10%	<10%	<10%	●	●	↑C	≥63	>20	≥6	>40	●		●		●		B	≥88	<10%	<10%	<10%	<10%	<10%	●
Mtentwana	B/C	↓	B	B	↑C	≥63	<20%	<20%	<20%	●		↑C	≥63	≥10	≥5	>50					●		↑C	≥63	<20%	<20%	<20%	<20%	<20%	

