water and sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Classification of Significant Water Resources and Determination of Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments

RESOURCE UNITS DELINEATION AND PRIORITIZATION REPORT

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Department of Water and Sanitation
Chief Directorate: Water Ecosystem Management

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Resource Units Delineation and Prioritisation Report

CLASSIFICATION OF SIGNIFICANT WATER RESOURCES AND DETERMINATION OF RESOURCE QUALITY OBJECTIVES FOR WATER RESOURCES IN THE USUTU TO MHLATHUZE CATCHMENTS

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REPORT SCHEDULE

Report Index Number	DWS Report Number	Report Title
1	WEM/WMA3/4/00/CON/CLA/0122	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Inception Report including Gap Analysis chapter**
2	WEM/WMA3/4/00/CON/CLA/0222	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: Status Quo and Delineation of Integrated Units of Analysis and Resource Unit Report
3	**WEM/WMA3/4/00/CON/CLA/0322**	**Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: Resource Units Delineation and Prioritisation Report**
4	WEM/WMA3/4/00/CON/CLA/0422	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Hydrology Systems Analysis Report**
5	WEM/WMA3/4/00/CON/CLA/0522	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **River EWR estimates for Desktop Biophysical Nodes Report**
6	WEM/WMA3/4/00/CON/CLA/0622	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **River Survey Report**
7	WEM/WMA3/4/00/CON/CLA/0722	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Basic Human Needs Report**
8	WEM/WMA3/4/00/CON/CLA/0822	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Groundwater Report**
9	WEM/WMA3/4/00/CON/CLA/0922	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **River specialist meeting Report**
10	WEM/WMA3/4/00/CON/CLA/1022	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Estuary Survey Report**
11	WEM/WMA3/4/00/CON/CLA/1122	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Wetland Report**
12	WEM/WMA3/4/00/CON/CLA/1222	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Ecological Water Requirements Report**
13	WEM/WMA3/4/00/CON/CLA/1322	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Scenario Description Report**
14	WEM/WMA3/4/00/CON/CLA/0123, Volume 1	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Ecological Consequences Report, Volume 1: Rivers**
	WEM/WMA3/4/00/CON/CLA/0123, Volume 2	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Ecological Consequences Report, Volume 2: Estuaries**

Report Index Number	DWS Report Number	Report Title
15	WEM/WMA3/4/00/CON/CLA/0223	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Ecosystem Services Consequences Report**
16	WEM/WMA3/4/00/CON/CLA/0323	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Economic and User water quality Consequences Report**
17	WEM/WMA3/4/00/CON/CLA/0423	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Water Resource Classes Report**
	WEM/WMA3/4/00/CON/CLA/0523, Volume 1	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Resource Quality Objectives Report, Volume 1: Rivers**
18	WEM/WMA3/4/00/CON/CLA/0523, Volume 2	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Resource Quality Objectives Report, Volume 2: Estuaries**
	WEM/WMA3/4/00/CON/CLA/0523, Volume 3	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Resource Quality Objectives Report, Volume 3: Wetlands and Groundwater**
19	WEM/WMA3/4/00/CON/CLA/0623	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Monitoring and Implementation Report**
20	WEM/WMA3/4/00/CON/CLA/0124	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Main Report**
21	WEM/WMA3/4/00/CON/CLA/0224	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Issues and Responses Report**
22	WEM/WMA3/4/00/CON/CLA/0324	Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: **Close out Report**

Shaded Grey indicates this report.

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EXECUTIVE SUMMARY

BACKGROUND

Chapter 3 of the National Water Act, 1998 (NWA) (Act 36 of 1998), deals with the protection of water resources. Section 12 of the NWA requires the Minister to develop a system to classify water resources. In response to this, the Water Resource Classification System (WRCS) was gazetted on 17 September 2010 and published in the Government Gazette no. 33541 as Regulation 810. The WRCS is a step-wise process, whereby water resources are categorised according to specific classes that represent a management vision of a particular catchment. This vision takes into account the current state of the water resource, the ecological, social, and economic aspects that are dependent on the resource. Once significant water resources have been classified through the WRCS, Resource Quality Objectives (RQOs) have to be determined to give effect to the class. The implementation of the WRCS, therefore, assesses the costs and benefits associated with utilisation versus protection of a water resource. Section 13 of the NWA requires that Water Resource Classes and RQOs be determined for all significant water resources.

The Chief Directorate: Water Ecosystems Management (CD: WEM) of the Department of Water and Sanitation (DWS), initiated a study to determine the Water Resource Classes and RQOs for all significant water resources in the Usutu to Mhlathuze Catchment. The Usutu to Mhlathuze Catchments are amongst many water-stressed catchments in South Africa. These catchment areas are important for conservation, and contain a number of protected areas such as natural heritage sites, cultural and historic sites, as well as other conservation areas that need protection. There are five RAMSAR[1] sites within the catchment, which includes the world heritage site, St Lucia. The others are Sibaya, Kosi Bay, Ndumo Game Reserve and Turtle Beaches.

STUDY AREA

The study area is the Usutu to Mhlathuze Catchment, which has been divided into six drainage areas, as well as secondary catchment areas:

- W1 catchment (main river: Mhlathuze).
- W2 catchment (main river: Umfolozi).
- W3 catchment (main river: Mkuze).
- W4 catchment (main river: Pongola) - part of this catchment area falls within Eswatini.
- W5 catchment (main river: Usutu) - much of this catchment falls within Eswatini.
- W7 catchment (Kosi Bay and Lake Sibaya).

PURPOSE OF THIS REPORT

The purpose of this report is to document the results of Task 2: Prioritise Resource Units (RUs) and select study sites. The objective of this task is to identify high priority Resource Units, as these would be the areas where more detailed work for the rest of the steps would be the focus.

WATER RESOURCE USE IMPORTANCE

The importance of a Resource Unit from the perspective of water resource use is determined by assessing the volume of use (both surface water – **Section 2.1** – **2.3** and groundwater - **Section 2.6 – 2.7** and) for the various user sectors (domestic and industrial, irrigation, afforestation). The

[1] A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention, also known as "The Convention on Wetlands", an intergovernmental environmental treaty established in 1971 by UNESCO in the Iranian city of Ramsar, which came into force in 1975.

use is compared relatively between Resource Units, and the Resource Units with high use (irrelevant of sector) score as higher priorities, and those with little to no use score as low priorities. Consideration is also given to future development of water resources if such is planned for a specific area (**Section 2.4**). Furthermore, importance scoring related to water quality is also included with Resource Units with potentially higher water quality problems scoring as higher priorities than those with no water quality problems (**Section 2.5**).

Combining all the water resources use importance scores resulted in the following:

- Five of fifteen RUs in W1 (Mhlathuze) have a WRUI rating of Very High. (Water quality and surface water use).
- Two of sixteen RUs in W2 (Umfolozi) have a WRUI rating of High to Very High. (Water quality, surface water use).
- Nine of thirteen RUs in W3 (Mkuze) have a WRUI rating of High to Very High. (Future development, surface water use and groundwater contribution to baseflow/lakes).
- Five of eleven RUs in W4 (Pongola) have a WRUI rating of High to Very High. (Water quality and groundwater contribution to baseflow/lakes).
- Seven of thirteen RUs in W5 (Usutu) have a WRUI rating of High to Very High. (Surface water use and groundwater contribution to baseflow/lakes).
- All three RUs in W7 (Kosi Bay and Sibaya Lake) have a WRUI rating of Very High. (Groundwater contribution to baseflow/lakes)

SOCIO-CULTURAL IMPORTANCE

The Socio-cultural Importance (SCI) was generated by scoring each Resource Unit for the following metrics:

- Ritual Use. This was scored between 0 – 5. The question that was asked was “How much ritual use of the river takes place?” Typically, this would be for ceremonial purposes or for spiritual/religious activities. Both intensity and significance of use are valued and the higher of the two scores is adopted. Intensity relates to the number of people likely to make use of the river for ritual use and significance relates to the degree to which the river is of critical importance to people.
- Aesthetic Value. This was scored between 0 – 5. The question that was asked was “How important is the aesthetic value to people? Does the river stretch add value to people’s life as an object of natural beauty? Would changing flows detract from this value?”
- Resource Dependence. This was scored between 0 – 5. This refers to the goods and services delivered by the river system and peoples’ dependence on these components. This is usually a critical element of the SCI score and is designed to cater for river resource dependence by those who rely directly on such aspects for their survival. It should be noted that commercial or “for financial gain” usage of resources is excluded from consideration in this instance.
- Recreational Use. This was scored between 0 – 5. The question that was asked was “Does the river stretch provide recreational facilities to people and would this be affected by changing flows?”
- Historical/Cultural Value. This was scored between 0 – 5. The question that was asked was “Does the river have a strong cultural or historical value?”

The results are summarised as follows:

- Four of fifteen RUs in W1 (Mhlathuze) have a SCI rating of High. (Recreation and aesthetic value, historical importance of the high dependence on resource associated with poor and vulnerable communities).
- Four of sixteen RUs in W2 (Umfolozi) have a of SCI rating of High. (Recreation and aesthetic value, historical importance of the high dependence on resource associated with poor and vulnerable communities).
- Three of thirteen RUs in W3 (Mkuze) have a of SCI rating of High. (Recreation and aesthetic value, historical importance of the high dependence on resource associated with poor and vulnerable communities).
- Two of eleven RUs in W4 (Pongola) have a SCI rating of High. (Recreation and aesthetic value, historical importance of the high dependence on resource associated with poor and vulnerable communities).
- Two of three RUs in W7 (Kosi Bay and Sibaya Lake) have a SCI rating of High. (Recreation and aesthetic value, historical importance of the high dependence on resource associated with poor and vulnerable communities).

RIVER ECOLOGICAL IMPORTANCE AND SENSITIVITY

The ecological importance of a river is an expression of its importance to the maintenance of biological diversity and ecological functioning on local and wider scales. Ecological sensitivity (or fragility) refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred (resilience) (Resh *et al.*, 1988; Milner, 1994). The Ecological Importance and Sensitivity (EIS) information was used as provided in the 2014 PES/EIS study (DWS, 2014b).

Freshwater Ecosystem Priority Areas (FEPAs) for Sub-quaternary reaches (SQRs) were indicated in the master spreadsheet. The verification of the NFEPAs was essential prior to the NFEPA status being used to influence decision-making within the National Water Resource Classification System (NWRCS). The following filtering process was followed to verify the current NFEPA status:

- All FEPAs were identified from the shapefiles (Nel *et al.*, 2011) as well as correlating it with the data provided in the front end PESEIS models (DWS, 2014).
- If the PES results from the PESEIS project (DWS, 2014 and 2022 update) indicated that the SQR was not in a B or higher PES, it was not further considered as a FEPA (Category B/C was considered to be marginal and hence included within the acceptable limit).
- The presence of the important fish species (that the NFEPA was based on) in the SQR were verified using the information from the PESEIS study (DWS, 2014).

Using the PES/EIS study (DWS, 2014b), and verifying the information with the NFEPA output, the results were as follows:

- Thirteen of fifteen RUs in W1 (Mhlathuze) have an EIS rating of High.
- Fourteen of sixteen RUs in W2 (Umfolozi) have an EIS rating of High.
- Twelve of thirteen RUs in W3 (Mkuze) have an EIS rating of High.
- Eight of eleven RUs in W4 (Pongola) have an EIS rating of High.
- Six of thirteen RUs in W5 (Usutu) have an EIS rating of High.
- One of three RUs in W7 (Kosi Bay and Sibaya Lake) have an EIS rating of High

RIVER RU PRIORITISATION

The steps used to identify the priority areas (hotspots) were:

- Reviewed desktop EcoClassification which included the determination of the EIS, SCI and PES was used as the basis.
- Determination of the Integrated Environmental Importance (IEI) by integrating the EIS, SCI and the PES.
- Determining the Water Resource Use Importance (WRUI).
- Identification of the areas which were priority hotspots because of high IEI and/or WRUI and require more detailed studies.
- Provide recommendations for the locality of detailed EWR sites.

Integrated Environmental Importance: The Ecological and Socio-Cultural Importance were assessed separately and were then integrated with the PES to determine the Integrated Environmental Importance. The PES forms part of the IEI as rivers (or wetlands) in good condition are scarce, and therefore important in their own right. A river that is in very good condition, but of low EIS, and/or SCI; might still be important from an ecological perspective, as it could be one of a limited number of that type of river that is in good condition.

The High and Very High IEI results were as follows:

- W1: Four RUs in the Matigulu, Mhlathuze and Manzamnyama rivers.
- W2: Ten RUs in the White Umfolozi, Black Umfolozi, Mfolozi and the Msunduzi rivers.
- W3: Eight RUs in the Mkuze, Msunduze, Hluhluwe, Nyalazi and Munywana rivers.
- W4: Four RUs in the Manzana, Pongola and Mozana rivers.
- W5: Four RUs in the Assegaai, Hlelo, Mpuluzi and lower uSutu rivers.
- W7: One RU in the Malangeni River.

RU prioritisation: High Priority RUs (hotspots) are identified by comparing (or overlaying) IEI with WRUI. RU importance for groundwater is addressed as part of the WRUI (**Section 2.6** - **2.7**) and water quality importance is discussed in **Section 2.5**. The results are summarised below:

- The rivers in W1 with a Very High priority importance are the Mhlathuze, Nseleni, Kondweni and those associated with Lake Msingaze. This is due to the high WRUI around current and future water use.
- The rivers in W2 are dominated by a Moderate priority.
- The rivers in W3 are dominated by High and Very High priority mostly associated with the Mkuze River. The High IEI and a Moderate WRUI are the driving force for this evaluation.
- The rivers in W4 are dominated with a High priority with the IEI the driving force. W45-1 is the only RU with a Very High priority and this is due to the WRUI.
- The rivers in W5 have mostly Very High and High priority and it is driven largely by the high WRUI.
- The three rivers in W7 have a Very High and High priority driven by the groundwater WRUI.

WETLAND ECOLOGICAL IMPORTANCE AND PRIORITISATION

According to the latest national wetland map (National biodiversity assessment; van Deventer *et al.*, 2018) there are almost 1.5 million Ha of wetlands in the study area if estuaries are included in the analysis and 371 603 Ha if they are excluded. This includes five RAMSAR sites, the St Lucia System, Lake Sibaya, Kosi Bay, Ndumo Game Reserve and the Turtle Beaches / Coral Reefs of Tongaland. One of the fundamental concepts of the Ramsar convention is Wise Use, which is defined as "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development". Ramsar sites are

therefore automatically designated as high priority wetlands in this study, and for this section, only includes those that are freshwater wetlands i.e. Ndumo Game Reserve and Lake Sibaya.

The objective of this report was to identify high priority wetlands or wetland groups. These high priority areas were selected based on ecological, socio-cultural and water resource use importance and are often areas of high ecological importance where water resources are stressed or may be stressed in future. A simple 7-step process was followed, using best available data

- Step 1: Determine wetland PES at SQ catchment scale.
- Step 2: Determine wetland ecological importance (EI) at the same scale as above.
- Step 3: Determine wetland sensitivity (ES) at the same scale as above.
- Step 4: Determine the wetland importance score (IS) by integration of EI, ES and SCI.
- Step 5: Determine integrated environmental importance of wetland/s (IEI) by integration of IS and PES.
- Step 6: Determine wetland priority by integration of IEI and WRUI.
- Step 7: Contribute to determination of High Priority Areas by integration with other components.

Estuaries were excluded in the process of wetland prioritisation and where values within the same SQ are assigned, they refer to wetlands surrounding / associated with the respective estuary.

The extensive wetland assessment work conducted in the study area by Begg (1989) and DWS (DWS, 2014) was additionally integrated into this assessment and used to adjust moderate or low scores of wetlands that were previously highlighted as priority wetlands. Begg (1989) identified 24 priority wetlands within the entire KwaZulu Natal region and these included several known “Vleis” in the headwater regions of major rivers, and some large “swamps” in the lower reaches of the catchments. Out of these 24 priority wetlands, 8 systems fall within this study area:

- Pongola floodplain.
- Muzi swamps;
- Greater Mkuze Swamp system;
- Mfolozi swamps;
- Aloeboom Vlei;
- Mvamanzi Pan;
- Stilwater Vlei; and
- Greater Mhlatuze Wetland system which includes:
    - Richards Bay Sanctuary;
    - Lake Nsese;
    - Lake Mzingazi; and
    - Lake Chubu.

Priority RUs were identified by integrating Integrated Environmental Importance and Water Resource Use Importance. RUs with Very High priority are summarised as follows:

- W1 (Mhlathuze Catchment)
    - W12-3 (Nyawushane and Mhlathuze), W12-6 (Mhlathuze and Mtambanana, including the Mhlathuze swamp system), W12-8 (mostly lower reaches of Nseleni, including Nsezi and portions of the Mhlathuze floodplain), W12-9 (Nhlabane and Mzingwenya including lake Cubhu) and W12-10 (mainly Mzingazi).
- W2 (Umfolozi)
    - W21-5 (mainly the White Mfolozi).

- W3 (Mkuze)
    - W31-1 (Mkuze), W31-4 (Mkuze including Nhlnhlela Pan), W31-5 (Mkuze), W31-6 (Nsumu), W32-1 (Mkuze), W33-7 (Hluhluwe, Nyalazi and Mpate, including Nyalazi, Bushlands Pan and Hluhluwe River Vlei) and the St Lucia RU.
- W4 (Pongola)
    - W41-1 (Bivane) and W43-1 (Ngwavuma).
- W5 (Usutu)
    - W51-2 (Boesmanspruit and Assegaai), W51-3 (Swartwater and Mhkondvo), W53-1 (Sandspruit and Ngwempisi), W54-1 (uSuthu, inckusing Coalbank and Liefgekozen, and Seganagana) and W55-1 (Mpumalanga pan district around Chrissiesmeer, Majosie se Vlei and Mpuluzi) and W57-1 (uSuthu, Banzi Pan Ndumo, Shokwe Pan).
- W7 (Kosi Estuary and Lake Sibaya)
    - W70-1 (Swamanzi) and W70-3 (Lake Sibaya, Muzi swamps).

ESTUARY IMPORTANCE

The steps used to identify the priority estuaries were:

- Desktop EcoClassification which included the determination of the **Ecological and Biodiversity/Conservation, Ecosystem Services Importance** and **PES**.
- Determination of the **Integrated Environmental Importance (IEI)** by integrating the Ecological, Biodiversity/Conservation, and Ecosystem Services Importance and the PES.

Ecological and Biodiversity/Conservation Importance: The ecological importance of an estuary is an expression of its importance to the maintenance of biological diversity and ecological functioning on a regional, national or global scale. All estuaries within the study area, with the exception of iNhlabane, are also conservation priorities, being either in formally protected areas (i.e. provincial park, iSimangaliso Wetland Park and UNESCO World Heritage Site) or desired protected areas. In addition, three systems are also Ramsar sites and five systems are Important Bird Areas.

Combining the Ecological and Biodiversity/Conservation Importance of the estuaries in the study area showed that all the systems had either High or Very High ratings:

- W1: Six estuaries (aMatigulu/iNyoni, iSiyaya, uMlalazi, uMhlathuze, Richards Bayand iNhlabane).
- W2: One estuary (iMfolozi/uMsunduze – part of St Lucia Estuarine Lakes complex).
- W3: One estuary (St Lucia – part of St Lucia Estuarine Lakes complex).
- W7: Two estuaries (uMgobezeleni, and Kosi).

Ecosystem Services were evaluated for each estuary based on its carbon sequestration and nursery function value. 'Blue carbon' is associated with three estuary biotic habitats (mangroves, seagrasses, and salt marshes) that sequester carbon from the atmosphere and lock it into the soil. More than half of South Africa's estuarine-associated fish species are utilised in fisheries (subsistence, recreational and commercial). At least 60% of these species are considered entirely or partially dependent on estuaries. Thus, one of the most important values of estuaries to various fisheries species relates to the provision of sheltered nursery environments.

The evaluation of key Ecosystems Services indicated that most of the estuaries in the study area also rated High to Very High from this perspective:

- W1: Five estuaries (aMatigulu/iNyoni, uMlalazi, uMhlathuze, Richards Bay and iNhlabane).

- W2: One estuary (iMfolozi/uMsunduze – part of St Lucia Estuarine Lakes complex).
- W3: One estuary (St Lucia– part of St Lucia Estuarine Lakes complex).
- W7: One estuary (Kosi).

Ecological/Conservation Importance and Ecosystem Service Importance were assessed separately and then integrated with the PES to determine the **IEI**. The PES forms part of the IEI because estuaries in good condition are important in their own right as they assist in achieving national biodiversity targets.

The IEI for the estuaries in the study area showed that all the systems had either High or Very High ratings:

RIVER BIOPHYSICAL NODES

Each RU is represented by biophysical nodes which are either desktop nodes, or EWR sites. These nodes and sites are those where an EWR assessment of appropriate level will be provided. The selected nodes and EWR sites are summarised as follows:

- W1: Seven desktop nodes. Two desktop nodes with hydraulics (i.e. higher confidence). Two active EWR sites in the Matigulu and Nseleni Rivers where EWRs will be reviewed. One historical EWR site in the Mhlathuze River where the existing gazetted results for compulsory licensing will be reviewed to ensure an acceptable monthly distribution.
- W2: Seven desktop nodes. Four desktop nodes which will be extrapolated from active EWR sites. One active EWR site in the White Umfolozi where EWRs will be reviewed. Three active EWR sites in the Black Umfolozi and EWRs will be reviewed at one or two of the sites.
- W3: Seven desktop nodes. Three desktop nodes which will be extrapolated from an active EWR site. One active EWR site in the Mkuze River where the EWRs will be reviewed.
- W4: Seven desktop nodes. One desktop node which will be extrapolated from an active EWR site. One active EWR site in the Pongola River where the EWRs will be reviewed.
- W5: Ten desktop nodes. One desktop node with hydraulics available from a historical EWR site (i.e. higher confidence). One desktop node which will be extrapolated from an active EWR site. One active EWR site in the Assegaai River where the EWRs will be reviewed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TERMINOLOGY AND ACRONYMS

BAS	Best Attainable State
CBA	Critical Biodiversity Area
CD: WEM	Chief Directorate: Water Ecosystems Management
D:RQIS	Directorate: Resource Quality Information Services
DFFE	Department of Forestry, Fisheries and the Environment
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EFZ	Estuarine Functional Zone
EI	Ecological Importance
EIS	Ecological Importance and Sensitivity
EPA	Estuarine Protected Area
ES	Ecological Sensitivity
EWR	Ecological Water Requirement
FEPA	Freshwater Ecosystem Priority Areas
HGM	Hydrogeomorphic
IBA	Important Bird and Biodiversity Areas
IEI	Integrated Environmental Importance
IS	Importance Score
IUA	Integrated Unit of Analysis
IUCN	International Union for Conservation of Nature
KZN	KwaZulu Natal
NFEPA	National Freshwater Ecosystem Priority Area
NWA	National Water Act
NWM	New Wetland Map
NWRCS	National Water Resource Classification System
PES	Present Ecological State
PES/EI/ES	Present Ecological State, Ecological Importance and Ecological Sensitivity
REC	Recommended Ecological Category
RQO	Resource Quality Objectives
RU	Resource Unit
SCI	Socio-Cultural Importance
SQR	Sub- quaternary reach
WETCON	Wetland Condition
WRCS	Water Resource Classification System
WRUI	Water Resource Use Importance
WTW	Water Treatment Works
WWTW	Waste Water Treatment Works

SELECTED SPELLING FOR THIS STUDY

There are multiple variations for the spelling of names for the Rivers, Lakes, Dams and Estuaries in the catchment/study area. For the purpose of this study the following table presents the commonly accepted variations of spelling for the place names of concern, which are discussed in the reports. The names were derived from information from different sources in the region.

Selected Spelling for this Study	Alternate spellings
Usutu River	Usuthu River
Mhlathuze River	Mhlatuze, uMhlatuze River
Pongola (river, Town & Pongolapoort Dam)	Phongola, Phongolo
Lake Sibaya	Lake Sibiya, Lake Sibhayi, Lake Sibhaya
Eswatini	eSwatini
Umfolozi River	Mfolozi River
Amatigulu River	Amatikulu, Matigulu River
Goedertrouw Dam	Lake Phobane
Mfuli River	Mefule River
aMatigulu/iNyoni Estuary	-
Sibiya Estuary	-
Mlalazi Estuary	-
uMhlathuze /Richards Bay Estuary	-
iNhlabane Estuary	-
uMfolozi/uMsunduze Estuary	-
St Lucia Estuary	-
uMgobezeleni Estuary	-
Kosi Estuary	-
Hluhluwe Game Reserve	-
iMfolozi Game Reserve	-
Ithala Game Reserve	-
Ndumo Game Reserve	-
Tembe Elephant Reserve	-
iSimangaliso Wetland Park	-
Kosi Bay and Coastal Forest Area	-
uMkhuze Game Reserve	-

Note:

The spelling of the Rivers, Lakes, Dams and Estuaries provided in the DWS PESEIS (https://www.dws.gov.za/iwqs/rhp/eco/PESEIS_secondary.aspx) database will not be changed based on the above when used in presentation of database tables and results from the database.

GLOSSARY

Ecological Water Requirements (EWR)	The flow patterns (magnitude, timing and duration) and water quality needed to maintain a riverine ecosystem in a particular condition. This term is used to refer to both the quantity and quality components.
Integrated Unit of Analysis (IUAs)	An IUA is a homogeneous area that can be managed as an entity. It is the basic unit of assessment for the Classification of water resources, and is defined by areas that can be managed together in terms of water resource operations, quality, socio-economics and ecosystem services.
Resource Quality Objectives (RQOs)	RQOs are numeric or descriptive goals or objectives that can be monitored for compliance to the Water Resource Classification, for each part of each water resource. "The purpose of setting RQOs is to establish clear goals relating to the quality of the relevant water resources".
Scenario	Scenarios, in the context of water resource management and planning, are plausible definitions (settings) of factors (variables) that influence the water balance and water quality in a catchment and the system as a whole. Each scenario represents an alternative future condition, generally reflecting a change to the present condition.
Sub-quaternary reaches (SQR)	A finer subdivision of the quaternary catchments (the catchment areas of tributaries of main stem rivers in quaternary catchments), to a sub-quaternary reach or quinary level.
Target Ecological Category (TEC)	This is the ecological category towards which a water resource will be managed once the Classification process has been completed and the Reserve has been finalised. The draft TECs are therefore related to the draft Classes and selected scenario.
Water Resource Class	The Water Resource Class (hereafter referred to as Class) is representative of those attributes that the DWS (as the custodian) and society require of different water resources. The decision-making toward a Class requires a wide range of trade-offs to be assessed and evaluated at a number of scales. Final outcome of the process is a set of desired characteristics for use and ecological condition of the water resources in a given catchment. The WRCS defines three management classes, Class I, II, and III, based on extent of use and alteration of ecological condition from the predevelopment condition.

1 INTRODUCTION

1.1 BACKGROUND

Chapter 3 of the National Water Act, 1998 (NWA) (Act 36 of 1998), deals with the protection of water resources. Section 12 of the NWA requires the Minister to develop a system to classify water resources. In response to this, the Water Resource Classification System (WRCS) was gazetted on 17 September 2010 and published in the Government Gazette no. 33541 as Regulation 810. The WRCS is a step-wise process, whereby water resources are categorised according to specific classes that represent a management vision of a particular catchment. This vision takes into account the current state of the water resource, the ecological, social, and economic aspects that are dependent on the resource. Once significant water resources have been classified through the WRCS, Resource Quality Objectives (RQOs) have to be determined to give effect to the class. The implementation of the WRCS, therefore, assesses the costs and benefits associated with utilisation versus protection of a water resource. Section 13 of the NWA requires that Water Resource Classes and RQOs be determined for all significant water resources.

The Chief Directorate: Water Ecosystems Management (CD: WEM) of the Department of Water and Sanitation (DWS), initiated a study to determine the Water Resource Classes and RQOs for all significant water resources in the Usutu to Mhlathuze Catchment. The Usutu to Mhlathuze Catchments are amongst many water-stressed catchments in South Africa. These catchment areas are important for conservation, and contain a number of protected areas such as natural heritage sites, cultural and historic sites, as well as other conservation areas that need protection. There are five RAMSAR[2] sites within the catchment, which includes the world heritage site, St Lucia. The others are Sibaya, Kosi Bay, Ndumo Game Reserve and Turtle Beaches.

1.2 STUDY AREA

The study area is the Usutu to Mhlathuze Catchment that has been divided into six drainage areas and secondary catchment areas as follows (refer to the locality map provided as **Figure 1.1**):

- W1 catchment (main river: Mhlathuze).
- W2 catchment (main river: Umfolozi).
- W3 catchment (main river: Mkuze).
- W4 catchment (main river: Pongola) - part of this catchment area falls within Eswatini.
- W5 catchment (main river: Usutu) - much of this catchment falls within Eswatini.
- W7 catchment (Kosi Bay estuary and Lake Sibaya).

Note that all assessments within Eswatini are excluded apart from the hydrological modelling required to assess any downstream rivers in South Africa that either run through Eswatini or originate (source) in Eswatini.

[2] A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention, also known as "The Convention on Wetlands", an intergovernmental environmental treaty established in 1971 by UNESCO in the Iranian city of Ramsar, which came into force in 1975.

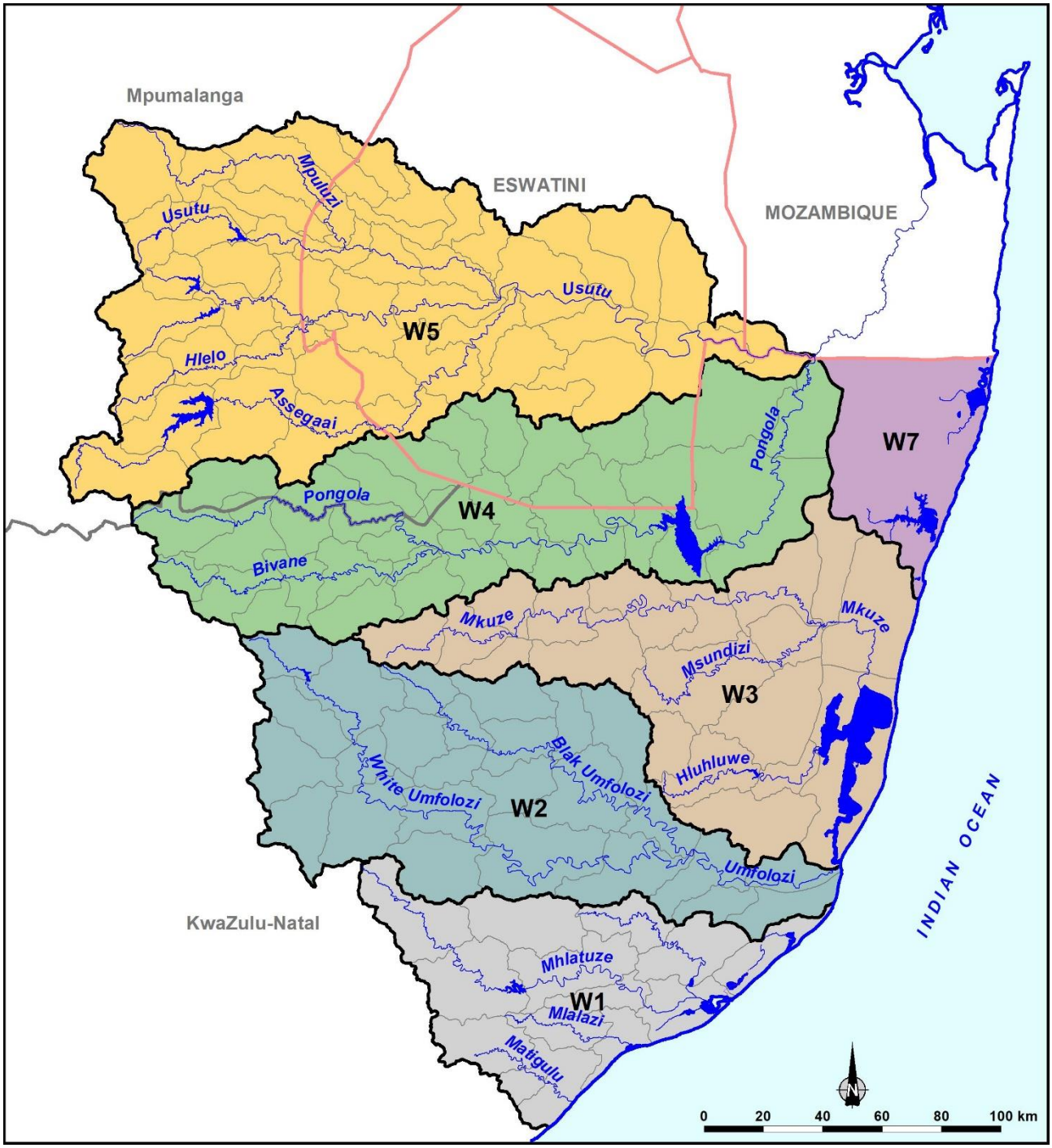

Figure 1.1 Locality Map of the Study Area

1.3 PURPOSE OF THIS REPORT

The purpose of this report is to document the results of Task 2: Prioritise Resource Units (RUs) and select study sites. **Figure 1.2** provides the project plan for this study and illustrates where step 2 fits within the project plan.

The objective of this task is to identify high priority Resource Units, as these would be the areas where more detailed work for the rest of the steps would be the focus. These high priority areas are selected based on ecological, socio-cultural and water resource use importance and are often areas of high ecological importance where water resources are stressed or may be stressed in future.

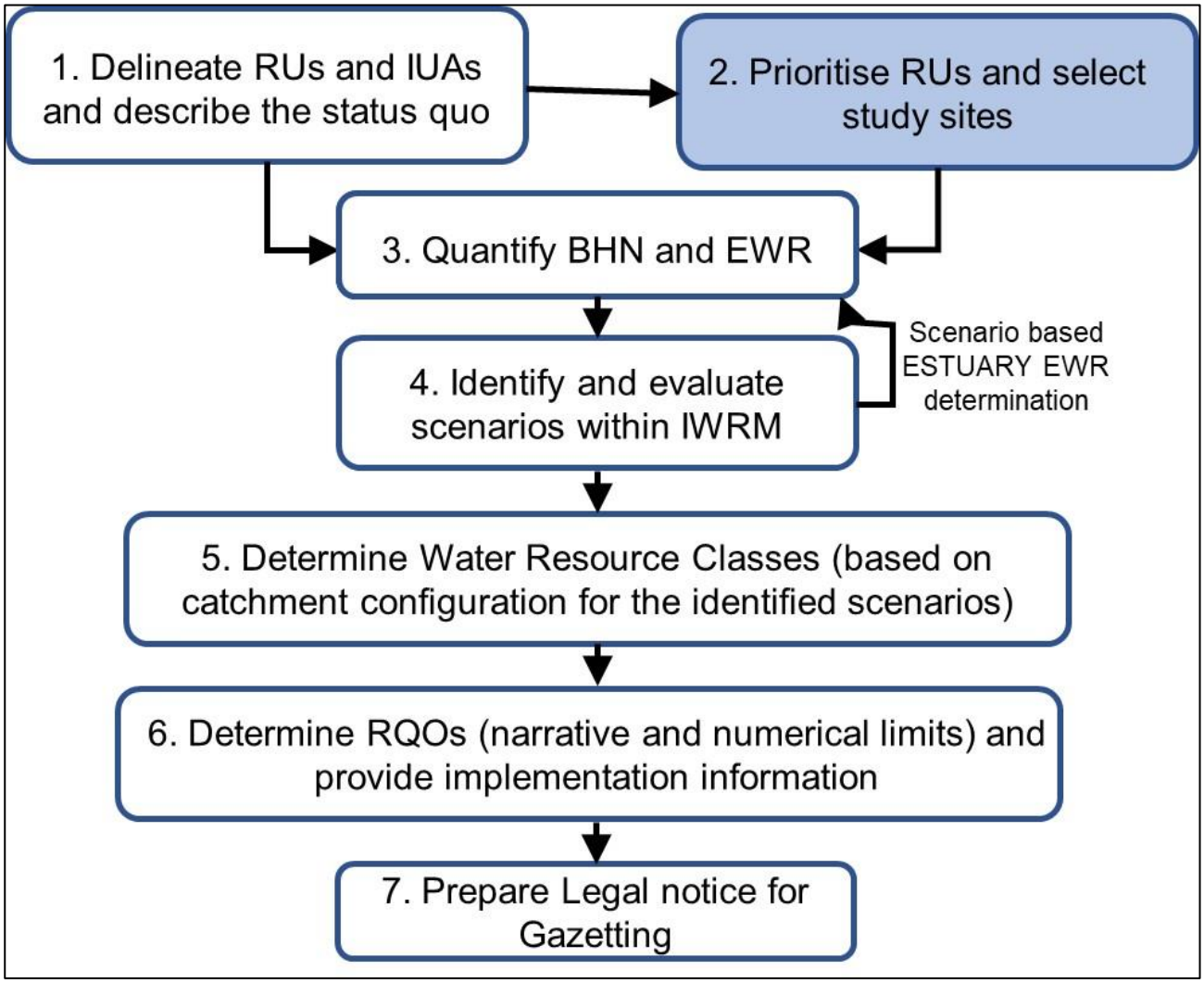

Figure 1.2 Project Plan for the Usutu-Mhlathuze Classification study

1.4 REPORT OUTLINE

The report outline is as follows:

- **Chapter 1** provides general background information on the study area and the Project Plan. This chapter provides a general overview of Task 2: Prioritise Resource Units (RUs) and select study sites.
- **Chapter 2 – 7** of the report outlines the various multi-disciplinary methodologies adopted during this task and provides the findings of the various RUs of importance within the Usutu to Mhlathuze Catchment.
- **Chapter 8** describes the river biophysical nodes.
- **Chapter 9** provides the references.

2 WATER RESOURCE USE IMPORTANCE

2.1 APPROACH

The Water Resource Use Importance (WRUI) (DWAF, 2007) was assessed by assigning a qualitative score to each resource unit for seven variables that represented the status of the instream flow. The scores of the seven variables were combined to determine (qualitatively) an overall score which represented the importance of the river reach in terms of the water resource use. Most often, the maximum value was used to represent the final score. Severity and extent of the variables had to be considered to determine whether the maximum was the appropriate rating for the quaternary catchment.

The variables included in the rating method aimed to represent the status and function of the river reach. The variables and the associated characteristics associated with a score ranging from zero to four are presented in **Table 2.1**.

Table 2.1 Water Resource Use Priority rating variables and scoring characteristics

Variables	Score range and associated characteristic descriptions	
	0	4
Current water balance of catchment contributing flow to the river reach.	Very little water use occurs in the upstream catchment. Low, maintenance and high flow is largely natural.	Significant utilisation of water from the upstream catchment. Low and maintenance flows have been reduced and/or there exists significant regulating storage in the catchment.
Utilisation of the river reach for operational purposes.	Minimum changes in the river flow due to operational purposes.	The river reach is utilised as a conveyance conduit.
Possible future developments and/or water use expected in the catchment.	No known development planned in the catchment that could change the flow in the river reach.	It is expected that future developments that could change the flow in the river could occur.
Water quality related problems, assimilative capacity.	The water quality in the river reach is excellent and large assimilative capacity is present.	The river contains very high loads of pollutants.
Groundwater Stress Index (use/recharge	< 5% recharge utilised.	More than 65% of recharge utilised.
Significance of groundwater contribution to baseflow/lakes	Groundwater a small contributor.	Baseflow dependent on groundwater.
Falls within a defined boundary of a Strategic Water Source Area (SWSA)*	Outside a SWSA	Within a SWSA
Overall score:	**There is no reason to determine the EWR in the river reach from a water resource management perspective.**	**A comprehensive EWR determination is necessary from a water use point of view.**

Note *: Strategic Water source areas are defined as natural places or areas, such as water catchments, which produce disproportionately greater volumes of water per unit area than other areas. The SWSAs falling within the Study Area are presented in **Figure 2.1**. The information is sourced from Lötter, M.C. & Le Maitre, D. (2021).

The water use score was subdivided into three further categories, and assessed by primary water use (urban and industrial), irrigation use as well as afforestation. Scoring was done depending on the size of the water use for each sector. The detailed Excel spreadsheet will be made available electronically with all data provided with the main report.

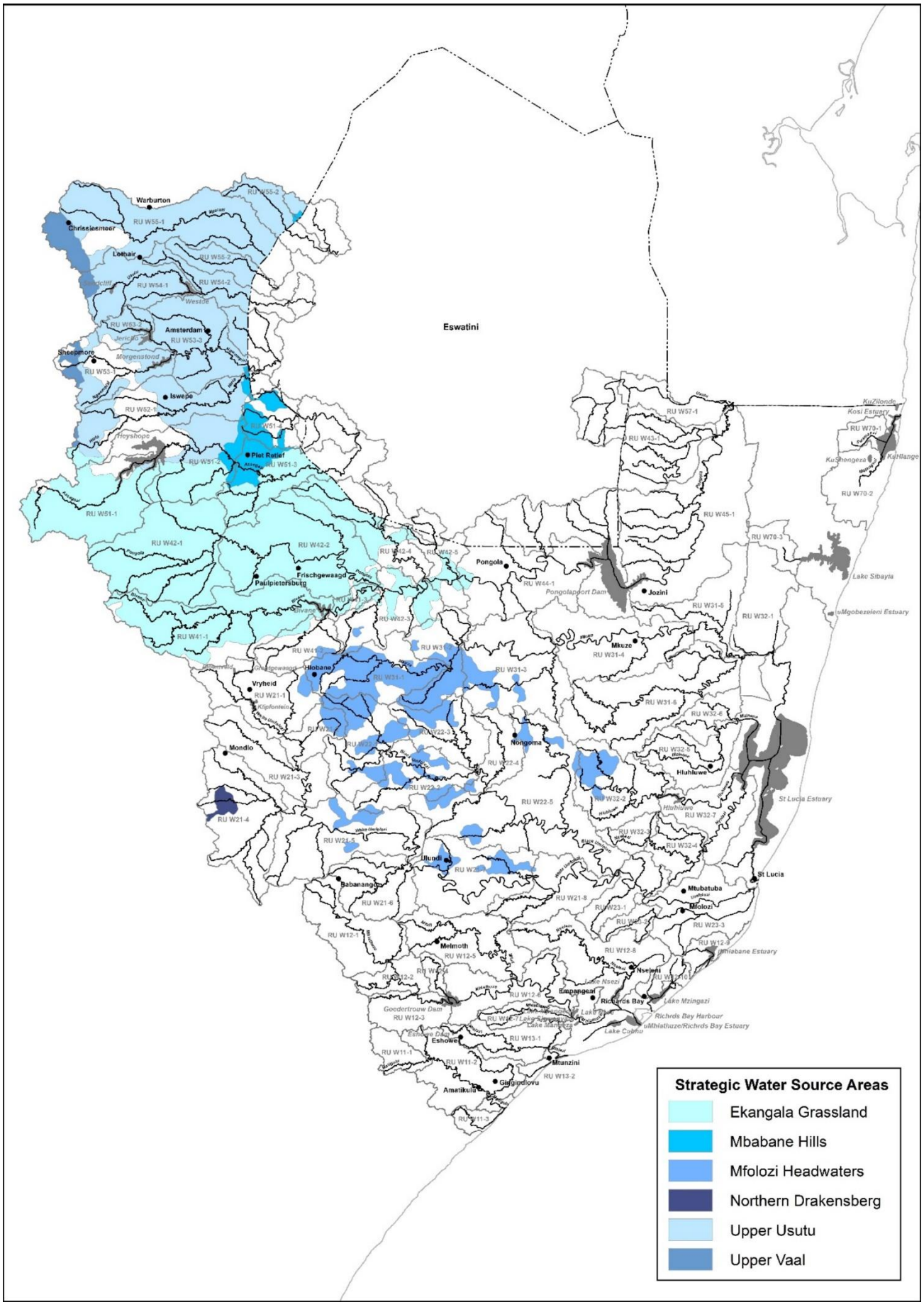

Figure 2.1 Strategic Water Source Areas in W catchment

2.2 WRUI: VARIABLE 1: CURRENT WATER BALANCE OF CATCHMENT CONTRIBUTING FLOW TO THE RIVER REACH

2.2.1 Urban use scoring

Table 2.2 provides an indication of the scores assigned to Resource Units that provide water for the primary sector. The details of the user are included in the table, which is sorted by highest to lowest score.

Table 2.2 Primary use sector scores per RU

RU	Urban use scores	Details
W12-8	4	Nsezi Water Treatment Works (WTW)
W12-9	4	Esikhaweni WTW
W12-9	4	RBM
W12-10	4	Mzingazi WTW
W21-5	4	Mpunga WTW, Ulundi WTW
W23-3	4	Umfolozi sugar mill, RBM transfer, Riverview WTW, Mtubatuba WTW
W44-1	4	Simdland E Grootdraai abstraction
W44-1	4	Pongola town WTW
W45-1	4	Ingwavuma WTW, Jozini WTW x2, Shemula WTW
W51-2	4	Driefontein Town, Kangra Coal, Transfer to Grootdraai-Morgenstond, Piet Retief
W53-1	4	Transfer to Jericho
W53-2	4	Transfer to Eskom
W54-1	4	Transfer to Jericho
W13-1	2	Eshowe WTW, Mtunzini WTW
W21-1	2	Blomveld WTW, Klipfontein WTW
W22-4	2	Usuthu WTW, Nongoma WTW
W31-4	2	Mandlakazi WTW, Mkhuze WTW, Ubombo WTW
W33-7	2	Hluhluwe WTW
W42-2	2	Paul P WTW, Frischgewaagd and Simdland W WTW, Tholokela WTW
W11-2	1	Amatikulu & Gingindlovu
W12-5	1	Melmoth WTW
W21-4	1	Emondli WTW
W21-6	1	Emakhosini
W21-7	1	Nqulwane
W22-1	1	Gelukstadt
W22-3	1	Thulasizwe WTW, Ceza WTW
W22-5	1	Zululand Anthr Colliery, Osingisingi WTW
W22-5	1	Kwampanza Pack plant
W23-1	1	Thendele coal mine
W31-1	1	Nkongolwane & Hlobane, mines
W31-3	1	Khangela Palace WTW
W42-1	1	Luneburg
W42-3	1	Louwsburg
W42-4	1	Khiphun WTW, Belgrade WTW, Msibi WTW
W44-1	1	RCL foods
W52-1	1	Iswepe, Mpact Factory
W53-3	1	Amsterdam

RU	Urban use scores	Details
W55-1	1	Empuluzi town
W55-2	1	Metula and Fernie town areas, Lushushwane town
W70-3	1	Mbazwane and Mseleni WTW

2.2.2 Irrigation use scoring

Table 2.3 provides an indication of the scores assigned to Resource Units that provide water for the irrigation sector. The details of the major users (irrigation schemes) are included in the Table, which is sorted by highest to lowest score. The use volumes were obtained from various sources as indicated in the Status Quo Report prepared for this Study (DWS, 2022). For W1 the volumes are based on allocations issued during Compulsory licensing. For W2, 3 and W4, the WARMS database has been used to obtain the registered use. For W5, the Validation and Verification information was used.

Table 2.3 Irrigation sector scores per RU

RU	Use (million m^3/annum)	Irrigation use score	Details
W12-6	100.62	4	Heatonville, Nkwalini
W12-8	20.78	4	Lower Mhlathuze
W23-3	37.51	4	Umfolozi Sugar Planters
W31-3	21.61	4	Senekal, Mkuze
W31-4	44.88	4	Senekal, Mkuze
W44-1	170.00	4	Impala Scheme
W45-1	82.12	4	Umjindi Farming, Sibuyele Ekhaye Trust
W11-2	6.59	3	Amatigulu irrigators
W12-5	5.96	3	Mfuli
W21-2	5.88	3	Diffuse irrigation
W33-7	10.84	3	Lower Hluhluwe
W41-1	5.78	3	Diffuse irrigation
W42-1	5.47	3	Diffuse irrigation
W42-4	5.33	3	Diffuse irrigation
W11-3	3.57	2	Diffuse irrigation
W21-3	2.64	2	Diffuse irrigation
W22-1	2.89	2	Diffuse irrigation
W22-3	1.85	2	Diffuse irrigation
W31-1	3.14	2	Diffuse irrigation
W31-2	1.74	2	Diffuse irrigation
W32-5	2.51	2	Diffuse irrigation
W42-3	4.22	2	Diffuse irrigation
W42-5	1.05	2	Diffuse irrigation
W51-1	3.49	2	Diffuse irrigation
W52-1	1.56	2	Diffuse irrigation
W53-3	1.52	2	Diffuse irrigation
W55-1	1.21	2	Diffuse irrigation
W11-1	0.46	1	Diffuse irrigation
W12-2	0.34	1	Diffuse irrigation
W12-9	0.83	1	Diffuse irrigation
W21-1	0.76	1	Diffuse irrigation

RU	Use (million m^3/annum)	Irrigation use score	Details
W21-4	0.03	1	Diffuse irrigation
W21-5	0.09	1	Diffuse irrigation
W21-6	0.06	1	Diffuse irrigation
W21-7	0.25	1	Diffuse irrigation
W22-2	0.21	1	Diffuse irrigation
W22-5	0.45	1	Diffuse irrigation
W23-1	0.52	1	Diffuse irrigation
W41-2	0.58	1	Diffuse irrigation
W51-2	0.94	1	Diffuse irrigation
W51-3	0.66	1	Diffuse irrigation
W51-4	0.62	1	Diffuse irrigation
W53-1	0.65	1	Diffuse irrigation
W53-2	0.17	1	Diffuse irrigation
W54-1	0.63	1	Diffuse irrigation
W54-2	0.09	1	Diffuse irrigation

2.2.3 Afforestation use scoring

Table 2.4 provides an indication of the scores assigned to Resource Units that contain commercial afforestation. The table is sorted by highest to lowest score which is related to the size of the afforestation grown. The afforestation areas were obtained from various sources as indicated in the Status Quo Report prepared for this Study (DWS, 2022). For W1 the volumes are based on allocations issued during Compulsory licensing. For W2,3 and W4, the WARMS database, cross referenced with the National Landcover Surveys, has been used to obtain the areas planted. For W5, the Validation and Verification information was used.

Table 2.4 Commercial Afforestation sector scores per RU

RUs scoring a 3		RUs scoring a 2		RUs scoring a 1	
RU	Area (ha)	RU	Area (ha)	RU	Area (ha)
W12-9	14934	W12-1	15884	W11-1	1500
W23-3	22177	W12-5	7780	W11-2	3100
W41-1	23642	W12-8	12348	W12-2	2153
W42-2	35611	W21-1	6431	W12-4	2153
W51-2	24883	W21-2	5856	W12-6	720
W53-3	20578	W21-6	5101	W13-1	1750
W70-3	24591	W22-1	7786	W13-2	1750
		W22-3	6160	W21-3	283
		W31-1	8709	W21-4	79
		W31-2	5813	W21-3	302
		W32-4	5287	W21-5	1586
		W33-7	16761	W21-7	1255
		W42-1	11550	W21-8	13
		W51-3	14491	W22-2	456
		W52-1	13476	W22-4	14
		W53-1	9211	W22-5	98
		W54-2	7757	W23-1	250
		W55-1	8215	W31-3	786
				W31-4	98

RUs scoring a 3		RUs scoring a 2		RUs scoring a 1	
RU	Area (ha)	RU	Area (ha)	RU	Area (ha)
				W32-2	142
				W32-5	446
				W41-2	1164
				W42-3	350
				W42-4	3293
				W51-1	1341
				W51-4	2543
				W53-2	2735
				W54-1	4681
				W55-2	5572

2.3 WRUI: VARIABLE 2: UTILISATION OF THE RIVER REACH FOR OPERATIONAL PURPOSES

Operational scores are given to RUs containing stretches of river which provide a conduit for releases or transfers which occur. **Table 2.5** provides a summary of these and their assigned scores.

Table 2.5 Operational scores per RU

RU	Operational score	Details
W12-3	4	Carries Thukela transfer
W12-6	4	Carries Goedertrouw releases
W41-1	2	Carries Bivane releases
W42-3	2	Carries Bivane releases
W42-5	2	Carries Bivane releases
W44-1	2	Carries Bivane releases
W45-1	4	Carries Pongolapoort releases

2.4 WRUI: VARIABLE 3: POSSIBLE FUTURE DEVELOPMENTS AND/OR WATER USE EXPECTED

Information relating to potential future development obtained from the Reconciliation Strategy of the Mhlathuze Catchment is summarised in **Table 2.6**, including the score assigned. The W2, W3 and W4 catchments are currently undergoing a Reconciliation Strategy development, after which more information will be known about the potential future developments in these areas.

Table 2.6 Future development scores per RU

RU	Future development score	Details
W12-3	4	Increased Thukela transfer
W12-6	3	Raise Goedertrouw Dam
W12-8	3	Potential Dam on Nseleni

2.5 WRUI: VARIABLE 4: WATER QUALITY RELATED PROBLEMS AND ASSIMILATIVE CAPACITY

Water quality priority areas identified by poor water quality status and low assimilative capacity in the Status Quo and Delineation Report, are scored per RU in **Table 2.7** below. Note that these sites are a sub-set of priority areas identified in the Status Quo and Delineation of Integrated Units of Analysis and Resource Unit Report (DWS, 2022).

Table 2.7 Water quality priority areas

RU	Water quality score	Details
W12-5	2	One priority area; Melmoth ponds
W12-8	3	Two priority areas; Tronox KZN Sands Fairbreeze mine and Nseleni Waste Water Treatment Work (WWTW)
W12-10	2	One priority area; Richards Bay Minerals (RBM) smelter
W21-1	3	Two priority areas; Vryheid urban impacts, Hlobane Mine dumps and extensive settlements
W21-4	2	Most of the RU is impacted by extensive bank and gully erosion
W21-7	2	One priority area; Ulundi and coal mining
W22-5	2	One priority area; Zululand Anthracite Collieries
W23-1	2	Two priority areas; mining operations
W31-1	3	Two priority areas; coal mining impacts and irrigation return flows
W31-4	2	One priority area; Mkuze WWTW
W32-5	2	One priority area; Hluhluwe WWTW
W41-1	2	One priority area; Kariboo Colliery and irrigation return flows
W42-2	2	One priority area; Paulpietersburg and closed and operational mines
W43-1	2	One priority area; extensive erosion and irrigation return flows
W44-1	3	Four priority areas; extensive irrigation agriculture, Pongola WWTW and other urban impacts, RCL Sugar Mill
W45-1	2	Two priority areas; Jozini WWTW, extensive irrigated agriculture and dense settlements
W51-3	2	One priority area; Piet Retief urban impacts including Mpact
W51-4	3	Two priority areas; irrigation return flows, tannery effluent draining into the Farroloop and Blesbokspruit
W70-1	3	One priority area; Manguzi WWTW and urban impacts
W70-3	3	One priority area; extensive settlements

2.6 WRUI: VARIABLE 5: GROUNDWATER USE SCORE

Except in very few catchments, groundwater use is less than 5% of recharge (0). This is due to the relatively high recharge rates and low abstraction volumes resulting from low borehole yields. Where significant groundwater use does occur, it is still below 20% of recharge, which is scored 1.

2.7 WRUI: VARIABLE 6: GROUNDWATER CONTRIBUTION TO BASEFLOW/LAKES SCORE

Table 2.8 provides an indication of the scores assigned to groundwater based on groundwater use relative to aquifer recharge and the importance of groundwater baseflow, which can be impacted by abstraction, to the total baseflow component. All High and Very High scores (3 and 4) have been shaded grey.

Scoring is based o\n the following:

- 0: Groundwater baseflow < 20% of baseflow.
- 1: Groundwater baseflow < 40% of baseflow.
- 2: Groundwater baseflow < 60% of baseflow.
- 3: Groundwater baseflow < 80% of baseflow.
- 4: Groundwater baseflow > 80% of baseflow.

Table 2.8 Groundwater scoring

Secondary	RU	Groundwater Use Score	Groundwater contribution to baseflow/lakes score
W1	W11-1	0	1
	W11-2	0	1
	W11-3	0	0
	W12-1	0	1
	W12-2	0	1
	w12-3	0	1
	W12-4	0	1
	W12-5	0	1
	W12-6	0	1
	W12-7	0	1
	W12-8	0	1
	W12-9	0	1
	W12-10	0	1
	W13-1	0	0
	W13-2	0	0
W2	W21-1	0	1
	W21-2	0	1
	W21-3	0	1
	W21-4	1	1
	W21-5	0	1
	W21-6	0	1
	W21-7	0	1
	W21-8	0	1
	W22-1	0	1
	W22-2	0	1
	W22-3	0	1
	W22-4	0	2
	W22-5	1	2
	W23-1	0	2
	W23-2	0	1
	W23-3	0	2
W3	W31-1	0	1
	W31-2	0	1
	W31-3	0	3
	W31-4	0	3
	W31-5	0	3
	W31-6	0	3
	W32-1	0	4
	W32-2	0	2
	W32-3	0	2
	W32-4	0	2
	W32-5	0	3
	W32-6	0	3
	W33-7	0	2
W4	W41-1	0	0
	W41-2	0	0

Secondary	RU	Groundwater Use Score	Groundwater contribution to baseflow/lakes score
	W42-3	0	0
	W42-1	0	0
	W42-2	0	1
	W42-4	0	0
	W42-5	0	1
	W43-1	0	3
	W44-1	0	2
	W45-1	0	3
W5	W51-1	1	1
	W51-2	0	1
	W51-3	0	1
	W51-4	0	1
	W52-1	0	1
	W53-1	0	1
	W53-2	00	1
	W53-3	0	1
	W54-1	0	1
	W54-2	0	1
	W55-1	0	1
	W55-2	0	1
	W57-1	0	3
W7	W70-1	0	4
	W70-2	0	4
	W70-3	0	4

2.8 OVERALL SCORING

Table 2.9 provides an indication of the higher scoring RUs, i.e. those that were assigned a score of 4 and 3 resulting from the combined scoring presented in the previous sub-sections. These indicate the most significant RUs from a surface water perspective.

Table 2.9 Prioritized RUs with high overall scoring

Secondary	RU	Overall score
W1	W12-3	4
	W12-6	4
	W12-8	4
	W12-9	4
	W12-10	4
W2	W21-5	3
	W23-3	4
W3	W31-1	3
	W31-3	3
	W31-4	3
	W31-5	3
	W31-6	3
	W32-1	4
	W32-5	3
	W32-6	3
	W32-7	3

Secondary	RU	Overall score
W4	W41-1	3
	W42-1	3
	W43-1	3
	W44-1	4
	W45-1	4
W5	W51-2	4
	W51-4	3
	W53-1	4
	W53-2	4
	W54-1	4
	W57-1	3
W7	W70-1	4
	W70-2	4
	W70-3	4

3 SOCIO-CULTURAL IMPORTANCE

3.1 APPROACH

The Socio-cultural Importance (SCI) was generated by scoring each Resource Unit (RU), based on the following features (Huggins *et al.*, 2010) described below. To generate the SCI model, information was extracted in a master spreadsheet that incorporates all the SCI results. Column descriptions in the SCI sheet in the master spreadsheet are as follows:

- **Column A:** Resource Unit number.
- **Column B:** Sub-quaternary (SQ) number. Individual code provided for each SQ by DWS and based on the codes used in the National Freshwater Ecosystem Priority Area (NFEPA) assessment.
- **Column C:** River. River name where available.
- **Column D:** Length of river stretch in kilometres.
- **Column E:** Ritual Use. This was scored between 0 – 5. The question that was asked was "How much ritual use of the river takes place?" Typically, this would be for ceremonial purposes or for spiritual/religious activities. An example would be pools used for traditional initiation purposes. Both intensity and significance of use are valued and the higher of the two scores is adopted. Intensity relates to the number of people likely to make use of the river for ritual use and significance relates to the degree to which the river is of critical importance to people.
- **Column F:** Weighted score for Ritual Use. Ritual Use is given a weighted score of 40 points. So a score of 3 out of 5 in Column D would result in a weighted score of 120.
- **Column G:** Aesthetic Value. This was scored between 0 – 5. The question that was asked was "How important is the aesthetic value to people? Does the river stretch add value to people's life as an object of natural beauty? Would changing flows detract from this value?"
- **Column H:** Weighted score for Aesthetic Value. Aesthetic Value is given a weighted score of 100 points.
- **Column I:** Resource Dependence. This was scored between 0 – 5. This refers to the goods and services delivered by the river system and peoples' dependence on these components. This is usually a critical element of the SCI score and is designed to cater for river resource dependence by those who rely directly on such aspects for their survival. It should be noted that commercial or "for financial gain" usage of resources is excluded from consideration in this instance.
- **Column J:** Weighted score for Resource Dependence. Resource Dependence is given a weighted score of 500 points.
- **Column K:** Recreational Use. This was scored between 0 – 5. The question that was asked was "Does the river stretch provide recreational facilities to people and would this be affected by changing flows?"
- **Column L:** Weighted score for Recreational Use. Recreational Use is given a weighted score of 250 points.
- **Column M:** Historical/Cultural Value. This was scored between 0 – 5. The question that was asked was "Does the river have a strong cultural or historical value?"
- **Column N:** Weighted score for Historical/Cultural Value. Historical/Cultural Value is given a weighted score of 450 points.
- **Column O:** This is the overall SCI score derived by adding the weighted scores and dividing by the number of criteria and as a proportion of the overall maximum score.

The SCI rating is described in **Table 3.1**.

Table 3.1 SCI rating

SCI score	Category	Comment
0 – 0.99	**VERY LOW**	Of little or no socio-cultural importance.
1 – 1.99	**LOW**	Of some importance. PES not critical, but caution should be displayed with regard to negative impact on dependent communities.
2 – 2.99	**MODERATE**	Of moderate importance. PES should not be allowed to be negative affected without strong motivation.
3 – 3.99	**HIGH**	Of high importance. A score in this range motivates for maintenance or potentially positive change to PES.
4 – 5	**VERY HIGH**	Of extreme importance. A score in this range motivates for positive change to PES.

3.2 SCI RESULTS PER SECONDARY CATCHMENT

3.2.1 W1 Catchment (Main River: Mhlathuze)

The following RUs, as set out in **Table 3.2**, scored High. There were no scores in the Very High range. The bulk of those scoring HIGH did so either because of the recreation and aesthetic value, historical importance or the high dependence on resources associated with poor and vulnerable communities located within the combined SQs that make up the RU.

Table 3.2 Weighted SCI scores per RU for all reaches scoring High

RU	River Name	Weighted Score
W11-2	Nyezane	3.21
W11-3	Nyoni	3.26
W12-2	Mavungwini	3.16
W12-4	KwaMazula	3.16

3.2.2 W2 Catchment (Main River: Umfolozi)

The following RUs, as set out in **Table 3.3**, scored High. There were no scores in the Very High range. The bulk of those scoring HIGH did so either because of the recreation and aesthetic value, historical importance or the high dependence on resources associated with poor and vulnerable communities located within the combined SQs that make up the RU.

Table 3.3 Weighted SCI scores per RU for all reaches scoring High

RU	River Name	Weighted Score
W21-5	White Mfolozi	3.09
W22-3	Sikwebezi	3.07
W22-4	Black Mfolozi	3.02
W22-5	Black Mfolozi	3.51

3.2.3 W3 Catchment (Main River: Mkuze)

The following RUs, as set out in the **Table 3.4**, scored High. There were no scores in the Very High range. The bulk of those scoring HIGH did so either because of the recreation and aesthetic value, historical importance or the high dependence on resources associated with poor and vulnerable communities located within the combined SQs that make up the RU.

Table 3.4 Weighted SCI scores per RU for all reaches scoring High

RU	River Name	Weighted Score
W31-5	Mkuze	3.01
W31-6	Msunduzi	3.04
W32-2	Hluhluwe	3.12

3.2.4 W4 Catchment (Main River: Pongola - excluding Eswatini)

The following RUs, as set out in the **Table 3.5**, scored High. There were no scores in the Very High range. The bulk of those scoring HIGH did so either because of the recreation and aesthetic value, historical importance or the high dependence on resources associated with poor and vulnerable communities located within the combined SQs that make up the RU.

Table 3.5 Weighted SCI scores per RU for all reaches scoring High

RU	River Name	Weighted Score
W41-1	Bivane	3.04
W45-1	Pongola	3.17

3.2.5 W5 Catchment (Main River: Usutu - excluding Eswatini)

There were no RUs in this area that scored as High or Very High in terms of SCI.

3.2.6 W7 Catchment (Kosi Estuary and Sibaya Lake)

The following RUs, as set out in the **Table 3.6**, scored High. There were no scores in the Very High range. The bulk of those scoring HIGH did so either because of the recreation and aesthetic value, historical importance or the high dependence on resources associated with poor and vulnerable communities located within the combined SQs that make up the RU.

Table 3.6 Weighted SCI scores per RU for all reaches scoring High

RU	River Name	Weighted Score
W70-1	Swamanzi	3.11
W70-2	Malangeni	3.11

4 RIVER ECOLOGICAL IMPORTANCE AND SENSITIVITY

4.1 INTRODUCTION

The ecological importance of a river is an expression of its importance to the maintenance of biological diversity and ecological functioning on local and wider scales. Ecological sensitivity (or fragility) refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred (resilience) (Resh *et al.*, 1988; Milner, 1994). Both abiotic and biotic components of the system were taken into consideration in the assessment.

The importance evaluation for rivers used for this study were those generated as part of the PESEIS study (DWS, 2014) from the front end models as provided by Dr Kleynhans, Directorate: Resource Quality Information Services (D: RQIS), DWS. The Ecological Importance (EI) and Ecological Sensitivity (ES) of SQRs were assessed to obtain an indication of its vulnerability to environmental modification within the context of the PES. This would relate to the ability of the SQR to endure, resist and be able to recover from various forms of human use (DWS, 2014).

4.2 FRESHWATER ECOSYSTEM PRIORITY AREAS (FEPAS)

Freshwater Ecosystem Priority Areas (FEPAs) for SQRs were indicated in the master spreadsheet. **Table 4.1** provides the SQRs identified as a NFEPA. The reasoning behind the selection of a specific SQR as a NFEPA was not clear within the data (meta data or atlas) provided as part of the NFEPA documentation. The raw data (such as the fish distribution and conservation status description) used for inclusion in the FEPA was also not readily available. It was, however, evident that the primary FEPA selection criteria was that a reach had to fall within a good PES and that a fish of conservation importance must be present. Nel *et al.*, 2011 indicated that the base criterion of the river FEPA is the following: "Rivers had to be in a good condition (A or B PES) to be chosen as FEPAs".

The results of the PESEIS study (DWS, 2014) provided a higher confidence PES assessment as that on which the NFEPA study was based [which was largely Kleynhans's 2000 PESEIS database as well as some localised and expert data]. The PESEIS study (DWS, 2014) included a Google Earth™ assessment by various specialists with different backgrounds and extensive local knowledge and it must supersede (Kleynhans, *pers. comm.*) the NFEPA baseline. The DWS (2014) PESEIS information was further refined during this study (2022), based on the latest available information (especially Google Earth aerial imagery) and hence a more recent PES was calculated for each SQR.

The results of the PESEIS study (DWS, 2014) also provided distribution information for fish species in every SQR based on survey results and expert knowledge. These results also superseded the fish information used for the NFEPA assessment and hence the potential presence of important fish species in a SQR was verified by the use of the PESEIS (DWS, 2014) database.

Based on the above, the verification of the NFEPAs was essential prior to the NFEPA status being used to influence decision-making within the National Water Resource Classification System (NWRCS). The following filtering process was followed to verify the current NFEPA status:

- All FEPAs were identified from the shapefiles (Nel *et al.*, 2011) as well as correlating it with the data provided in the front end PESEIS models (DWS, 2014).

- If the PES results from the PESEIS project (DWS, 2014 and 2022 update) indicated that the SQR was not in a B or higher PES, it was not further considered as a FEPA (Category B/C was considered to be marginal and hence included within the acceptable limit).
- The presence of the important fish species (that the NFEPA was based on) in the SQR were verified using the information from the PESEIS study (DWS, 2014).

There are also Phase 2 FEPAs which were in a "present condition of a C (moderately modified) Ecological Category." According to Nel *et al.* (2011) the condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation. This implied that all Phase 2 FEPAs should be in a C PES and maintained in the short term as a C PES. These Phase 2 FEPAs were therefore not further considered as the EcoClassification approach will never set the Recommended Ecological Category (REC) to be lower than the PES.

Adjustments of EIS based on FEPA: When the latest information confirmed that a SQR qualifies to be considered as a NFEPA, the EIS was increased (if required) to fall in a minimum of a High category.

4.3 ADJUSTED RIVER ECOLOGICAL IMPORTANCE AND SENSITIVITY RESULTS

The SQRs with associated NFEPAs are listed and verified in **Table 4.1**. The EIS results without considering NFEPA and after considering verified NFEPA for all the SQRs are also provided in **Table 4.1**. No review or adjustments have been made to EIS results generated during the DWS (2014) study.

Barbus anoplus was listed as a fish species of concern during the NFEPA selection process. The current International Union for Conservation of Nature (IUCN) rating (2016-1) of this species remains *Least Concern*, although it is indicated that this species complex is currently under revision (ideally IUCN should indicate this species as Data Deficient: Taxonomy). Communication with Dr A. Bok (and Dr L. da Costa) indicate that the *Barbus anoplus/amatolicus* (recent genus change recommended for African *Barbus* to *Enteromius*) may well be of conservation concern, validating the use of this species in the FEPA delineation of this region. *Enteromius anoplus* belong to the "chubbyhead barb" species complex that has been shown to have significant genetic variation and to represent multiple potential species. Although *E. anoplus* is classified as Least Concern (IUCN, 2021, the *Enteromius* species in the study area was likely a unique genetic linage of the complex "*Enteromius anoplus* group of species" and hence flagged as a species of conservation concern. Until further verification, it will be considered a unique species that qualifies for NFEPA criteria.

Table 4.1 Verification of NFEPA for each SQR

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
W1 Secondary Catchment (Main River: Mhlathuze)									
W12-1	W12A-03153	Mhlatuze	Very High	C		Permanent/Seasonal - North Eastern Uplands - Lower foothill Permanent/Seasonal - North Eastern Uplands - Mountain stream Permanent/Seasonal - North Eastern Uplands - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	Very High
W12-7	W12E-03526	Mhtatuzana	High	B		Permanent/Seasonal - North Eastern Uplands - Lower foothill Permanent/Seasonal - North Eastern Uplands - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore does meet criteria (PES of A or B).	Y	High
W12-7	W12E-03530	Mateku	High	B		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore does meet criteria (PES of A or B).	Y	High
W12-7	W12E-03558	Mhlatuzana	High	B		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore does meet criteria (PES of A or B).	Y	High
W12-8	W12G-03229	Nseleni	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W12-8	W12H-03289	Mbabe	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W12-8	W12H-03316	Mposa	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W12-8	W12H-03401	Okula	Moderate	D		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), PES=D, therefore does not meet criteria (PES of A or B).	N	Moderate
W12-8	W12H-03418	Nseleni	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
						- Upper foothill	meet criteria.		
W12-8	W12H-03428	Mbabe	Moderate	D		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), PES=D, therefore does not meet criteria (PES of A or B).	N	Moderate
W12-8	W12H-03459	Nseleni	High	D		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), PES=D, therefore does not meet criteria (PES of A or B).	N	High
W12-9	W12J-03290	Nhlabane	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W12-9	W12J-03411	0.00	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W12-10	W12J-03392	Mpisini	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W12-10	W12J-03403	0.00	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W12-10	W12J-03450	Nundwane	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	Y	High
W13-1	W13A-03583	Mlalazi	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	High
W13-1	W13A-03609	Mlalazi	Moderate	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in category A or B under PES, therefore does not meet criteria.	N	Moderate
W13-1	W13A-03641	Mkukuze	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
						Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	or B under PES, therefore does not meet criteria.		
W13-1	W13B-03593	KwaGugushe	High	C		Permanent/Seasonal - Eastern Coastal Belt - Lower foothill Permanent/Seasonal - Eastern Coastal Belt - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B under PES, therefore does not meet criteria.	N	High
W13-2	W13B-03774	Manzamnyama	High	B/C			Classified as FEPA (River ecosystems), unlikely in Category A or B under PES, therefore does not meet criteria.	N	High
W2 Secondary Catchment (Main River: Umfolozi)									
W21-1	W21A-02512	aMagoda	High	C	*Enteromius anoplus*	Permanent/Seasonal - North Eastern Uplands - Mountain stream Permanent/Seasonal - North Eastern Uplands - Upper foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. FEPA fish spp. listed is Enteromius anoplus and this spp. estimated to still be present in SQ. Although not in a Category A or B (PES=C) this species may still be present and hence this SQ remains of ecological importance.	Y?	High
W22-2	W22C-02688	Black Mfolozi	High	C		Permanent/Seasonal - North Eastern Uplands - Lower foothill Permanent/Seasonal - North Eastern Uplands - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-2	W22D-02795	iThaka	High	B		Permanent/Seasonal - Lowveld - Lower foothill			High
W22-3	W22F-02726	Sikwebezi	High	B/C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-2	W22F-02722	Black Mfolozi	High	C/D		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W22-3	W22E-02601	Bululwana	Moderate	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C/D), therefore does not meet criteria.	N	Moderate
W22-3	W22E-	Sikwebezi	High	B/C		Permanent/Seasonal - Lowveld - Lower	Classified as FEPA (River	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
	02605					foothill	ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.		
W22-3	W22E-02595		High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W22-3	W22E-02702	Sikwebezi	Moderate	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	Moderate
W22-4	W22F-02748	Black Mfolozi	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-4	W22G-02624	Vuna	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-4	W22H-02846	Black Mfolozi	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-5	W22H-02844	Mbhekamuzi	High	B/C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W22-5	W22J-02942	Mvalo	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-5	W22J-02918	Wela	High	B/C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W22-5	W22J-02807	Black Mfolozi	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-5	W22J-02910	Black Mfolozi	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
							meet criteria.		
W22-5	W22J-02817	Black Mfolozi	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-5	W22K-02761	Mapopoma	High	B		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W22-5	W22K-02636	Manzimakulu	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-5	W22K-02629	Mona	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W22-5	W22K-02783	Mona	High	B		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W22-5	W22L-02916	Black Mfolozi	High	B		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W23-1	W23A-03098	Nkatha	Moderate	B/C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	Moderate
W23-1	W23A-03160	Mvamanzi	High	B		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W23-1	W23A-03058	Mbukwini	High	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W23-1	W23A-03083	Mfolozi	High	C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W23-1	W23A-	Mfolozi	High	B		Permanent/Seasonal - Lowveld - Lower	Classified as FEPA (River	Y	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
	03149					foothill Permanent/Seasonal - Lowveld - Lowland river	ecosystems), PES=B, therefore just meet criteria (PES of A or B).		
W23-1	W23A-03113	Mfolozi	High	B		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W23-2	W23B-03250	Ntobozi	High	C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W23-2	W23B-03222	Msunduzi	High	B		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W23-3	W23B-03231	Msunduzi	Moderate	E		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	Moderate
W23-3	W23C-03287	Mavuya	High	D		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), not in Category A or B (PES=D), therefore does not meet criteria.	N	High
W23-3	W23C-03272	Ntenja	Moderate	E		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), not in Category A or B (PES=E), therefore does not meet criteria.	N	Moderate
W23-3	W23C-03254	Mavuya	Moderate	D		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), not in Category A or B (PES=D), therefore does not meet criteria.	N	Moderate
W23-3	W23C-03180	Msunduzi	Moderate	E		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (River ecosystems), not in Category A or B (PES=E), therefore does not meet criteria.	N	Moderate
W23-3	W23D-03108	Mfolozi	Moderate	E			Classified as FEPA (River ecosystems), not in Category A or B (PES=E), therefore does not meet criteria.	N	Moderate

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
W3 Secondary Catchment (Main River: Mkuze)									
W31-2	W31D-02436	Manzimhlope	High	B		Permanent/Seasonal - North Eastern Uplands - Mountain stream Permanent/Seasonal - North Eastern Uplands - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-3	W31E-02456	Mkuze	High	B/C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W31-3	W31F-02573	Mpuphisi	High	B/C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W31-3	W31F-02555	Nkunzana	High	C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W31-3	W31F-02530	Nkunzana	High	C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W31-3	W31G-02455	Mtiki	High	B/C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W31-3	W31G-02506	Mkuze	Moderate	C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	Moderate
W31-4	W31G-02425	Mkuze	High	C		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W31-4	W31H-02514	KwaSekane	High	B		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-5	W31J-02343	Mthambalala	Moderate	C		Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), unlikely in Category A	N	Moderate

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
						Permanent/Seasonal - Lowveld - Upper foothill	or B (PES=C), therefore does not meet criteria.		
W31-5	W31J-02406	Ndlamyane	High	D		Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W31-5	W31J-02509	Mkuze	High	C/D		Permanent/Seasonal - Natal Coastal Plain - Lowland river	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C/D), therefore does not meet criteria.	N	High
W31-6	W31K-02617	Mduna	High	B		Permanent/Seasonal - Natal Coastal Plain - Lowland river	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31K-02611	Msebe	High	B/C		Permanent/Seasonal - Natal Coastal Plain - Lowland river	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	Moderate
W31-6	W31K-02582	Ntweni	High	B		Permanent/Seasonal - Natal Coastal Plain - Lowland river	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31K-02568	Msunduzi	High	B		Permanent/Seasonal - Natal Coastal Plain - Lowland river	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31L-02553	Nsumu	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31L-02525		High	B		Ephemeral - Lowveld - Lower foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31L-02528	Masundwini	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31L-02551	Nsumu	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31L-02563	Nsumu	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W31-6	W31L-02569	Msunduzi	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream	Classified as FEPA (River ecosystems), PES=B, therefore just	Y	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
						Ephemeral - Lowveld - Upper foothill	meet criteria (PES of A or B).		
W32_1	W32A-02345	Neshe	High	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W32_1	W32A-02557	Mkuze	High	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W32_1	W32B-02476	Khobeyane	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W32-2	W32E-02887	Hluhluwe	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W32-2	W32E-02797	Manzabomvu	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W32-2	W32E-02859	Nzimane	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W32-2	W32E-02865	Hluhluwe	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W32-3	W32G-02946	Sikhathula	High	B/C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W32-3	W32G-02973	Nyalazi	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W32-4	W32G-03102	Nsane	High	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W32-4	W32G-02943	Hlazane	High	B/C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y	High
W32-4	W32G-02980	Mnyaba	High	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream	Classified as FEPA (River ecosystems), unlikely in Category A	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
						Ephemeral - Lowveld - Upper foothill	or B (PES=C), therefore does not meet criteria.		
W32-4	W32G-03006	Nyalazi	High	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W32-4	W32G-03055	Nyalazi	Moderate	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	Moderate
W32-4	W32G-02986	Hlazane	High	C/D		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C/D), therefore does not meet criteria.	N	High
W32-5	W32C-02684	Ngweni	High	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W32-5	W32C-02671	Mzinene	High	C		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), unlikely in Category A or B (PES=C), therefore does not meet criteria.	N	High
W32-6	W32C-02634	Mhlosinga	High	B		Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W32-6	W32C-02612	Munywana	High	B		Permanent/Seasonal - Natal Coastal Plain - Lower foothill Permanent/Seasonal - Natal Coastal Plain - Mountain stream Permanent/Seasonal - Natal Coastal Plain - Upper foothill	Classified as FEPA (River ecosystems), PES=B, therefore just meet criteria (PES of A or B).	Y	High
W4 Secondary Catchment (Main River: Pongola - excluding Eswatini)									
W41-1	W41A-02372	Bivane	High	C	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Eastern Escarpment Mountains - Lower foothill Permanent/Seasonal - Eastern Escarpment Mountains - Mountain stream Permanent/Seasonal - Eastern Escarpment Mountains - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W41-1	W41B-	uBivanyana	High	C	*Enteromius anoplus*	Permanent/Seasonal - Eastern Escarpment	Does not meet criteria (Category A	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
	02401				*Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Mountains - Lower foothill Permanent/Seasonal - Eastern Escarpment Mountains - Mountain stream Permanent/Seasonal - Eastern Escarpment Mountains - Upper foothill	or B) as PES=C.		
W41-1	W41B-02427	Bivane	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Eastern Escarpment Mountains - Lower foothill Permanent/Seasonal - Eastern Escarpment Mountains - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W41-1	W41B-02431	Bivane	High	**B/C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Uplands - Lower foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). Two of the SCC (*E. anoplus* and *V. nelspruitensis*) estimated to be present.	Y?	High
W41-1	W41B-02434	Soetmelks	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Uplands - Lower foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W41-1	W41C-02437	Mpemvana	High	**C**	*Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Uplands - Lower foothill Permanent/Seasonal - North Eastern Uplands - Mountain stream Permanent/Seasonal - North Eastern Uplands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W41-1	W41D-02373	Bivane	High	**B/C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Uplands - Lower foothill Permanent/Seasonal - North Eastern Uplands - Mountain stream Permanent/Seasonal - North Eastern Uplands - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). Two of the SCC (*E. anoplus* and *V. nelspruitensis*) estimated to be present.	Y?	High
W41-1	W41D-02435	iNxwayi	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Uplands - Lower foothill Permanent/Seasonal - North Eastern Uplands - Mountain stream Permanent/Seasonal - North Eastern Uplands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W41-1	W41E-	Bivane	High	**C**	*Enteromius anoplus*	Permanent/Seasonal - Lowveld - Lower	Does not meet criteria (Category A	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
	02359				*Opsaridium peringueyi* *Varicorhinus nelspruitensis*	foothill Permanent/Seasonal - Lowveld - Upper foothill	or B) as PES=C.		
W41-2	W41F-02433	Manzana	High	**B**	*Enteromius anoplus* *Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B, therefore meet criteria (PES of A or B). Both SCC (*E. anoplus* and *O. peringueyi*) estimated to be present.	Y	High
W41-2	W41F-02454	Manzana	High	**B**	*Enteromius anoplus* *Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Mountain stream Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B, therefore meet criteria (PES of A or B). Both SCC (*E. anoplus* and *O. peringueyi*) estimated to be present.	Y	High
W41-2	W41F-02461	KwaCeba	High	**B**	*Enteromius anoplus* *Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Mountain stream Permanent/Seasonal - Lowveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B, therefore meet criteria (PES of A or B). Both SCC (*E. anoplus* and *O. peringueyi*) estimated to be present.	Y	High
W42-1	W42A-02261	Phongolo	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Eastern Escarpment Mountains - Lower foothill Permanent/Seasonal - Eastern Escarpment Mountains - Mountain stream Permanent/Seasonal - Eastern Escarpment Mountains - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W42-1	W42B-02268	Phongolo	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Highlands - Lower foothill Permanent/Seasonal - North Eastern Highlands - Lowland river Permanent/Seasonal - North Eastern Highlands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W42-1	W42B-02271	Phongolo	Moderate	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Highlands - Lowland river	Does not meet criteria (Category A or B) as PES=C.	N	Moderate
W42-1	W42C-02205	Ntombe	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus*	Permanent/Seasonal - Eastern Escarpment Mountains - Lower foothill Permanent/Seasonal - Eastern Escarpment Mountains - Lowland river	Does not meet criteria (Category A or B) as PES=C.	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
					nelspruitensis	Permanent/Seasonal - Eastern Escarpment Mountains - Mountain stream Permanent/Seasonal - Eastern Escarpment Mountains - Upper foothill			
W42-2	W42D-02251	Phongolo	Moderate	**D**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Highlands - Lower foothill Permanent/Seasonal - North Eastern Highlands - Lowland river Permanent/Seasonal - North Eastern Highlands - Upper foothill	Does not meet criteria (Category A or B) as PES=D.	N	Moderate
W42-2	W42D-02327	Gode	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Highlands - Lower foothill Permanent/Seasonal - North Eastern Highlands - Lowland river Permanent/Seasonal - North Eastern Highlands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W42-2	W42E-02221	Phongolo	Moderate	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Highlands - Lower foothill Permanent/Seasonal - North Eastern Highlands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	Moderate
W42-2	W42F-02185	Wit	High	**C**	*Enteromius anoplus* *Opsaridium peringueyi* *Varicorhinus nelspruitensis*	Permanent/Seasonal - North Eastern Highlands - Lower foothill Permanent/Seasonal - North Eastern Highlands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W42-3	W42H-02394	iThalu	High	**B**	*Enteromius anoplus* *Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Upper foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS both SCC estimated to be present.	Y	High
W42-3	W42H-02411	iThalu	High	**B**	*Enteromius anoplus* *Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Mountain stream Permanent/Seasonal - Lowveld - Upper foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS both SCC estimated to be present.	Y	High
W42-3	W42H-02428	Mbizane	High	**B**	*Enteromius anoplus* *Opsaridium*	Permanent/Seasonal - Lowveld - Mountain stream	Classified as a FEPA based on fish species of conservation concern	Y	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
					peringueyi	Permanent/Seasonal - Lowveld - Upper foothill	and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS both SCC estimated to be present.		
W42-3	W42J-02353	Phongolo	High	**B**	*Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Lower foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS the SCC estimated to be present.	Y	High
W42-3	W42J-02378	Phongolo	High	**B**	*Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Lower foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS the SCC estimated to be present.	Y	High
W42-3	W42J-02397	Mhulumbela	High	**C**	*Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Mountain stream Permanent/Seasonal - Lowveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W42-4	W42K-02148	Mozana	Moderate	**C**	*Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Mountain stream Permanent/Seasonal - Lowveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	Moderate
W42-4	W42K-02242		Moderate	**C**	*Opsaridium peringueyi*	Permanent/Seasonal - North Eastern Highlands - Mountain stream Permanent/Seasonal - North Eastern Highlands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	Moderate
W42-4	W42K-02272	Mozana	High	**B**	*Opsaridium peringueyi*	Permanent/Seasonal - North Eastern Highlands - Mountain stream Permanent/Seasonal - North Eastern Highlands - Upper foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS the SCC estimated to be present.	Y	High
W42-4	W42L-02270	Mozana	Moderate	**B**	*Opsaridium peringueyi*	Permanent/Seasonal - North Eastern Highlands - Mountain stream Permanent/Seasonal - North Eastern Highlands - Upper foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS the SCC estimated to be present.	Y	Moderate

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
42-5	W42M-02269	Mtokotshwala	High	C	*Opsaridium peringueyi*	Permanent/Seasonal - North Eastern Highlands - Mountain stream Permanent/Seasonal - North Eastern Highlands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
42-5	W42M-02294	Spekboom	High	B/C	*Opsaridium peringueyi*	Permanent/Seasonal - North Eastern Highlands - Mountain stream Permanent/Seasonal - North Eastern Highlands - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). Fish SCC estimated to be present.	Y?	Moderate
42-5	W42M-02352	Phongolo	High	B	*Opsaridium peringueyi*	Permanent/Seasonal - Lowveld - Lower foothill	Classified as a FEPA based on fish species of conservation concern and river ecosystem types. PES=B, therefore meet criteria (Category A or B). Based on PESEIS the SCC estimated to be present.	Y	High
W43-1	W43F-02072	Ngwavuma	Moderate	C	*Hydrocynus vittatus*	Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Lowland river	Does not meet criteria (Category A or B) as PES=C.	N	Moderate
W43-1	W43F-02076	Msunduzi	Moderate	D/E	*Hydrocynus vittatus*	Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Lowland river	Does not meet criteria (Category A or B) as PES=C.	N	Moderate
W43-1	W43F-02089	Ngwavuma	Moderate	C/D	*Hydrocynus vittatus*	Permanent/Seasonal - Lowveld - Lower foothill	Does not meet criteria (Category A or B) as PES=C/D.	N	Moderate
W43-1	W43F-02107		High	C	*Hydrocynus vittatus*	Permanent/Seasonal - Lebombo Uplands - Lowland river Permanent/Seasonal - Lebombo Uplands - Mountain stream Permanent/Seasonal - Lebombo Uplands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W43-1	W43F-02142		High	B/C	*Hydrocynus vittatus*	Ephemeral - Lebombo Uplands - Mountain stream Ephemeral - Lebombo Uplands - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). Fish SCC estimated to be present.	Y?	High
W45-1	W45A-02216	Zibayeni	High	C	*Hydrocynus vittatus*	Ephemeral - Lowveld - Lower foothill Ephemeral - Lowveld - Lowland river Ephemeral - Lowveld - Mountain stream Ephemeral - Lowveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W45-1	W45A-02310	Mangqwashi	High	C	*Hydrocynus vittatus*	Permanent/Seasonal - Lowveld - Lower foothill	Does not meet criteria (Category A or B) as PES=C.	N	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
						Permanent/Seasonal - Lowveld - Mountain stream Permanent/Seasonal - Lowveld - Upper foothill			
W45-1	W45A-02316	Mfongosi	High	**C**	*Hydrocynus vittatus*	Ephemeral - Lebombo Uplands - Lower foothill Ephemeral - Lebombo Uplands - Lowland river Ephemeral - Lebombo Uplands - Mountain stream Ephemeral - Lebombo Uplands - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W45-1	W45A-02356	Mlambo	High	**C**	*Hydrocynus vittatus*	Permanent/Seasonal - Lowveld - Lower foothill Permanent/Seasonal - Lowveld - Mountain stream Permanent/Seasonal - Lowveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C.	N	High
W5 Secondary Catchment (Main River: Usutu - excluding Eswatini)									
W51-1	W51A-02082	Assegaai	High	**C**	*Enteromius anoplus* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Lowland river Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. Only *E. anoplus* expected.	N	High
W51-1	W51B-02101	Ngulane	Moderate	**D**	*Enteromius anoplus* *Enteromius brevipinnis* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=D. Only *E. anoplus* and *E. brevipinnis* expected.	N	Moderate
W52-1	W52A-01934		High	**C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. Only BANO expected.	N	High
W52-1	W52A-	Hlelo	High	**B/C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower	Classified as FEPA (fish SCC and	Y?	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
	01983					foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *E. anoplus* estimated to be present.		
W52-1	W52B-01890		Moderate	**C/D**	*Enteromius anoplus*	Ephemeral - Highveld - Lower foothill Ephemeral - Highveld - Mountain stream Ephemeral - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C/D. Only *E. anoplus* expected.	N	Moderate
W52-1	W52B-01964	Hlelo	Moderate	**C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Lowland river	Does not meet criteria (Category A or B) as PES=C. Only *E. anoplus* expected.	N	Moderate
W52-1	W52C-01867	Hlelo	Moderate	**B/C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *E. anoplus* estimated to be present.	Y?	Moderate
W52-1	W52C-01888	Tweelingspruit	Moderate	**B/C**		Permanent/Seasonal - Highveld - Upper foothill	Classified as FEPA (River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B).	Y?	Moderate
W52-1	W52D-01862	Hlelo	High	**B/C**	*Enteromius anoplus*	Permanent/Seasonal - North Eastern Highlands - Lower foothill Permanent/Seasonal - North Eastern Highlands - Mountain stream Permanent/Seasonal - North Eastern Highlands - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *E. anoplus* estimated to be present.	Y?	High
W53-1	W53A-01757	Sandspruit	High	**B/C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *E. anoplus* estimated to be present.	Y?	High
W53-1	W53A-01853	Ngwempisi	Moderate	**D**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=D. *E. anoplus* (BANO) unlikely to be present due to altered condition.	N	Moderate
W53-2	W53B-01694		Moderate	**B/C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of	Y?	Moderate

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
						stream Permanent/Seasonal - Highveld - Upper foothill	A or B). *E. anoplus* estimated to be present.		
W53-2	W53B-01710	Mpama	Moderate	**C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. Only BANO expected.	N	Moderate
W53-3	W53C-01679	Thole	Moderate	**C**	*Amphilius natalensis*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. Uncertain about presence of ANAT (only AURA indicated).	N	Moderate
W53-3	W53D-01751		Moderate	**C**	*Amphilius natalensis*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. Uncertain about presence of ANAT (only AURA indicated).	N	Moderate
W54-1	W54A-01534	uSuthu	Moderate	**C/D**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C/D. *E. anoplus* potentially present.	N	Moderate
W54-1	W54A-01630		Moderate	**C**	*Enteromius anoplus*	Ephemeral - Highveld - Lower foothill Ephemeral - Highveld - Mountain stream Ephemeral - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. *E. anoplus* potentially present.	N	Moderate
W54-1	W54B-01623	Seganagana	Moderate	**C**		Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. *E. anoplus* potentially present.	N	Moderate
W54-2	W54C-01512	Bonnie Brook	Moderate	**B**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B, therefore meet criteria (PES of A or B). *E. anoplus* estimated to be	Y	Moderate

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
							present.		
W54-2	W54C-01552	Bonnie Brook	Moderate	**B/C**	*Enteromius anoplus*	Ephemeral - Highveld - Mountain stream Ephemeral - Highveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *E. anoplus* estimated to be present.	Y?	Moderate
W54-2	W54C-01556	Bonnie Brook	Moderate	**C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. *E. anoplus* potentially present.	N	Moderate
W54-2	W54D-01593	uSuthu	High	**C**	*Enteromius anoplus*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. *E. anoplus* potentially present.	N	High
W55-1	W55A-01375	Mpuluzi	Moderate	**C**	*Enteromius anoplus* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Does not meet criteria (Category A or B) as PES=C. Only *E. anoplus* estimated to be present.	N	Moderate
W55-1	W55C-01395	Mpuluzi	High	**B/C**	*Enteromius anoplus* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *E. anoplus* and *L. nelspruitensis* estimated to be present.	Y?	High
W55-1	W55C-01489	Swartwater	Moderate	**B/C**	*Enteromius anoplus* *Varicorhinus nelspruitensis*	Permanent/Seasonal - Highveld - Lower foothill Permanent/Seasonal - Highveld - Mountain stream Permanent/Seasonal - Highveld - Upper foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *E. anoplus* and *L. nelspruitensis* estimated to be present.	Y?	High
W57-1	W57J-01923	uSuthu	High	**B/C**	*Hydrocynus vittatus*	Permanent/Seasonal - Lebombo Uplands - Lower foothill Permanent/Seasonal - Lebombo Uplands - Lowland river	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *H. vittatus* estimated to be present.	Y	High
W57-1	W57K-01929	uSuthu	High	**B/C**	*Hydrocynus vittatus*	Permanent/Seasonal - Lowveld - Lowland river	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of	Y	High

RU	SQR no	River	EIS	PES	FEPA Fish spp.	FEPA River ecosystem type	FEPA comment	FEPA River (Y/N)	FINAL EIS
							A or B). *H. vittatus* estimated to be present.		
W57-1	W57K-02025		High	**A**	*Hydrocynus vittatus*	Permanent/Seasonal - Lowveld - Lower foothill	Classified as FEPA (fish SCC and River ecosystems), PES=B/C, therefore just meet criteria (PES of A or B). *H. vittatus* estimated to be present.	Y	High
W7 Secondary Catchment (Kosi Bay and Sibaya Lake)									
W70-1	W70A-02079	Swamanzi	Moderate	**D**	*Silhouetta sibaya*	Permanent/Seasonal - Natal Coastal Plain - Lower foothill Permanent/Seasonal - Natal Coastal Plain - Upper foothill	Does not meet criteria (Category A or B) as PES=D.	N	Moderate
W70-2	W70A-02112	Malangeni	High	**B**	*Silhouetta sibaya*	Ephemeral - Natal Coastal Plain - Lower foothill Ephemeral - Natal Coastal Plain - Lowland river	Classified as FEPA (fish SCC and River ecosystems), PES=B, therefore meet criteria (PES of A or B). Fish species of conservation concern (SCC) *S. sibaya* estimated to be present.	Y	High
W70-3	W70A-02301		Moderate	**D**	*Silhouetta sibaya*	Ephemeral - Natal Coastal Plain - Lower foothill Ephemeral - Natal Coastal Plain - Upper foothill	Does not meet criteria (Category A or B) as PES=D.	N	Moderate

4.4 EIS RESULTS PER SECONDARY CATCHMENT

The final EIS results for the RUs for High or Very High EIS after consideration of NFEPA is provided in **Table 4.2**.

Table 4.2 Final EIS results

RU	MAIN RIVER	EIS VALUE	EIS RATING
W1 Secondary Catchment (Main River: Mhlathuze)			
W11-1	Matigulu	3.28	High
W11-2	Matigulu	3.02	High
W12-1	Mhlathuze	3.58	High
W12-2	Mhlathuze	3.51	High
W12-3	Mhlatuze	3.71	High
W12-4	KwaMazula	3.26	High
W12-5	Mfule	3.46	High
W12-7	Mhlatuzana	3.69	High
W12-8	Nseleni	3.01	High
W12-9	Kondweni	3.34	High
W12-10	Lake Msingaze	3.41	High
W13-1	Mlalazi	3.36	High
W13-2	Manzamnyama	3.53	High
W2 Secondary Catchment (Main River: Umfolozi)			
W21-1	White Mfolozi	3.37	High
W21-2	White Mfolozi	3.37	High
W21-3	White Mfolozi	3.43	High
W21-5	White Mfolozi	3.34	High
W21-6	White Mfolozi	3.47	High
W21-7	White Mfolozi	3.46	High
W21-8	White Mfolozi	3.65	High
W22-1	Black Mfolozi	3.58	High
W22-2	Black Mfolozi	3.59	High
W22-3	Sikwebezi	3.28	High
W22-4	Black Mfolozi	3.29	High
W22-5	Black Mfolozi	3.41	High
W23-1	Mfolozi	3.32	High
W23-2	Msunduzi	3.34	High
W3 Secondary Catchment (Main River: Mkuze)			
W31-1	Mkuze	3.37	High
W31-2	Mkuze	3.37	High
W31-3	Mkuze	3.37	High
W31-4	Mkuze	3.37	High
W31-5	Mkuze	3.37	High
W31-6	Msunduzi	3.37	High
W32_1	Mkuze	3.37	High
W32-2	Hluhluwe	3.37	High
W32-3	Nyalazi	3.37	High
W32-4	Nyalazi	3.37	High
W32-5	Mzinene	3.37	High
W32-6	Munywana	3.37	High

RU	MAIN RIVER	EIS VALUE	EIS RATING
W4 Secondary Catchment (Main River: Pongola - excluding Eswatini)			
W41-1	Bivane	3.12	High
W41-2	Manzana	3.27	High
W41-3	Bivane	3.30	High
W42-1	Phongolo	3.06	High
W42-2	Phongolo	3.07	High
W42-3	Phongolo	3.45	High
W42-5	Phongolo	3.29	High
W45-1	Phongolo	3.20	High
W5 Secondary Catchment (Main River: Usutu - excluding Eswatini)			
W51-1	Assegaai	3.20	High
W51-3	Assegaai	3.00	High
W52-1	Hlelo	3.02	High
W55-1	Mpuluzi	3.11	High
W55-2	Lusushwana	3.15	High
W57-1	uSuthu	3.77	High
W7 Secondary Catchment (Kosi Bay and Sibaya Lake)			
W70-2	Malangeni	3.42	High

5 RIVER RU PRIORITISATION

5.1 APPROACH

A biodiversity/ecological hotspot is a biogeographic region which is a significant reservoir of biodiversity which is threatened with destruction (http://en.wikipedia. org/wiki/Biodiversity_hotspot). In the context used here, the hotspot represents a river reach with a high Integrated Environmental Importance (IEI) which could be under threat due to its importance for water resource use. The hotspots are therefore an indication of areas where detailed investigations would be required if, for example, development was being considered or the area was under water resource use stress. These hotspots usually represent areas which are already stressed or will be stressed in future (Louw and Huggins, 2007; Louw *et al.,* 2010).

In order to link with the Resource Quality Objectives (RQOs) terminology, the hotspots will from hereon be referred to as High Priority Resource Units.

Classification is usually undertaken for a large area with many Integrated Unit of Analysis (IUAs). IUAs are a combination of the socio-economic regions defined in watershed boundaries, within which ecological information is provided at a finer scale. This requires that biophysical nodes be nested within the IUAs (DWA, 2007). Ideally, each RU requires some level of EWR assessment. The hotspot identification will therefore provide an indication of the level of EWR assessment required at the biophysical nodes. In essence, this would be similar to a filtering process where the most detailed assessment is undertaken at hotspots, and less detailed assessments at the other areas. Nodes that are EWR sites represent the areas where most detailed EWR methods will be required.

The purpose of the identification of High Priority Resource Units for this study was the following:

- To determine whether hotspots were addressed by existing EWR sites.
- To provide guidance to levels of Reserve that might be required for licensing purposes within the framework provided by the NWRCS.
- To provide an indication where scenario development and testing would be important.
- To provide guidance to areas with a very low hotspot evaluation as flow requirements for these might not be necessary.
- To link to the RQO process that provides different levels of RQOs linked to the RU priority level.

The process used is described in **Figure 5.1** and relied on the results (with modifications during this study) of the PESEIS study.

As part of this assessment, the WRUI was undertaken as well as the SCI. These were undertaken on a RU scale.

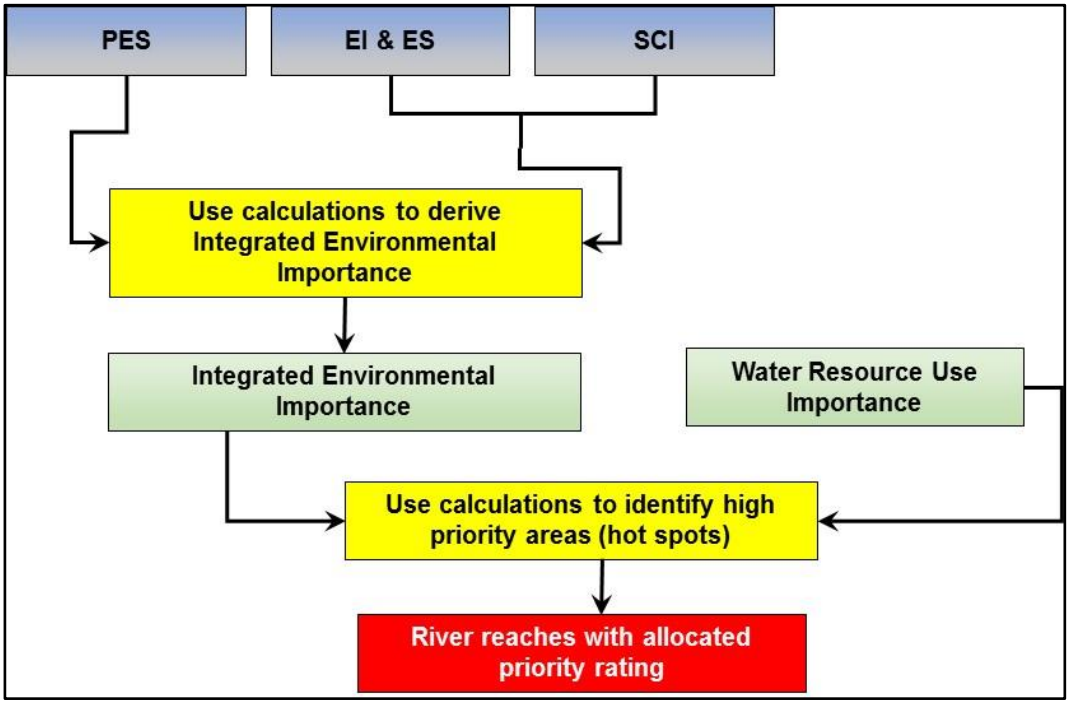

Figure 5.1 Summary of the process to identify biophysical nodes for EWR assessment

The steps used to identify the priority areas (hotspots) were:

- Desktop EcoClassification which included the determination of the EIS, SCI and PES.
- Determination of the IEI by integrating the EIS, SCI and the PES.
- Determining the WRUI.
- Identification of the areas which were priority hotspots because of high IEI and/or WRUI and require more detailed studies.
- Provide recommendations for the locality of detailed EWR sites.

The SQRs that were grouped into RUs are provided in **Appendix A** and sourced from the Status Quo report – Appendix B (DWS, 2022)

5.2 INTEGRATED ENVIRONMENTAL IMPORTANCE

5.2.1 Integrated Environmental Importance approach

As described above, the Ecological and Socio-Cultural Importance were assessed separately and were then integrated with the PES to determine the Integrated Environmental Importance. The PES forms part of the IEI as rivers (or wetlands) in good condition are scarce, and therefore important in their own right. A river that is in very good condition, but of low EIS, and/or SCI; might still be important from an ecological perspective, as it could be one of a limited number of that type of river that is in good condition. The IEI also provides an indication of the restoration potential. The restoration potential refers to the probability of achieving the rehabilitation of the river to an improved state. For example, if a river has very high Ecological and Socio-Cultural Importance, but is in bad condition, the restoration potential is often low and that will result in a low Integrated Environmental Importance.

The EIS and SCI ratings were not averaged, but the highest score of the two (referred to in tables as an Importance Score (IS) are used to integrate it with the PES. This is then called the Integrated Environmental Importance. A matrix (**Table 5.1**) to aid in consistently providing an

integrated rating comparing EIS, SCI, and PES was designed during 2006 (Louw and Huggins, 2007) and modified during to automate the process and thereby produce more consistent answers.

Table 5.1 Matrix used to determine a combined EIS/SCI and PES value which provides an Integrated Environmental Importance value

EIS &SCI (max)										
	Very high	4-5	3	3	3	4	5	5	5	5
	High	3-3.9	3	3	3	3	4	5	5	5
	Moderate	2-2.9	2	2	2	3	3	4	5	5
	Low	1-1.9	1	1	2	2	3	4	4	4
	Very low	0-0.9	1	1	1	2	2	3	4	4
			D/E to F	D	C/D	C	B/C	B	A/B	A
			>3.2	2.7-3.2	2.3-2.6	1.7-2.2	1.3-1.6	0.7-1.2	0.3-0.6	<0.3
			PES							

5.2.2 Integrated Environmental Importance results

The results of the IEI for each river RU are provided in **Table 5.2** and **Figure 5.2**. The scoring for the IEI is as follows:

5	Very High
4	High
3	Moderate
2	Low
1	Very Low

Table 5.2 IS and IEI results for river RUs

RU number	Main river name	River EIS	SCI	IS	PES RU EC	IEI
W1 Secondary Catchment (Main River: Mhlathuze)						
W11-1	Matigulu	High	Moderate	High	B	5
W11-2	Matigulu	High	High	High	C	3
W11-3	Nyoni	Moderate	High	High	C/D	3
W12-1	Mhlathuze	High	Moderate	High	C	3
W12-2	Mhlathuze	High	High	High	B	5
W12-3	Mhlatuze	High	Moderate	High	C	3
W12-4	KwaMazula	High	High	High	C	3
W12-5	Mfule	High	Moderate	High	C	3
W12-6	Mhlatuze	Moderate	Moderate	Moderate	C	3
W12-7	Mhlatuzana	High	Moderate	High	B	5
W12-8	Nseleni	High	Moderate	High	C	3
W12-9	Kondweni	High	Low	High	C	3
W12-10	Lake Msingaze	High	Low	High	C	3
W13-1	Mlalazi	High	Moderate	High	C	3
W13-2	Manzamnyama	High	Low	High	B/C	4
W2 Secondary Catchment (Main River: Umfolozi)						
W21-1	White Mfolozi	High	Low	High	C	3
W21-2	White Mfolozi	High	Low	High	B	5
W21-3	White Mfolozi	High	Low	High	C	3
W21-4	Nondweni	Moderate	Low	Moderate	D	2
W21-5	White Mfolozi	High	High	High	B/C	4
W21-6	White Mfolozi	High	Moderate	High	B/C	4

RU number	Main river name	River EIS	SCI	IS	PES RU EC	IEI
W21-7	White Mfolozi	High	Moderate	High	B/C	4
W21-8	White Mfolozi	High	Moderate	High	B	5
W22-1	Black Mfolozi	High	Moderate	High	B/C	4
W22-2	Black Mfolozi	High	Moderate	High	B/C	4
W22-3	Sikwebezi	High	High	High	C	3
W22-4	Black Mfolozi	High	High	High	C	3
W22-5	Black Mfolozi	High	High	High	B	4
W23-1	Mfolozi	High	Moderate	High	B	5
W23-2	Msunduzi	High	Low	High	B	5
W23-3	Mfolozi	Moderate	Moderate	Moderate	E	2
W3 Secondary Catchment (Main River: Mkuze)						
W31-1	Mkuze	High	Moderate	High	C	3
W31-2	Mkuze	High	Moderate	High	B	5
W31-3	Mkuze	High	Moderate	High	B/C	4
W31-4	Mkuze	High	Moderate	High	B	5
W31-5	Mkuze	High	High	High	C	3
W31-6	Msunduzi	High	High	High	B	5
W32_1	Mkuze	High	Moderate	High	B/C	4
W32-2	Hluhluwe	High	High	High	B	5
W32-3	Nyalazi	High	Moderate	High	B	5
W32-4	Nyalazi	High	Moderate	High	C	3
W32-5	Mzinene	High	Moderate	High	C	3
W32-6	Munywana	High	Moderate	High	B	5
W4 Secondary Catchment (Main River: Pongola - excluding Eswatini)						
W41-1	Bivane	High	High	High	C	3
W41-2	Manzana	High	Moderate	High	B	5
W41-3	Bivane	High	Moderate	High	C	3
W42-1	Phongolo	High	Low	High	C	3
W42-2	Phongolo	High	Moderate	High	C	3
W42-3	Phongolo	High	Moderate	High	B	5
W42-4	Mozana	Moderate	Low	Moderate	B	4
W42-5	Phongolo	High	Moderate	High	B	5
W43-1	Ngwavuma	Moderate	Moderate	Moderate	C	3
W44-1	Phongolo	Moderate	Moderate	Moderate	D	2
W45-1	Phongolo	High	High	High	C	3
W5 Secondary Catchment (Main River: Usutu - excluding Eswatini)						
W51-1	Assegaai	High	Low	High	C/D	3
W51-2	Assegaai	Moderate	Low	Moderate	C	3
W51-3	Assegaai	High	Low	High	B/C	4
W51-4	Blesbokspruit	Moderate	Low	Moderate	C	3
W52-1	Hlelo	High	Moderate	High	B/C	4
W53-1	Ngwempisi	Moderate	Low	Moderate	D	2
W53-2	Mpama	Moderate	Low	Moderate	B/C	3
W53-3	Ngwempisi	Moderate	Low	Moderate	C	3
W54-1	uSuthu	Moderate	Low	Moderate	B	3
W54-2	uSuthu	Moderate	Low	Moderate	C	3
W55-1	Mpuluzi	High	Moderate	High	B/C	4
W55-2	Lusushwana	High	Moderate	High	C	3
W57-1	uSuthu	High	Moderate	High	B/C	4
W7 Secondary Catchment (Kosi Bay and Sibaya Lake)						
W70-1	Swamanzi	Moderate	High	High	D	3
W70-2	Malangeni	High	High	High	B	4

RU number	Main river name	River EIS	SCI	IS	PES RU EC	IEI
W70-3		Moderate	Moderate	Moderate	**D**	**2**

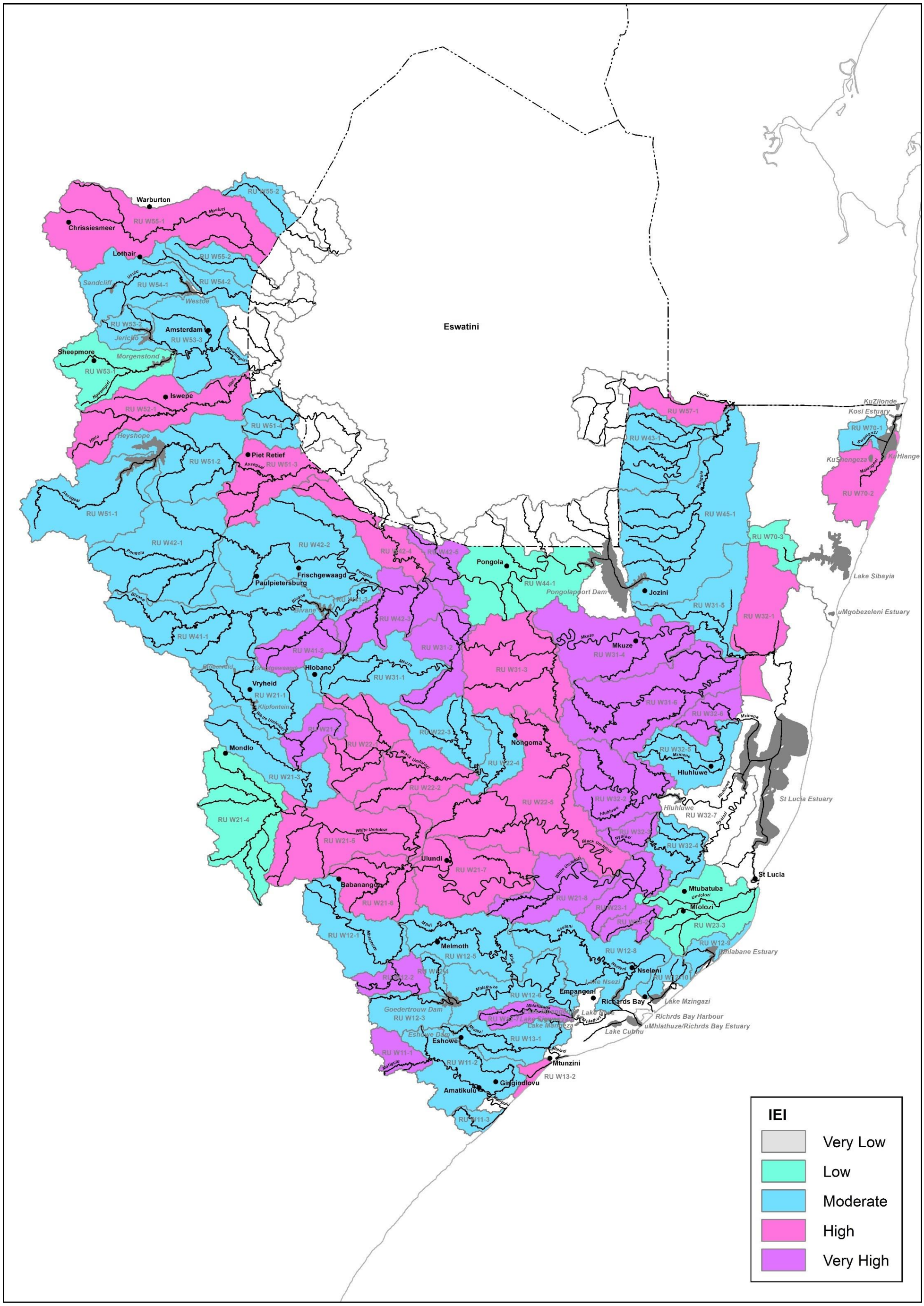

Figure 5.2 Integrated Environmental Importance (IEI) per river Resource Unit

5.3 PRIORITISATION OF RIVER RESOURCE UNITS

5.3.1 Approach to prioritise RU

As described in **Section 5.1**, High Priority RUs (hotspots) are identified by comparing (or overlaying) Integrated Environmental Importance with Water Resource Use Importance.

A matrix was designed (Louw and Huggins, 2007) and modified to guide the consistent identification of hotspots (**Table 5.3**). The Y-axis is based on the Integrated Environmental Importance value derived from the first matrix (**Table 5.1**). The X-axis depicts an estimate of water resource use, with 0 being of no importance and 4 being of very high importance. The information derived from the matrix provides an indication of the level of studies required. Although the terminology used is the same as that used for the different levels of EWR studies in South Africa, it is a descriptive term which is relevant for any environmental assessment required.

As an example – an Integrated Environmental Importance of 2.5 and Water Resource Use importance value of 3.5 would represent a priority of 3 and require a detailed EWR assessment.

Table 5.3 Matrix used in assessing hotspots

IEI	**Very high**	**4-5**	2	2	2	2	3	3	4	4	4
	High	**3-3.99**	1	2	2	2	2	3	3	4	4
	Moderate	**2-2.99**	1	1	1	2	2	2	3	3	3
	Low	**1-1.99**	1	1	1	1	1	2	2	2	3
	Very low	**0-0.99**	1	1	1	1	1	1	1	2	2
			0	**0.5**	**1**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**
			Very low	**Low**		**Moderate**		**High**		**Very high**	
			Water Resource Importance								

5.3.2 Priority RU results

The SQs and their identified priority ratings are provided in **Table 5.4** and illustrated in **Figure 5.3**.

4	Very High
3	High
2	Moderate
1	Low

Table 5.4 IS and IEI results for river RUs

RU number	Main river name	River EIS	SCI	PES RU EC	IEI	WRUI	RU Priority
W1 Secondary Catchment (Main River: Mhlathuze)							
W11-1	Matigulu	High	Moderate	**B**	5	1	**2**
W11-2	Matigulu	High	High	**C**	3	2	**2**
W11-3	Nyoni	Moderate	High	**C/D**	3	2	**2**
W12-1	Mhlathuze	High	Moderate	**C**	3	2	**2**
W12-2	Mhlathuze	High	High	**B**	5	1	**2**
W12-3	Mhlatuze	High	Moderate	**C**	3	4	**4**
W12-4	KwaMazula	High	High	**C**	3	1	**2**
W12-5	Mfule	High	Moderate	**C**	3	2	**2**

RU number	Main river name	River EIS	SCI	PES RU EC	IEI	WRUI	RU Priority
W12-6	Mhlatuze	Moderate	Moderate	C	3	4	4
W12-7	Mhlatuzana	High	Moderate	B	5	1	2
W12-8	Nseleni	High	Moderate	C	3	4	4
W12-9	Kondweni	High	Low	C	3	4	4
W12-10	Lake Msingaze	High	Low	C	3	4	4
W13-1	Mlalazi	High	Moderate	C	3	2	2
W13-2	Manzamnyama	High	Low	B/C	4	1	2
W2 Secondary Catchment (Main River: Umfolozi)							
W21-1	White Mfolozi	High	Low	C	3	3	3
W21-2	White Mfolozi	High	Low	B	5	2	3
W21-3	White Mfolozi	High	Low	C	3	1	2
W21-4	Nondweni	Moderate	Low	D	2	2	2
W21-5	White Mfolozi	High	High	B/C	4	3	4
W21-6	White Mfolozi	High	Moderate	B/C	4	1	2
W21-7	White Mfolozi	High	Moderate	B/C	4	1	2
W21-8	White Mfolozi	High	Moderate	B	5	1	2
W22-1	Black Mfolozi	High	Moderate	B/C	4	2	3
W22-2	Black Mfolozi	High	Moderate	B/C	4	1	2
W22-3	Sikwebezi	High	High	C	3	2	2
W22-4	Black Mfolozi	High	High	C	3	2	2
W22-5	Black Mfolozi	High	High	B	4	2	3
W23-1	Mfolozi	High	Moderate	B	5	2	3
W23-2	Msunduzi	High	Low	B	5	1	2
W23-3	Mfolozi	Moderate	Moderate	E	2	4	3
W3 Secondary Catchment (Main River: Mkuze)							
W31-1	Mkuze	High	Moderate	C	3	3	3
W31-2	Mkuze	High	Moderate	B	5	2	3
W31-3	Mkuze	High	Moderate	B/C	4	3	4
W31-4	Mkuze	High	Moderate	B	5	3	4
W31-5	Mkuze	High	High	C	3	3	3
W31-6	Msunduzi	High	High	B	5	3	4
W32-1	Mkuze	High	Moderate	B/C	4	4	4
W32-2	Hluhluwe	High	High	B	5	2	3
W32-3	Nyalazi	High	Moderate	B	5	2	3
W32-4	Nyalazi	High	Moderate	C	3	2	2
W32-5	Mzinene	High	Moderate	C	3	3	3
W32-6	Munywana	High	Moderate	B	5	3	4
W4 Secondary Catchment (Main River: Pongola - excluding Eswatini)							
W41-1	Bivane	High	High	C	3	3	3
W41-2	Manzana	High	Moderate	B	5	2	3
W41-3	Bivane	High	Moderate	C	3	2	2
W42-1	Phongolo	High	Low	C	3	3	3
W42-2	Phongolo	High	Moderate	C	3	2	2
W42-3	Phongolo	High	Moderate	B	5	2	3
W42-4	Mozana	Moderate	Low	B	4	2	3
W42-5	Phongolo	High	Moderate	B	5	2	3
W43-1	Ngwavuma	Moderate	Moderate	C	3	3	3
W44-1	Phongolo	Moderate	Moderate	D	2	4	3

RU number	Main river name	River EIS	SCI	PES RU EC	IEI	WRUI	RU Priority
W45-1	Phongolo	High	High	C	3	4	4
W5 Secondary Catchment (Main River: Usutu - excluding Eswatini)							
W51-1	Assegaai	High	Low	C/D	3	1	2
W51-2	Assegaai	Moderate	Low	C	3	4	4
W51-3	Assegaai	High	Low	B/C	4	4	4
W51-4	Blesbokspruit	Moderate	Low	C	3	3	3
W52-1	Hlelo	High	Moderate	B/C	4	2	3
W53-1	Ngwempisi	Moderate	Low	D	2	4	3
W53-2	Mpama	Moderate	Low	B/C	3	4	4
W53-3	Ngwempisi	Moderate	Low	C	3	2	2
W54-1	uSuthu	Moderate	Low	B	3	4	4
W54-2	uSuthu	Moderate	Low	C	3	1	2
W55-1	Mpuluzi	High	Moderate	B/C	4	2	3
W55-2	Lusushwana	High	Moderate	C	3	1	2
W57-1	uSuthu	High	Moderate	B/C	4	3	4
W7 Secondary Catchment (Kosi Bay and Sibaya Lake)							
W70-1	Swamanzi	Moderate	High	D	3	4	4
W70-2	Malangeni	High	High	B	4	4	4
W70-3		Moderate	Moderate	D	2	4	3

The above results can be summarised as follows:

- The rivers in W1 with a Very High priority importance are the Mhlathuze, Nseleni, Kondweni and those associated with Lake Msingaze. This is due to the high WRUI around current and future water use.
- The rivers in W2 are dominated by a Moderate priority.
- The rivers in W3 are dominated by High and Very High priority mostly associated with the Mkuze River. The high IEI and a moderate WRUI are the driving force for this evaluation.
- The rivers in W4 are dominated with a High priority with the IEI the driving force. W45-1 is the only RU with a Very High priority and this is due to the WRUI.
- The rivers in W5 have mostly Very High and High priority and it is driven largely by the high WRUI.
- The three rivers in W7 have a Very High and High priority driven by the groundwater WRUI.

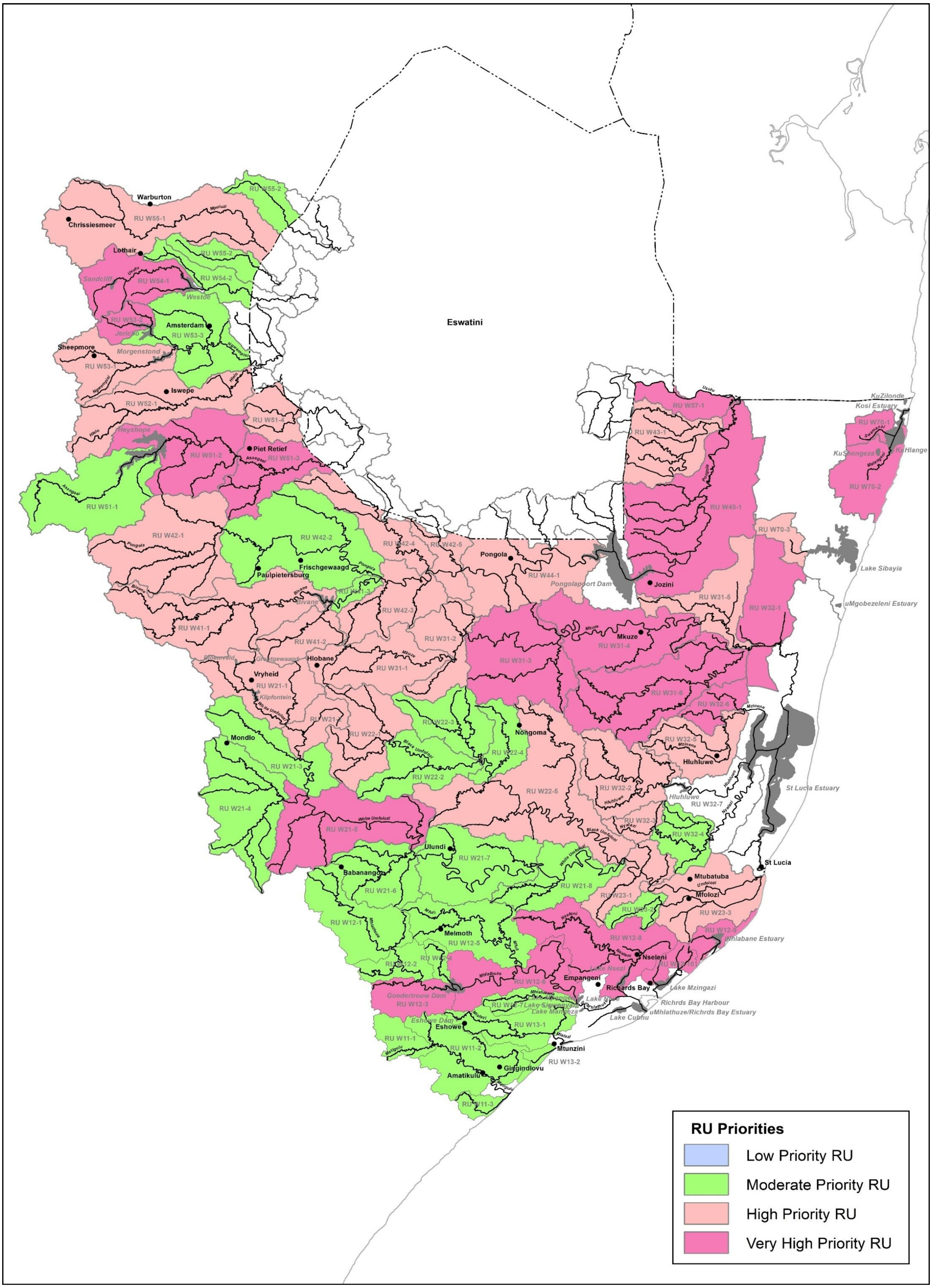

Figure 5.3 Usutu to Mhlathuze Catchment: Priority River Resource Units

6 WETLAND ECOLOGICAL IMPORTANCE AND PRIORITISATION

6.1 INTRODUCTION

This chapter focuses on the present ecological state of wetlands at the sub-quaternary catchment scale, their ecological importance and sensitivity, as well as their value to social and cultural importance (derived from **Chapter 3**) and the integration of these wetland properties to derive an integrated state of importance. This integrated state of importance is then evaluated in light of current water resource use importance (derived from **Chapter 2**) to prioritise wetlands. The process used is derived from the rivers approach and shown in **Figure 6.1** as applied here to wetlands. The purpose of the prioritisation process is to identify priority wetlands or wetland systems within the study area and within each secondary catchment. The assessment was done at the quinary catchment scale to facilitate comparability with other disciplines and to aid in the identification of hotspots (high priority river, wetland and/or groundwater areas). As part of the overall prioritisation process (not just wetlands), the WRUI was undertaken as well as the SCI. These were undertaken on a quinary catchment scale and outlined in **Chapters 2** and **3** respectively and results were applied directly to wetlands in this assessment at the applicable scale.

6.2 APPROACH TO PRIORITISE WETLANDS

The objective of this step was to identify high priority wetlands or wetland groups. These high priority areas were selected based on ecological, socio-cultural and water resource use importance and are often areas of high ecological importance where water resources are stressed or may be stressed in future. A simple 7-step process was followed, using best available data (also refer to **Figure 6.1**):

- Step 1: Determine wetland PES at sub quaternary catchment scale.
- Step 2: Determine wetland ecological importance (EI) at the same scale as above.
- Step 3: Determine wetland sensitivity (ES) at the same scale as above.
- Step 4: Determine the wetland importance score (IS) by integration of EI, ES and SCI.
- Step 5: Determine integrated environmental importance of wetland/s (IEI) by integration of IS and PES.
- Step 6: Determine wetland priority by integration of IEI and WRUI.
- Step 7: Contribute to determination of High Priority Areas by integration with other components.

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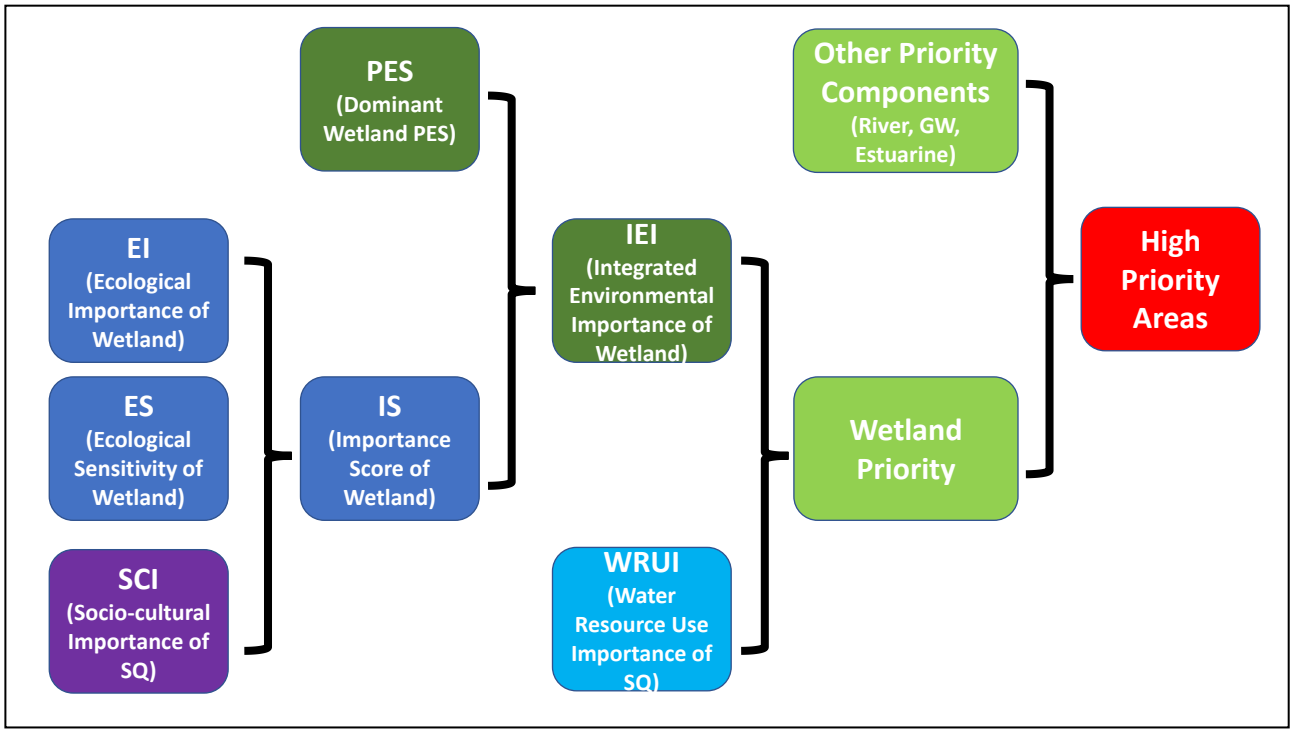

Figure 6.1 Summary of the process to identify high priority wetlands

6.2.1 PRESENT ECOLOGICAL STATE (PES)

The assessment of wetland PES relied on best available data from mainly 3 sources:

- The riparian and wetland metrics within the PES/EI/ES database (DWS, 2014).
- The wetland condition metric (WETCON) within the new wetland map (NWM) metadata from the 2018 national biodiversity assessment (van Deventer *et al*., 2018).
- The wetland condition metric (WETCON) within the NFEPA map metadata (Nel *et al.*, 2011).

Both of the riparian / wetland metrics rated in the PES/EI/ES database (DWS, 2014) were used as surrogate measures of wetland condition by taking an average of the following two metric scores.

- Riparian / wetland zone modification relates to “modifications that indicate the potential that wetland zones may have been changed from reference [condition] in terms of structure and composition that may influence these zones regarding functioning and processes occurring within these zones”, and also refers to these zones as habitats for biota.
- Riparian / wetland zone continuity modification relates to “modifications that indicate the potential that riparian/wetland connectivity may have changed from the reference [condition]”. Physical fragmentation (both longitudinal and lateral) is the indicator used for wetland continuity and includes for example inundation by weirs and dams, physical removal for farming, mining, overgrazing etc. and the presence of roads or other human structure, e.g. urban areas.

The underlying assumption is that these two metrics incorporate wetlands within each SQR, and as such should provide a useful measure of a more detailed investigation (visual assessment by specialist using satellite imagery) of overall ecological state.

Both the NFEPA project and the National Biodiversity Assessment produced an estimation of wetland condition and the final ecological condition of inland wetlands modelled from ancillary data (using mainly land use within variously defined buffer zones around wetlands) has been used here as a measure of present ecological state. The possible ratings in the NFEPA data are either A/B

(natural or good - % natural land cover ≥ 75%), C (moderately modified - % natural land cover 25-75%), D/E/F (heavily to critically modified), Z1 (artificial wetland and excluded from this assessment), Z2 (majority of the wetland classified as artificial and excluded from this assessment) or Z3 (heavily to critically modified - % natural land cover < 25%). Similarly, the possible ratings in the new wetland map (2018) data are either A/B (natural or good - % natural land cover ≥ 75%), C (moderately modified - % natural land cover 25 - 75%), D/E/F (heavily to critically modified), or not assessed. In order to integrate the WETCON categories with the PES/EI/ES ratings, each was assigned a score as follows: A/B a score of 1, C a score of 2, D/E/F a score of 3.5 and Z3 a score of 5. The average of the PES/EI/ES, NFEPA and NWM scores was taken to represent an integrated PES score presented herein under as the final wetland PES for use within prioritisation.

6.2.2 INTEGRATED ENVIRONMENTAL IMPORTANCE

The determination of Integrated Environmental Importance (IEI) for wetlands entailed the consideration of PES, EI, ES and SCI. The ecological importance of a wetland is an expression of its importance to the maintenance of biological diversity and ecological functioning on local and wider scales. Ecological sensitivity (or fragility) refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred (resilience) (Resh *et al.*, 1988; Milner, 1994).

Ecological Importance

The determination of EI considered the following criteria from the following data sources:

- National Biodiversity Assessment (new wetland map, 2018)
  - Diversity of wetland Hydrogeomorphic (HGMs) within quinary catchment - this is a count of different HGMs within the SQR excluding estuaries.
  - Overall extent of wetlands within quinary catchment (Ha per SQR).
- NFEPA (2011)
  - RAMSAR status – any wetland designated as a RAMSAR site would automatically be assigned a VERY HIGH EI.
  - Wetland FEPA status – any wetland denoted as a FEPA wetland was assigned a HIGH EI.
  - Wetland Cluster – does any of the wetlands within the SQ form part of a designated NFEPA wetland cluster.
  - Habitats for rare and endangered species including:
    - Cranes - wetlands (excluding dams) with the majority of its area within a sub-quaternary catchment that has sightings or breeding areas for threatened Wattled Cranes, Grey Crowned Cranes and Blue Cranes.
    - Amphibians - wetlands within 500 m of an IUCN threatened frog / toad point locality.
    - Water Birds - wetlands within 500 m of a threatened waterbird point locality.
- PES/EI/ES (DWS, 2014) – EI score (0 - 5) normalised to 4 for integration with other metrics.
- Known important peatland sites.
- Important Birding Areas (2015) - The Important Bird and Biodiversity Areas (IBA) Programme is a BirdLife International Programme to conserve habitats that are important for birds. These areas are defined according to a strict set of guidelines and criteria based on the species that occur in the area. The Important Bird Areas of Southern Africa directory was first published 1998 and identified within South Africa 122 IBAs. In September 2015 a revised IBA Directory was published by BirdLife South Africa. All these IBAs were objectively determined using established and globally accepted criteria. An IBA is defined by the presence of any of the

following bird species in a geographic area: Bird species of global or regional conservation concern, assemblages of restricted-range bird species, assemblages of biome-restricted bird species, and concentrations of numbers of congregatory bird species. If any of the wetlands within the SQR overlap with a designated IBA then they are rated accordingly (see below).

- Regions / Centres of Plant Endemism (Van Wyk & Smith, 2001) – wetland that occur in regions or centres of plant endemism
- Region Conservation Plans including:
  - KwaZulu Natal - Terrestrial Critical Biodiversity Areas (CBAs) in KZN developed 2010. This is an update to the 2007 terrestrial C-Plan (EKZNW, 2010)
  - Mpumalanga - Mpumalanga Biodiversity Conservation Plan (2006, 2014) comprising the Terrestrial Biodiversity and Freshwater Assessment (Lötter & Ferrar, 2006; Lötter, 2014; MTPA, 2014)

Each criterion was scored according to the system shown in **Table 6.1** and the IEI for each SQR was calculated using the maximum value assigned during this process.

Table 6.1 Determination of EI score: Scoring assigned to assessed criteria based on their state within each SQ. Scoring was from 0 (low / none) to 4 (high / most)

Criteria	State	Score
Wetland diversity:	5 or more HGMs	4
	3 or more HGMs	3
	2 HGMs	2
	1 HGM	1
	No wetlands	0
Wetland extent (total for SQ):	>= 100 Ha	4
	>= 30 Ha	3
	>= 10 Ha	2
	>= 5 Ha	1
	< 5 Ha	0
Ramsar Status	Yes	4
	No	0
Wetland FEPA status	Yes	2
	No	0
NFEPA wetland cluster	Yes	2.5
	No	0
Known important peatland sites	Yes	4
	No	0
Habitat for Cranes	Yes	3
	No	0
Habitat for Amphibians	Yes	3
	No	0
Habitat for Water Birds	Yes	3
	No	0
Important Birding Area	Yes	3
	No	0
Within a region / centre of Plant Endemism	Yes	2.5
	No	0
Critical Biodiversity Area (dominant status of SQR)	CBA 3	3
	CBA 2	2
	CBA 1	1
	Highly Significant	3
EI from PES/EI/ES for rip/wet metrics	EI score	As stated

Ecological Sensitivity

The determination of ES considered the following criteria from the following data sources:

- National Biodiversity Assessment (new wetland map, Van Deventer *et al.*, 2018) -
  - Dominant protection level of wetlands within SQR.
  - Dominant threat status of wetlands within SQR.
  - From the two criteria above an overall threat score is calculated by subtracting the protection level score (see **Table 6.2**) from the threat status score.
- Threatened Ecosystems (SANBI, 2011, remaining extent of natural vegetation; NBA 2018 Technical Report Volume 1: Terrestrial Realm).
- Threatened Plant Species with SQ (SANBI, 2009).
- PES/EI/ES (DWS, 2014) – ES score (0 - 5) normalised to 4 for integration with other metrics.

Each criterion was scored according to the system shown in **Table 6.2** and the integrated ES for each SQ was calculated using the maximum value assigned during this process.

Table 6.2 Determination of ES score: Scoring assigned to assessed criteria based on their state within each SQ. Scoring was from 0 (low / none) to 4 (high / most)

Criteria	State	Score
Dominant wetland protection level within SQR	Not protected	0
	Poorly protected	0.5
	Moderately protected	2
	Well protected	3
Dominant threat status of wetlands within SQR	Critical	4
	Endangered	3
	Vulnerable	2.5
	Not threatened / not assessed	1
Threat status score	(Wetland threat score) – (wetland protection score)	Calculated value
Threatened ecosystems within SQR	CR	4
	EN	3
	VU	2.5
	NT	1.5
	LC	1
Threatened plant species within SQR	CR listed species in SQ	4
	NE listed species in SQR	3.5
	VU listed species in SQR	3
	NT listed species in SQR	2.5
	Declining listed species in SQR	2
	LC listed species in SQR	1
ES from PES/EI/ES for rip/wet metrics	ES score	As stated

Socio-cultural Importance (SCI)

The SCI is outlined in **Chapter 3** and the scores were directly employed as is in the wetland evaluation per quinary catchment.

Integrated Environmental Importance (IEI)

As shown above in Figure 6.1, the Ecological (EI and ES) and SCI were assessed separately and were then integrated with the PES to determine the IEI of wetlands. The PES forms part of the IEI as wetlands in good condition have importance in their own right. A wetland that is in good condition, but has a low EI, ES, and/or SCI, may still be important from an ecological perspective.

The Importance Score (IS) is calculated from the median of the EI, ES and SCI scores. The IS is then integrated with the PES score to determine the IEI score. This is then called the Integrated Environmental Importance and is defined as VERY HIGH (IEI score = 5), HIGH (IEI score = 4), MODERATE (IEI score = 3), LOW (IEI score = 2) or VERY LOW (IEI score =1) according to the comparison matrix shown in **Table 6.3**).

Table 6.3 Matrix used to determine Wetland Integrated Environmental Importance, (IEI) comparing the EI, ES, SCI (IS) and PES scores

IS: EI, ES &SCI										
	Very high	4	3	3	3	4	5	5	5	5
	High	3	3	3	3	3	4	5	5	5
	Moderate	2	2	2	2	3	3	4	5	5
	Low	1	1	1	2	2	3	4	4	4
	Very low	0	1	1	1	2	2	3	4	4
			D/E to F	D	C/D	C	B/C	B	A/B	A
			>3.2	2.7-3.2	2.3-2.6	1.7-2.2	1.3-1.6	0.7-1.2	0.3-0.6	<0.3
			PES							

6.2.3 PRIORITY WETLANDS

Estuaries were excluded in the process of wetland prioritisation and where values within the same SQ are assigned, they refer to wetlands surrounding / associated with the respective estuary. The final prioritisation of wetlands per SQ considers both the IEI (a measure of the ecological and social importance of the wetland) and the Water Resource Unit Importance (WRUI; a measure of demand on, or risk to the wetland). The WRUI is covered in **Chapter 2** and the scores were directly employed as is in the wetland priority evaluation. The IEI and WRUI were integrated using a matrix of scores (Louw and Huggins, 2007; **Table 6.4**) to determine the final rating of priority, which can range from a value of 1 to 4 where 1 is Low and 4 is Very High. RU priority was taken to be the maximum SQ priority rating for all SQs within the RU. The extensive wetland assessment work conducted in the study area by Begg (1989) and DWA (DWS, 2014) was additionally integrated into this assessment and used to adjust moderate or low scores of wetlands that were previously highlighted as priority wetlands. Begg (1989) identified 24 priority wetlands within the entire KwaZulu Natal region and these included several known “Vleis” in the headwater regions of major rivers, and some large “swamps” in the lower reaches of the catchments. Out of these 24 priority wetlands, 8 systems fall within this study area:

- Pongola floodplain.
- Muzi swamps;
- Greater Mkuze Swamp system;
- Mfolozi swamps;
- Aloeboom Vlei;
- Mvamanzi Pan;
- Stilwater Vlei; and
- Greater Mhlatuze Wetland system which includes:

- Richards Bay Sanctuary;
- Lake Nsese;
- Lake Mzingazi; and
- Lake Chubu.

Table 6.4 Matrix used to determine wetland priority by comparing the IEI and the WRI for the SQ, where priority can be 1: Low, 2: Moderate, 3: High or 4: Very High

IEI	Very high	5	2	2	2	2	3	3	4	4	4
	High	4	1	2	2	2	2	3	3	4	4
	Moderate	3	1	1	1	2	2	2	3	3	3
	Low	2	1	1	1	1	1	2	2	2	3
	Very low	1	1	1	1	1	1	1	1	2	2
			0	0.5	1	1.5	2	2.5	3	3.5	4
			Very low	Low		Moderate		High		Very high	
			Water Resource Importance								

6.3 WETLAND PRIORITISATION PER SECONDARY CATCHMENT

According to the latest national wetland map (National biodiversity assessment; van Deventer *et al.*, 2018) there are almost 1.5 million Ha of wetlands in the study area if estuaries are included in the analysis and 371 603 Ha if they are excluded. This includes five RAMSAR sites, the St Lucia System, Lake Sibaya, Kosi Bay, Ndumo Game Reserve and the Turtle Beaches / Coral Reefs of Tongaland. One of the fundamental concepts of the Ramsar convention is Wise Use, which is defined as "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development". Ramsar sites are therefore designated as high priority wetlands in this study. The St Lucia System and Kosi Bay are designated estuaries and will be dealt with in that chapter, while the Turtle Beaches and Coral Reefs are marine wetlands and will not be dealt with in this project which focusses on freshwater ecosystems. The following are descriptions of the remaining Ramsar sites, extracted from the Ramsar fact-sheets available on the Ramsar website (Ramsar, 2010; https://www.ramsar.org):

Lake Sibaya

Ramsar Site number: 528
Area: 7,750 ha
Designation date: 28-06-1991
Location: Kwazulu-Natal Province, South Africa
Coordinates: 27°20'S 32°40'E
Status/Type: World Heritage Site.
Ramsar information sheet available here.
Description: The largest natural freshwater lake in South Africa, separated from the ocean by forested dunes; includes areas of swamp forest and wet grassland. A large variety of endangered or endemic species of reptiles, fish, birds, mammals and plants occur. The site is important for numerous species of breeding birds and supports the second largest population of hippopotamus in Kwa Zulu. The lake supports a diverse zooplankton fauna, 15 species of aquatic and 43 species of terrestrial molluscs, as well as flora and fauna unique to South Africa. A research station is located within the site. The lake provides water for Mbazwane and Vasi. Human activities consist of livestock grazing and cultivation.

Ndumo Game Reserve

Ramsar Site number: 887
Area: 10,117 ha
Designation date: 21-01-1997
Coordinates: 26°52'S 32°15'E
Location: Kwazulu-Natal Province, South Africa
Status/Type: Nature Reserve.
Ramsar information sheet available here.
Description: Situated at the junction of the Usuthu and Pongolo floodplain systems, the site forms the largest floodplain system in South Africa, consisting of five wetland types, from fresh to brackish, permanent to ephemeral lakes, marshes and pools, as well as riparian and gallery forest. Well known for its abundant bird life and diversity of species, internationally important numbers of several species are supported, including many that are rare or vulnerable. Human activities include controlled harvesting of reeds and sedges, low-density tourism, an important fishery, illegal black and white rhinoceros hunting, and collecting river water for sale in nearby communities. A large agricultural irrigation scheme is operating erratically south of the reserve in the catchment area.

The outcomes of the process of prioritisation outlined above are presented below per secondary catchment at both the sub-quaternary catchment and RU scales. Data summarised in the Tables are represented by the following columns:

- **SQR/RU:** The SQR number from the PESEIS study (DWS, 2014) representing the quinary catchment and the RU number representing the delineated Resource Unit, where data pertaining to the RU represent all the SQs within it and the priority is taken to be the maximum.
- **Name:** Name of the River in the SQR.
- **Wetland PES:** The dominant PES Category of the wetlands within the quinary catchment.
- **Wetland Ecological Importance (EI):** Obtained from an integration of RAMSAR status, wetland FEPA status, provision of habitats for rare and endangered species (birds, frogs, plants), critical biodiversity areas (Berliner & Desmet, 2007), and wetland extent (area) as outlined in **Section 6.2.2** above.
- **Wetland Ecological Sensitivity (ES):** Based on natural land cover data within wetlands and within a 100m buffer around wetlands (data from NFEPA; Nel *et al*., 2011 and NBA; Van Deventer *et al.*, 2018), as outlined in **Section 6.2.2** above.
- **Integrated Importance (IS):** Represents the maximum of the EI, ES and SCI.
- **Integrated Environmental Importance (IEI):** Based on a rating from 1 – 5 where 1 is Very Low and 5 is Very High. The IEI considers both the IS and the PES.
- **Water Resource Use Importance (WRUI):** Based on a rating from 0 – 4 where 0 is Very Low and 4 is Very High.
- **Wetland Priority:** This is based on a rating from 1 – 4 where 1 is Low, 2 is Moderate, 3 is High and 4 is Very High, and considers both the IEI and the WRUI. At the SQR level, the wetland priority represents the combined priority of all wetlands in the quinary catchment. At the RU level the wetland priority is taken from the maximum priority score of all the SQRs within the RU.

6.3.1 W1 Catchment (Main River: Mhlathuze)

The priority of wetlands within the Mhlathuze Catchment, as well as the data which are considered in its determination, are summarised at the quinary catchment and RU scales in **Table 6.5**. The wetland priority at the RU scale is visually shown on a map in **Figure 6.2**. The RUs that have a Very High wetland priority include W12-3 (Nyawushane and Mhlathuze), W12-6 (Mhlathuze and Mtambanana, including the Mhlathuze swamp system), W12-8 (mostly lower reaches of Nseleni, including Nsezi and portions of the Mhlathuze floodplain), W12-9 (Nhlabane and Mzingwenya including lake Cubhu) and W12-10 (mainly Mzingazi).

Table 6.5 Wetland priority in the Mhlathuze catchment at the RU and SQ scale, also showing wetland EI, ES, IS, PES, IEI and WRUI per SQ

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W11A-03597	Matigulu	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	1
W11A-03748	uMngwenya	C	MODERATE	MODERATE	MODERATE	MODERATE	1	1
W11A-03776	kuMnyameni	C	MODERATE	MODERATE	MODERATE	MODERATE	1	1
RU W11-1								1
W11A-03599	Ngoje	D/E	HIGH	VERY HIGH	HIGH	MODERATE	2	2
W11A-03612	Matigulu	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W11C-03713	Nyezane	D	VERY HIGH	HIGH	HIGH	MODERATE	2	3
RU W11-2								3
W11C-03917	Nyoni	D/E	VERY HIGH	LOW	HIGH	MODERATE	2	3
RU W11-3								3
W12A-03086	Gologodo	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W12A-03104	Mhlatuze	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W12A-03153	Mhlatuze	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W12A-03226		D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
RU W12-1								2
W12B-03334	Mhlatuze	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	1	2
W12B-03356	Mhlatuze	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	1	2
W12B-03398	Mavungwini	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	1	2
RU W12-2								2
W12B-03471	Nyawushane	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	4	4
W12B-03479	Mhlatuze	D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
RU W12-3								4
W12B-03336	KwaMazula	D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	1
RU W12-4								1
W12C-03189	Mfule	D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W12C-03225	Mfule	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W12C-03232	Nhlozane	B	VERY HIGH	LOW	MODERATE	HIGH	2	2
W12C-03263	Mfulazane	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W12C-03303	Mfule	B/C	VERY HIGH	LOW	MODERATE	MODERATE	2	2
RU W12-5								2
W12D-03346	Ntambanana	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W12D-03375	Mhlatuze	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12D-03388	Mhlatuze	E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12E-03475	Mhlatuze	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
RU W12-6								4
W12E-03526	Mhtatuzana	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	0	1
W12E-03530	Mateku	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	0	1
W12E-03558	Mhlatuzana	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	0	2

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
RU W12-7								2
W12G-03229	Nseleni	**D**	HIGH	VERY HIGH	HIGH	MODERATE	4	3
W12H-03289	Mbabe	**C/D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12H-03316	Mposa	**D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12H-03401	Okula	**E**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12H-03418	Nseleni	**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W12H-03428	Mbabe	**D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12H-03459	Nseleni	**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
RU W12-8								4
W12F-03611	Mzingwenya	**D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12J-03290	Nhlabane	**C/D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W12J-03411		**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W12J-03493		**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W12J-03501	Kondweni	**C/D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
RU W12-9								4
W12J-03392	Mpisini	**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W12J-03403		**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W12J-03450	Nundwane	**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
RU W12-10								4
W13A-03583	Mlalazi	**C**	HIGH	VERY HIGH	HIGH	MODERATE	2	2
W13A-03609	Mlalazi	**C/D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	3
W13A-03641	Mkukuze	**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W13B-03593	KwaGugushe	**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	3
W13B-03774	Manzamnyama	**B**	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	1	2
RU W13-2								2
W11C-03893		**Estuary**						3
W11C-03932		**Estuary**						3
W12F-03494	Mhlatuze	**D/E**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE		1
W12F-03509	Mzingazi	**Estuary**	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH		2
W12F-03511	Mhlatuze	**Estuary**	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH		2
W12J-03390	Nhlabane	**Estuary**	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH		2
W12J-03485		**Estuary**	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH		2
W12J-03489	Mzingazi	**Estuary**	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH		2
W13B-03673	Mlalazi	**Estuary**	VERY HIGH	HIGH	HIGH	VERY HIGH		2
RU Freshwater wetlands associated with Estuary								3

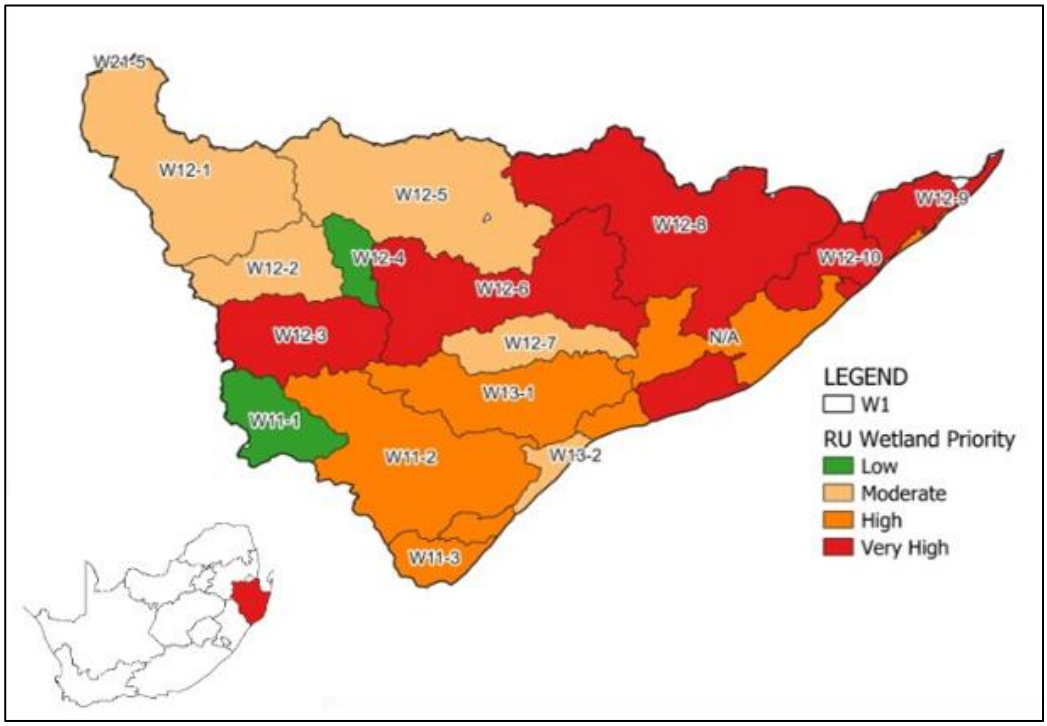

Figure 6.2 Map showing wetland priority per RU in the Mhlathuze catchment

A number of threatened or sensitive riparian / wetland plant species occur in the W1 Catchment (Data from SANBI (POSA), 2016):

- Critically Endangered:
  - Kniphofia pauciflora
- Endangered:
  - *Mondia whitei*
- Vulnerable:
  - *Crinum moorei, Wolffiella denticulate, Fimbristylis aphylla*
- Near Threatened:
  - *Cyperus sensilis*
- Sensitive, Declining:
  - *Crinum bulbispermum, Crinum macowanii, Cyathea capensis* var*. capensis, Gunnera perpensa, Ilex mitis* var. *mitis*

6.3.2 W2 Catchment (Main River: Umfolozi)

The priority of wetlands within the Umfolozi Catchment, as well as the data which are considered in its determination, are summarised at the quinary catchment and RU scales in **Table 6.6**. The wetland priority at the RU scale is visually shown on a map in **Figure 6.3**. The RUs that have a Very High wetland priority include W21-5 (mainly the White Mfolozi)

Table 6.6 Wetland priority in the Umfolozi catchment at the RU and SQ scale, also showing wetland EI, ES, IS, PES, IEI and WRUI per SQ

SQR / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W21A-02512	aMagoda	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	3	3
W21A-02527	White Mfolozi	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W21B-02539	iShoba	C	VERY HIGH	HIGH	HIGH	MODERATE	2	3
W21B-02546	White Mfolozi	B/C	VERY HIGH	MODERATE	MODERATE	MODERATE	2	3
RU W21-1								**3**
W21B-02603	Lenjane	B/C	VERY HIGH	HIGH	HIGH	HIGH	2	3
W21B-02652	White Mfolozi	B	VERY HIGH	HIGH	HIGH	VERY HIGH	2	3
W21B-02670	White Mfolozi	B	VERY HIGH	HIGH	HIGH	VERY HIGH	2	3
RU W21-2								**3**
W21C-02599	Sandspruit	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	1	3
W21F-02727	White Mfolozi	B/C	VERY HIGH	HIGH	HIGH	HIGH	1	2
RU W21-3								**3**
W21D-02676	Mvunyane	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W21D-02788	Vumankala	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W21D-02815	Mvunyane	B/C	VERY HIGH	HIGH	HIGH	HIGH	2	2
W21D-02832	Jojosi	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W21D-02848	Jojosi	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W21E-02873	Nondweni	B/C	VERY HIGH	HIGH	HIGH	HIGH	2	2
W21E-02912	Nondweni	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W21E-02934	Vuwankala	C	VERY HIGH	MODERATE	MODERATE	MODERATE	2	2
W21E-02953	Ngwebini	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W21E-02963	Nondweni	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
RU W21-4								**2**
W21F-02840	Mvunyane	B/C	VERY HIGH	HIGH	HIGH	HIGH	3	3
W21G-02851	White Mfolozi	B/C	VERY HIGH	HIGH	HIGH	HIGH	3	3
W21G-02885	White Mfolozi	B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
W21G-02914	Ntinini	B/C	VERY HIGH	MODERATE	HIGH	HIGH	3	3
W21G-02929	Nsubeni	B/C	VERY HIGH	MODERATE	HIGH	HIGH	3	3
W21G-03067		E	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W21G-03085	Ntinini	D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W21H-02889	Mhlahlane	C	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W21H-02897	White Mfolozi	B	VERY HIGH	MODERATE	HIGH	VERY HIGH	3	4
W21H-03004	White Mfolozi	B	VERY HIGH	MODERATE	HIGH	VERY HIGH	3	4
RU W21-5								**4**
W21J-03018	Maphophoma	D	VERY HIGH	MODERATE	MODERATE	LOW	1	1
W21J-03030	White Mfolozi	C	VERY HIGH	MODERATE	MODERATE	MODERATE	1	1
W21J-03036	Mpembeni	B	VERY HIGH	MODERATE	MODERATE	HIGH	1	2
W21J-03050	Mpembeni	B	VERY HIGH	LOW	MODERATE	HIGH	1	2
W21J-03066	Mpembeni	B/C	VERY HIGH	MODERATE	MODERATE	MODERATE	1	1
W21J-03075	Mkumbane	B	VERY HIGH	HIGH	HIGH	VERY HIGH	1	2
W21J-03112	Mzinhlanga	C	VERY HIGH	MODERATE	MODERATE	MODERATE	1	1
RU W21-6								**2**
W21K-02976	Mbilane	C/D	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W21K-02981	White Mfolozi	C	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W21K-03019	Nhlungwane	B	VERY HIGH	MODERATE	HIGH	VERY HIGH	1	2
W21K-03080	White Mfolozi	C	VERY HIGH	HIGH	HIGH	MODERATE	1	1
RU W21-7								**2**

SQR / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W21L-03041	White Mfolozi	B	VERY HIGH	MODERATE	MODERATE	HIGH	1	2
W21L-03059	White Mfolozi	B	HIGH	MODERATE	MODERATE	HIGH	1	2
W21L-03161	Munywana	B/C	HIGH	MODERATE	MODERATE	MODERATE	1	1
W21L-03163	Munywana	B	HIGH	LOW	MODERATE	HIGH	1	2
W21L-03176	Mayayeni	B	VERY HIGH	MODERATE	MODERATE	HIGH	1	2
RU W21-8								**2**
W22A-02586	Black Mfolozi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	3
W22A-02587	Mgobhozi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	3
W22A-02591		C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	3
W22A-02596	Black Mfolozi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	3
W22A-02610	Black Mfolozi	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W22B-02661	Hlonyana	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W22B-02662	KwaMbizankulu	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W22B-02706	Hlonyane	B/C	VERY HIGH	MODERATE	MODERATE	MODERATE	2	2
W22B-02728	Hlonyane	B	VERY HIGH	MODERATE	MODERATE	HIGH	2	2
W22B-02773	Hlangabende	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
RU W22-1								**3**
W22C-02688	Black Mfolozi	C	VERY HIGH	HIGH	HIGH	MODERATE	1	1
W22D-02795	iThaka	C	VERY HIGH	HIGH	HIGH	MODERATE	1	1
W22F-02722	Black Mfolozi	C/D	VERY HIGH	HIGH	HIGH	MODERATE	0	1
RU W22-2								**1**
W22E-02595		C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W22E-02601	Bululwana	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W22E-02605	Sikwebezi	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W22E-02702	Sikwebezi	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W22F-02726	Sikwebezi	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
RU W22-3								**2**
W22F-02748	Black Mfolozi	C	VERY HIGH	MODERATE	HIGH	MODERATE	2	2
W22G-02624	Vuna	B/C	VERY HIGH	MODERATE	HIGH	HIGH	2	2
W22H-02846	Black Mfolozi	B/C	VERY HIGH	LOW	HIGH	HIGH	2	2
RU W22-4								**2**
W22H-02844	Mbhekamuzi	C	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W22J-02807	Black Mfolozi	C/D	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W22J-02817	Black Mfolozi	B/C	VERY HIGH	MODERATE	HIGH	HIGH	1	2
W22J-02910	Black Mfolozi	B/C	VERY HIGH	MODERATE	HIGH	HIGH	1	2
W22J-02918	Wela	C	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W22J-02942	Mvalo	C/D	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W22K-02622		C	VERY HIGH	MODERATE	HIGH	MODERATE		1
W22K-02629	Mona	C	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W22K-02636	Manzimakulu	C	VERY HIGH	MODERATE	HIGH	MODERATE	1	1
W22K-02761	Mapopoma	B	VERY HIGH	MODERATE	HIGH	VERY HIGH	1	2
W22K-02783	Mona	B	VERY HIGH	LOW	HIGH	VERY HIGH	1	2
W22L-02916	Black Mfolozi	B	VERY HIGH	HIGH	HIGH	VERY HIGH	1	2
RU W22-5								**2**
W23A-03058	Mbukwini	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	1
W23A-03083	Mfolozi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	1	2
W23A-03098	Nkatha	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	1
W23A-03113	Mfolozi	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	1
W23A-03149	Mfolozi	B/C	MODERATE	VERY HIGH	MODERATE	MODERATE	1	1
W23A-03160	Mvamanzi	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	3

SQR / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
RU W23-1								**3**
W23B-03222	Msunduzi	**C**	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	0	1
W23B-03250	Ntobozi	**D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	0	1
RU W23-2								**1**
W23B-03231	Msunduzi	**D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W23C-03180	Msunduzi	**E**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W23C-03254	Mavuya	**D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W23C-03272	Ntenja	**E**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W23C-03287	Mavuya	**D**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W23D-03108	Mfolozi	**E**	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
RU W23-3								**3**

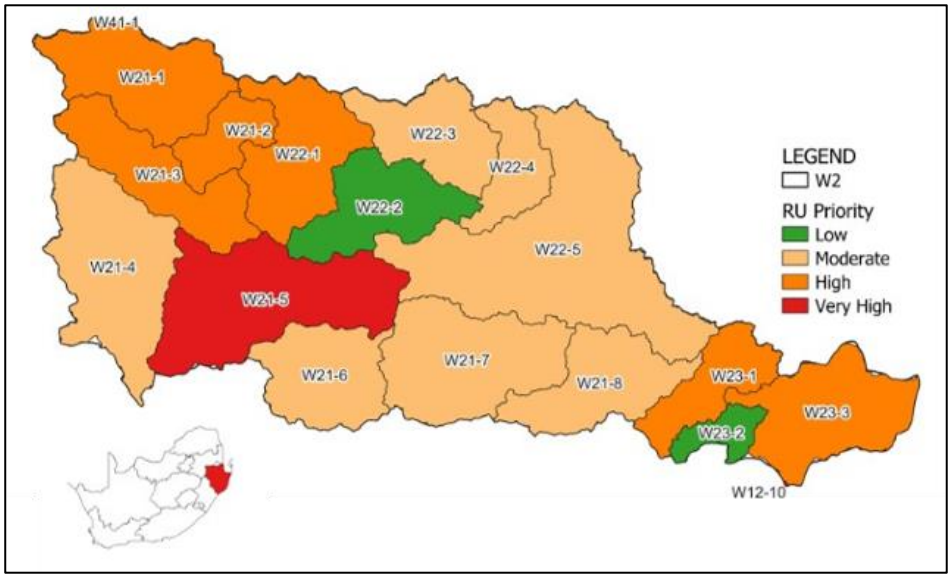

Figure 6.3 Map showing wetland priority per RU in the Umfolozi catchment

A number of threatened or sensitive riparian / wetland plant species occur in the W2 catchment (Data from SANBI (POSA), 2016):

- Critically Endangered:
  - *Kniphofia pauciflora*
- Endangered:
  - *Mondia whitei*
- Vulnerable:
  - *Crinum moorei, Fimbristylis aphylla*
- Near Threatened:
  - *Kniphofia typhoides, Cyperus sensilis*
- Sensitive, Declining:
  - *Crinum bulbispermum, Crinum macowanii, Cyathea capensis* var. *capensis, Gunnera perpensa, Ilex mitis* var. *mitis.*

6.3.3 W3 Catchment (Main River: Mkuze)

The priority of wetlands within the Mkuze Catchment, as well as the data which are considered in its determination, are summarised at the quinary catchment and RU scales in **Table 6.7**. The wetland priority at the RU scale is visually shown on a map in **Figure 6.4**. The RUs that have a

Very High wetland priority include W31-1 (Mkuze), W31-4 (Mkuze including Nhlnhlela Pan), W31-5 (Mkuze), W31-6 (Nsumu), W32-1 (Mkuze), W33-7 (Hluhluwe, Nyalazi and Mpate, including Nyalazi, Bushlands Pan and Hluhluwe River Vlei) and the St Lucia RU.

Table 6.7 Wetland priority in the Mkuze catchment at the RU and SQ scale, also showing wetland EI, ES, IS, PES, IEI and WRUI per SQ

SQR / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W31A-02494	Nkongolwana	E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	3	3
W31A-02534	Mkuze	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	3	4
W31B-02477	Mkuze	C	VERY HIGH	HIGH	HIGH	MODERATE	3	3
RU W31-1								**4**
W31C-02556	Sihlengeni	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W31D-02436	Manzimhlope	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W31D-02450	Ntutshe	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W31D-02495	Mkuze	C/D	VERY HIGH	LOW	MODERATE	LOW	2	1
W31D-02500	Mkuze	B	VERY HIGH	LOW	MODERATE	HIGH	2	2
RU W31-2								**2**
W31E-02456	Mkuze	C/D	VERY HIGH	LOW	MODERATE	LOW	3	2
W31F-02530	Nkunzana	C/D	VERY HIGH	LOW	MODERATE	LOW	3	2
W31F-02555	Nkunzana	D/E	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W31F-02573	Mpuphisi	B	VERY HIGH	LOW	MODERATE	HIGH	3	3
W31G-02455	Mtiki	C/D	MODERATE	LOW	MODERATE	LOW	3	2
W31G-02506	Mkuze	C/D	MODERATE	LOW	MODERATE	LOW	3	2
RU W31-3								**3**
W31G-02425	Mkuze	C	VERY HIGH	MODERATE	MODERATE	MODERATE	3	3
W31H-02514	KwaSekane	B/C	MODERATE	HIGH	MODERATE	MODERATE	3	3
W31J-02469	Mkuze	B	HIGH	HIGH	HIGH	VERY HIGH	3	4
W31J-02501	Nhlohlela	B	HIGH	LOW	MODERATE	HIGH	3	3
RU W31-4								**4**
W31J-02343	Mthambalala	C	VERY HIGH	MODERATE	HIGH	MODERATE	3	3
W31J-02406	Ndlamyane	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W31J-02480	Mkuze	B/C	VERY HIGH	MODERATE	HIGH	HIGH	3	3
W31J-02509	Mkuze	B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
RU W31-5								**4**
W31K-02568	Msunduzi	C	VERY HIGH	MODERATE	HIGH	MODERATE	3	3
W31K-02582	Ntweni	C/D	VERY HIGH	LOW	HIGH	MODERATE	3	3
W31K-02611	Msebe	B	VERY HIGH	LOW	HIGH	VERY HIGH	3	4
W31K-02617	Mduna	D	VERY HIGH	LOW	HIGH	MODERATE	3	3
W31L-02525		B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
W31L-02528	Masundwini	B	VERY HIGH	MODERATE	HIGH	VERY HIGH	3	4
W31L-02551	Nsumu	B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
W31L-02553	Nsumu	D	VERY HIGH	MODERATE	HIGH	MODERATE	3	3
W31L-02563	Nsumu	B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
W31L-02569	Msunduzi	B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
RU W31-6								**4**
W32A-02345	Neshe	C	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W32A-02557	Mkuze	B/C	VERY HIGH	HIGH	HIGH	HIGH	4	4
W32B-02476	Khobeyane	B	VERY HIGH	HIGH	HIGH	VERY HIGH	4	4
W32B-02547	Mkuze	C	VERY HIGH	MODERATE	MODERATE	MODERATE	4	3
RU W32-1								**4**

SQR / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W32D-02720	Wela	B/C	VERY HIGH	LOW	HIGH	HIGH	2	2
W32D-02811	Nzimane	C	VERY HIGH	MODERATE	HIGH	MODERATE	2	3
W32E-02765	Mansiya	C	VERY HIGH	LOW	HIGH	MODERATE	2	2
W32E-02779	Nzimane	B/C	VERY HIGH	LOW	HIGH	HIGH	2	2
W32E-02797	Manzabomvu	D	VERY HIGH	MODERATE	HIGH	MODERATE	2	2
W32E-02859	Nzimane	B	VERY HIGH	LOW	HIGH	VERY HIGH	2	3
W32E-02865	Hluhluwe	B	VERY HIGH	LOW	HIGH	VERY HIGH	2	3
W32E-02887	Hluhluwe	B/C	VERY HIGH	LOW	HIGH	HIGH	2	2
RU W32-2								**3**
W32G-02946	Sikhathula	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W32G-02973	Nyalazi	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
RU W32-3								**3**
W32G-02943	Hlazane	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W32G-02980	Mnyaba	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W32G-02986	Hlazane	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W32G-03006	Nyalazi	D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W32G-03055	Nyalazi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W32G-03102	Nsane	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
RU W32-4								**2**
W32C-02671	Mzinene	B	VERY HIGH	MODERATE	MODERATE	HIGH	3	3
W32C-02684	Ngweni	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W32C-02721	Mzinene	C	VERY HIGH	MODERATE	MODERATE	MODERATE	3	3
W32C-02749	Mzinene	C	VERY HIGH	HIGH	HIGH	MODERATE	3	3
RU W32-5								**3**
W32C-02612	Munywana	B	VERY HIGH	MODERATE	MODERATE	HIGH	3	3
W32C-02634	Mhlosinga	C	VERY HIGH	MODERATE	MODERATE	MODERATE	3	3
RU W32-6								**3**
W32F-02835	Hluhluwe	D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	3	3
W32H-02854	Nyalazi	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	3	3
W32H-02998	Mpate	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	3	4
RU W33-7								**4**
W32H-02627	St Lucia		VERY HIGH	HIGH	HIGH	VERY HIGH		4
W32H-02642	St Lucia		VERY HIGH	HIGH	HIGH	VERY HIGH		4
W32H-02801	St Lucia		VERY HIGH	HIGH	HIGH	VERY HIGH		4
W32H-02804	St Lucia		VERY HIGH	HIGH	HIGH	VERY HIGH		4
W32H-02818	St Lucia		VERY HIGH	HIGH	HIGH	VERY HIGH		4
W32H-03048	St Lucia		VERY HIGH	HIGH	HIGH	VERY HIGH		4
RU St Lucia – freshwater wetlands associated with St Lucia								**4**

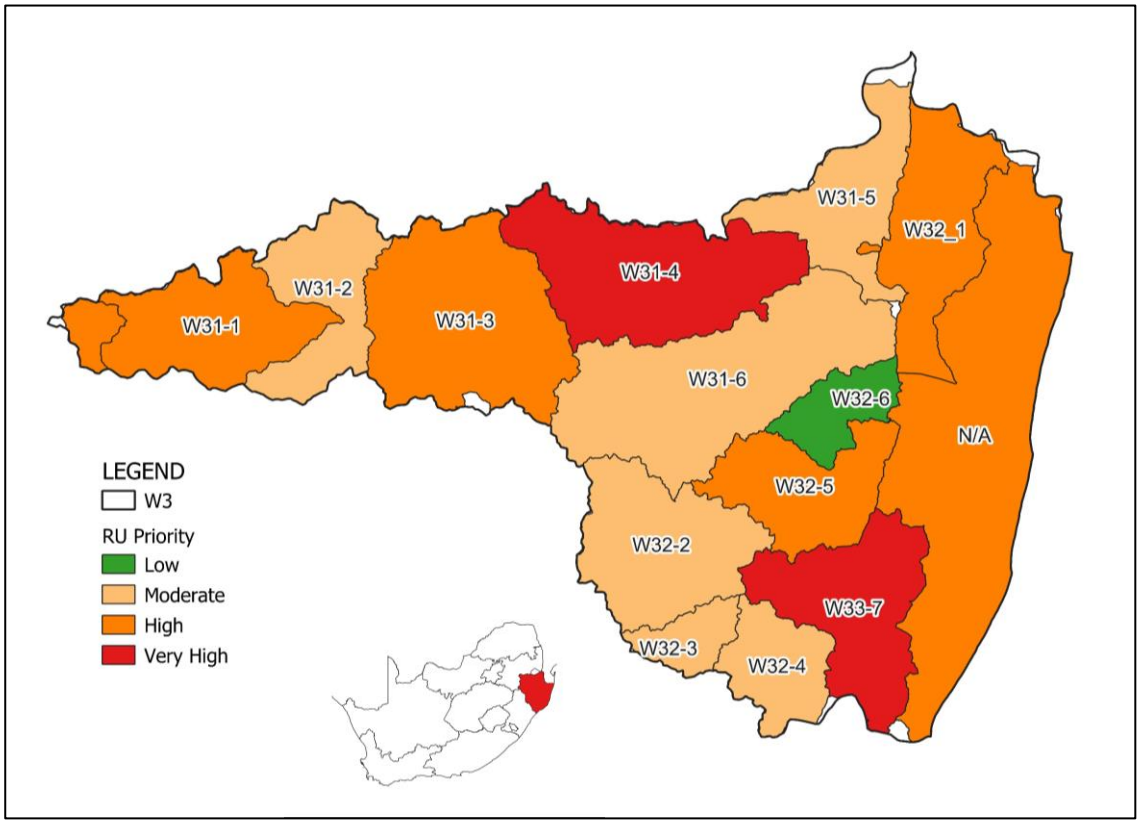

Figure 6.4 Map showing wetland priority per RU in the Mkuze catchment

A number of threatened or sensitive riparian / wetland plant species occur in the W3 catchment (Data from SANBI (POSA), 2016):

- Endangered:
  - *Mondia whitei*
- Vulnerable:
  - *Crinum moorei, Wolffiella denticulate, Fimbristylis aphylla*
- Near Threatened:
  - *Cyperus sensilis*
- Sensitive, Declining:
  - *Balanites maughamii* subsp*. maughamii, Crinum macowanii, Cyathea capensis* var*. capensis, Gunnera perpensa, Ilex mitis* var*. mitis*

6.3.4 W4 Catchment (Main River: Pongola - excluding Eswatini)

The priority of wetlands within the Pongola Catchment, as well as the data which are considered in its determination, are summarised at the quinary catchment and RU scales in **Table 6.8**. The wetland priority at the RU scale is visually shown on a map in **Figure 6.5**. The RUs that have a Very High wetland priority include W41-1 (Bivane) and W43-1 (Ngwavuma [Ndumo]). An unexpected outcome of the process is that the Pongola floodplain has a High priority and not Very High. This is mainly due to poor ecological state (PES is mainly C/D, D or worse) even though ecological importance and WRUI are high.

Table 6.8 Wetland priority in the Pongola catchment at the RU and SQ scale, also showing wetland EI, ES, IS, PES, IEI and WRUI per SQ

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W41A-02372	Bivane	B/C	VERY HIGH	HIGH	HIGH	HIGH	3	3
W41B-02401	uBivanyana	C/D	HIGH	HIGH	HIGH	MODERATE	3	3
W41B-02427	Bivane	D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W41B-02431	Bivane	B	MODERATE	HIGH	HIGH	VERY HIGH	3	4
W41B-02434	Soetmelks	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W41C-02437	Mpemvana	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	3	3
W41D-02373	Bivane	D/E	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W41D-02435	iNxwayi	C	HIGH	HIGH	HIGH	MODERATE	3	3
W41E-02359	Bivane	D/E	VERY HIGH	MODERATE	HIGH	MODERATE	3	3
RU W41-1								**4**
W41F-02433	Manzana	D	HIGH	MODERATE	MODERATE	LOW	2	1
W41F-02454	Manzana	D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W41F-02461	KwaCeba	C	HIGH	HIGH	HIGH	MODERATE	2	2
W41F-02481	Manzana	C/D	MODERATE	HIGH	MODERATE	LOW	2	1
W41F-02502		D	MODERATE	HIGH	MODERATE	LOW	2	1
RU W41-2								**2**
W42A-02261	Phongolo	B/C	VERY HIGH	HIGH	HIGH	HIGH	3	3
W42A-02328	Pandana	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W42B-02268	Phongolo	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W42B-02271	Phongolo	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	3	3
W42B-02315	Tsakwe	C	HIGH	HIGH	HIGH	MODERATE	3	3
W42B-02325	Tsakwe	D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W42B-02331	Bazangoma	D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W42C-02205	Ntombe	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
RU W42-1								**3**
W42D-02251	Phongolo	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W42D-02327		C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W42E-02221	Phongolo	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W42F-02185	Wit	D	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W42G-02317	Phongolo	B	VERY HIGH	HIGH	HIGH	VERY HIGH	2	3
RU W42-2								**3**
W41G-02379	Bivane	D	VERY HIGH	MODERATE	MODERATE	LOW	2	1
W42H-02382	Phongolo	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
W42H-02394	iThalu	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
W42H-02411	iThalu	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
W42H-02428	Mbizane	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
W42J-02353	Phongolo	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
W42J-02378	Phongolo	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
W42J-02397	Mhulumbela	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
RU W42-3								**3**
W42K-02148	Mozana	C	VERY HIGH	HIGH	HIGH	MODERATE	2	2
W42K-02242		B/C	VERY HIGH	HIGH	HIGH	HIGH	2	2
W42K-02272	Mozana	B	HIGH	LOW	MODERATE	HIGH	2	2
W42L-02270	Mozana	B	VERY HIGH	MODERATE	MODERATE	HIGH	2	2
RU W42-4								**2**
W42M-02269	Mtokotshwala	D/E	VERY HIGH	MODERATE	MODERATE	LOW	2	1
RU W42-5								**1**

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W42M-02294	Spekboom	D	VERY HIGH	MODERATE	MODERATE	LOW	2	1
RU W42-6								**1**
W42M-02352	Phongolo	B	VERY HIGH	MODERATE	MODERATE	HIGH	2	2
RU W42-7								**2**
W43F-02013	uMsunduzi	D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02053		D/E	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02072	Ngwavuma	C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02076	Msunduzi	E/F	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02089	Ngwavuma	D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02099	Ngwavuma	C	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02104	Mnvoni	B/C	VERY HIGH	HIGH	HIGH	HIGH	3	3
W43F-02107		C/D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02113	Ngwavuma	D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W43F-02142		B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
W43F-02159	Ngwavuma	C	VERY HIGH	HIGH	HIGH	MODERATE	3	4
RU W43-1								**4**
W44A-02332	Phongolo	C	VERY HIGH	MODERATE	MODERATE	MODERATE	4	3
W44A-02386	Phongolo	D/E	VERY HIGH	MODERATE	MODERATE	LOW	4	3
W44A-02389	Voyizana	E	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W44A-02410	Mdlavenga	D	VERY HIGH	MODERATE	MODERATE	LOW	4	3
W44B-02248	Manzawakho	E	VERY HIGH	MODERATE	MODERATE	LOW	4	3
W44B-02351	Phongolo	E	VERY HIGH	MODERATE	MODERATE	LOW	4	3
W44C-02338	Phongolo	E	VERY HIGH	MODERATE	MODERATE	LOW	4	3
W44D-02304	Phongolo	D	VERY HIGH	MODERATE	MODERATE	LOW	4	3
RU W44-1								**3**
W45A-02216	Zibayeni	C/D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02245	Zibayeni	D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02246	Phongolo	D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02256	Lubambo	C/D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02275	Mpontshane	D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02282	Phongolo	D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02285	Mpontshane	C/D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02310	Mangqwashi	D/E	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02316	Mfongosi	C	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02356	Mlambo	C	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02367	Phongolo	C/D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45A-02368	Phongolo	D/E	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45B-02029	Phongolo	D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
W45B-02105	Phongolo	D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
RU W45-1								**3**

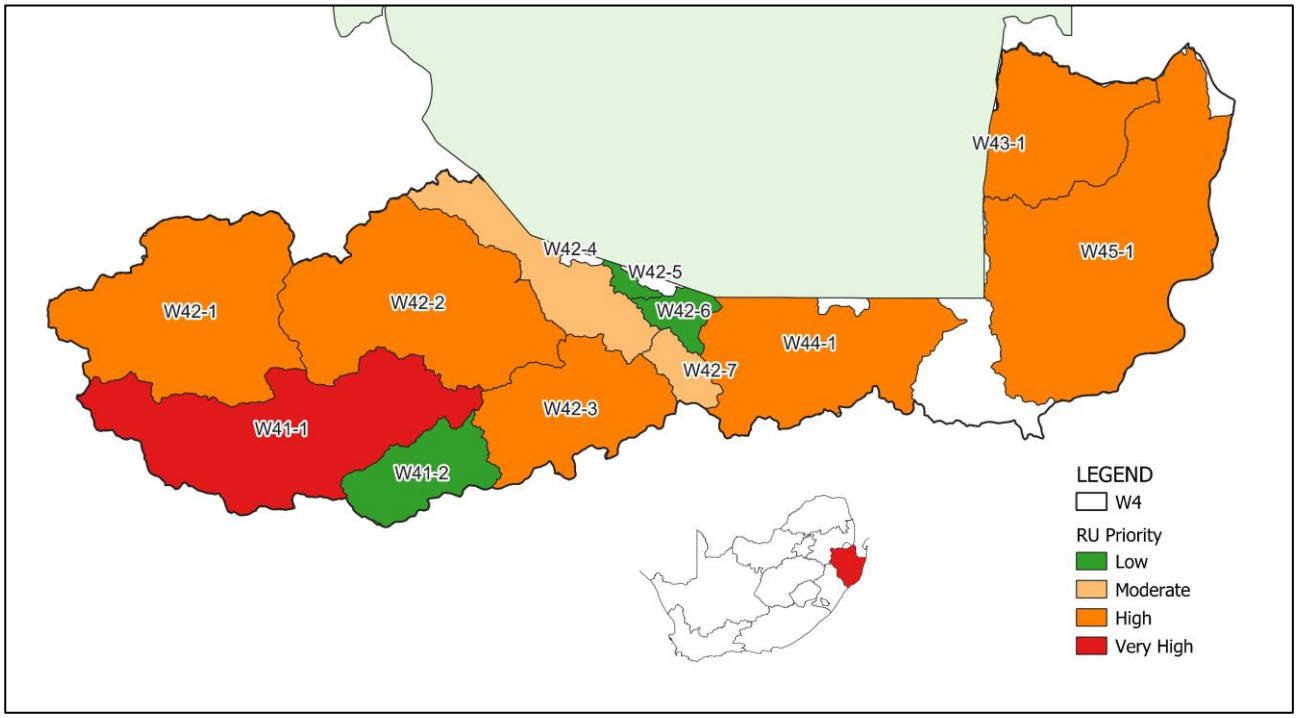

Figure 6.5 Map showing wetland priority per RU in the Pongola catchment

A number of threatened or sensitive riparian / wetland plant species occur in the W4 catchment (Data from SANBI (POSA), 2016):

- Near Endangered:
  - *Carex acutiformis*
- Near Threatened:
  - *Kniphofia typhoides*
- Sensitive, Declining:
  - *Balanites maughamii subsp. maughamii, Crinum bulbispermum, Crinum macowanii, Gunnera perpensa, Ilex mitis* var. *mitis.*

6.3.5 W5 Catchment (Main River: Usutu - excluding Eswatini)

The priority of wetlands within the Usutu Catchment, as well as the data which are considered in its determination, are summarised at the quinary catchment and RU scales in **Table 6.9**. The wetland priority at the RU scale is visually shown on a map in **Figure 6.6**. The RUs that have a Very High wetland priority include W51-2 (Boesmanspruit and Assegaai), W51-3 (Swartwater and Mhkondvo), W53-1 (Sandspruit and Ngwempisi), W54-1 (uSuthu, including Coalbank and Liefgekozen, and Seganagana) and W55-1 (Mpumalanga pan district around Chrissiesmeer, Majosie se Vlei and Mpuluzi) and W57-1 (uSuthu, Banzi Pan Ndumo, Shokwe Pan).

Table 6.9 Wetland priority in the Usutu catchment at the RU and SQ scale, also showing wetland EI, ES, IS, PES, IEI and WRUI per SQ

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W51A-02082	Assegaai	D/E	VERY HIGH	HIGH	HIGH	MODERATE	1	3
W51B-02101	Ngulane	E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	3
RU W51-1								**3**
W51C-01981	Assegaai	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W51C-02011		C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W51C-02022	Assegaai	E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W51C-02067	Assegaai	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W51C-02074	Anysspruit	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W51C-02109	Boesmanspruit	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
RU W51-2								**4**
W51D-02044	Assegaai	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W51D-02151	Swartwater	D	VERY HIGH	MODERATE	MODERATE	LOW	4	3
W51D-02160		C	HIGH	VERY HIGH	HIGH	MODERATE	4	3
W51D-02171	Klein-Assegaai	D	HIGH	VERY HIGH	HIGH	MODERATE	4	3
W51D-02177	Klein-Assegaai	C	HIGH	VERY HIGH	HIGH	MODERATE	4	3
W51D-02193	Swartwater	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W51E-02049	Mhkondvo	B	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	4	4
RU W51-3								**4**
W51F-01919	Ndlozane	D	MODERATE	VERY HIGH	MODERATE	LOW	3	2
W51F-01951		D	VERY HIGH	HIGH	HIGH	MODERATE	3	3
W51F-01986	Blesbokspruit	D	HIGH	VERY HIGH	HIGH	MODERATE	3	3
W51F-02019	Blesbokspruit	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	3	3
RU W51-4								**3**
W52A-01934		C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	3
W52A-01983	Hlelo	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	3
W52B-01890		D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W52B-01964	Hlelo	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W52C-01867	Hlelo	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W52C-01888	Tweelingspruit	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W52D-01862	Hlelo	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
RU W52-1								**3**
W53A-01757	Sandspruit	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W53A-01804	Ngwempisi	E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W53A-01853	Ngwempisi	C/D	VERY HIGH	HIGH	HIGH	MODERATE	4	3
RU W53-1								**4**
W53B-01694		D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W53B-01710	Mpama	D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
RU W53-2								**3**
W53C-01679	Thole	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	2	3
W53D-01751		B/C	HIGH	HIGH	HIGH	HIGH	2	2
W53D-01764	Mpama	D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W53D-01773	Ngwempisi	D/E	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W53D-01801	Ngwempisi	D	VERY LOW	LOW	LOW	VERY LOW	2	1
W53D-01809	Ngwempisi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W53D-01814	Swartwaterspruit	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W53E-01790	Ngwempisi	D/E	VERY HIGH	MODERATE	MODERATE	LOW	2	1
RU W53-3								**3**
W54A-01534	uSuthu	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W54A-01630		C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
W54B-01569	uSuthu	D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	3
W54B-01623	Seganagana	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	4	4
RU W54-1								**4**
W54C-01512	Bonnie Brook	B/C	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH	1	2
W54C-01552	Bonnie Brook	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	1	2
W54C-01556	Bonnie Brook	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	1	2

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W54D-01593	uSuthu	C/D	VERY HIGH	HIGH	HIGH	MODERATE	1	1
RU W54-2								**2**
W55A-01375	Mpuluzi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	4
W55A-01423	Majosie se Vlei	C	VERY HIGH	HIGH	HIGH	MODERATE	2	4
W55C-01395	Mpuluzi	C/D	VERY HIGH	HIGH	HIGH	MODERATE	2	4
W55C-01489	Swartwater	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	2	2
W55E-01477	Mpuluzi	C	VERY HIGH	VERY HIGH	VERY HIGH	HIGH	2	2
W55D-01506	Metula	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	1
W56A-01372	Lusushwana	C/D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	1	1
RU W55-2								**4**
W57J-01923	uSuthu	A/B	VERY HIGH	MODERATE	MODERATE	VERY HIGH	3	4
W57K-01929	uSuthu	B	VERY HIGH	HIGH	HIGH	VERY HIGH	3	4
W57K-02025		B/C	VERY HIGH	HIGH	HIGH	HIGH	3	3
RU W57-1								**4**

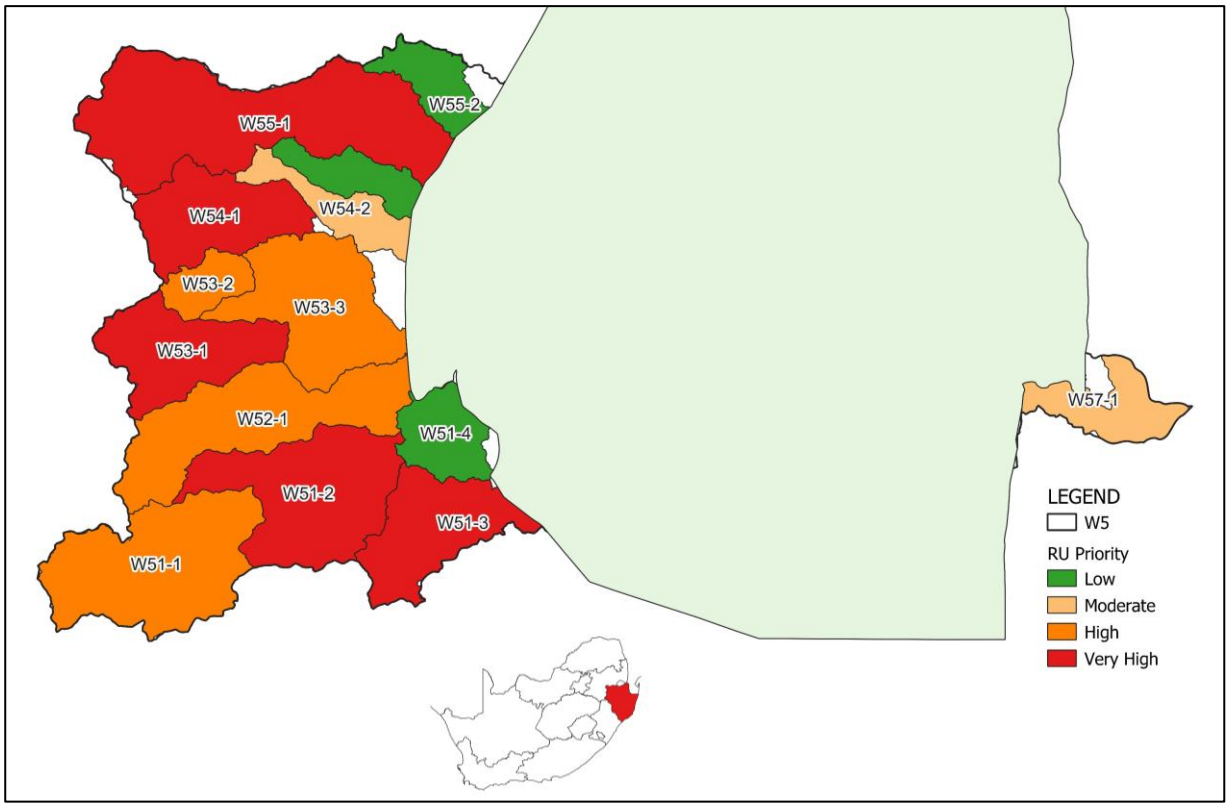

Figure 6.6 Map showing wetland priority per RU in the Usutu catchment

A number of threatened or sensitive riparian / wetland plant species occur in the W5 catchment (Data from SANBI (POSA), 2016):

- Near Endangered:
  - *Carex acutiformis*
- Sensitive, Declining:
  - *Balanites maughamii subsp. maughamii, Crinum bulbispermum, Crinum macowanii, Ilex mitis* var. *mitis*

6.3.6 W7 Catchment (Kosi Estuary and Sibaya Lake)

The priority of wetlands within the Kosi and Sibaya Catchment, as well as the data which are considered in its determination, are summarised at the quinary catchment and RU scales in **Table 6.10**. The wetland priority at the RU scale is visually shown on a map in **Figure 6.7**. The RUs that have a Very High wetland priority include W70-1 (Swamanzi) and W70-3 (Lake Sibaya, Muzi swamps).

Table 6.10 Wetland priority in the Kosi and Sibaya catchment at the RU and SQ scale, also showing wetland EI, ES, IS, PES, IEI and WRUI per SQ

SQ / RU	Name	Wetland PES	Wetland EI	Wetland ES	IS	Wetland IEI	WRUI	Priority
W70A-02079	Swamanzi	E	VERY HIGH	HIGH	HIGH	MODERATE	3	4
RU W70-1								**4**
W70A-02112	Malangeni	B/C	VERY HIGH	HIGH	HIGH	HIGH	3	3
RU W70-2								**3**
W70A-02030	Muzi Swamps		VERY HIGH	HIGH	HIGH	VERY HIGH	4	3
W70A-02278	Lake Sibaya		VERY HIGH	HIGH	HIGH	VERY HIGH	4	3
W70A-02301		D	VERY HIGH	VERY HIGH	VERY HIGH	MODERATE	4	4
W70A-02381		C	VERY HIGH	HIGH	HIGH	MODERATE	4	3
RU W70-3								**4**

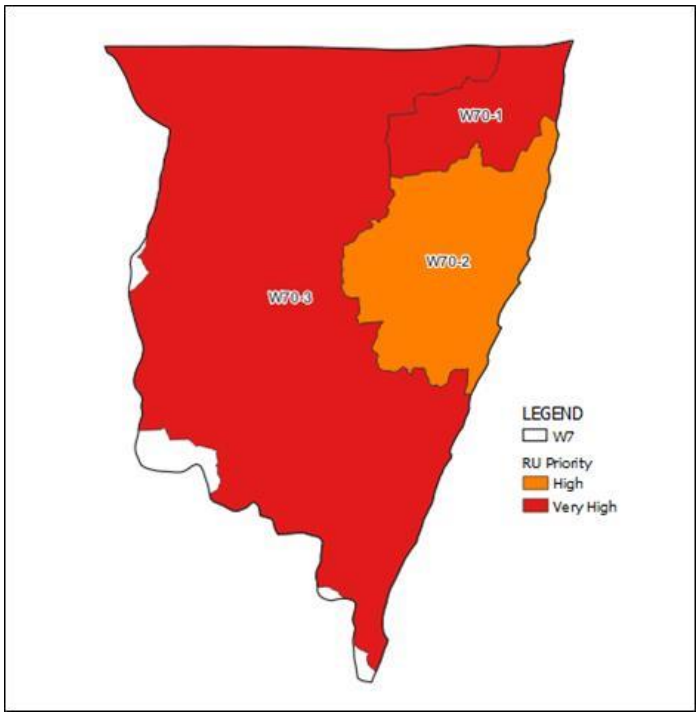

Figure 6.7 Map showing wetland priority per RU in the Kosi and Sibaya catchment

A number of threatened or sensitive riparian / wetland plant species occur in the W7 catchment (Data from SANBI (POSA), 2016):

- Vulnerable:
  - *Wolffiella denticulate, Fimbristylis aphylla*
- Sensitive, Declining:
  - *Balanites maughamii subsp. maughamii, Crinum macowanii*

6.3.7 Summary

A summary map showing maximum wetland priority per RU for the whole study area is shown in **Figure 6.8**.

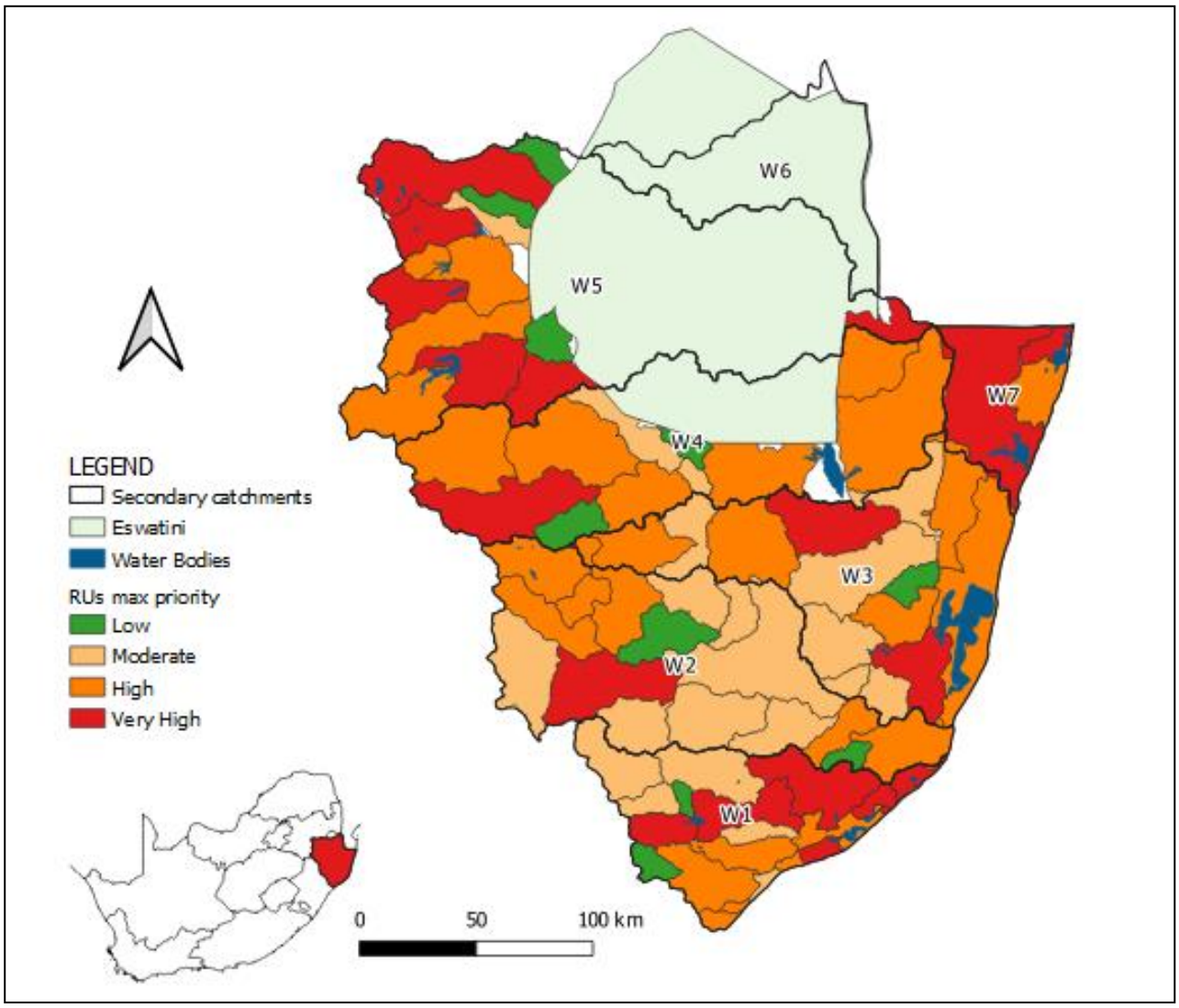

Figure 6.8 Map showing maximum wetland priority per RU in the whole study area

7 ESTUARY IMPORTANCE AND SENSITIVITY

7.1 PRESENT ECOLOGICAL STATE

The assesment is based on a desktop procedure using a standardized approach developed for determining the ecological water requirements of South Africa's estuaries and applied in the National Biodiversity Assessment in 2018 (Van Niekerk *et al*., 2019). The determination of the PES was described in the Report 1 and the results are repeated in **Table 7.1**.

Table 7.1 Present Ecological State of the estuaries

IUA	NAME	Present Ecological State (2018)	Hydrology	Hydrodynamics	Water Quality	Physical habitat	Microalgae	Macrophytes	Invertebrates	Fish	Birds
IUA W11	aMatigulu/iNyoni	**B**	B	B	A	A	B	B	C	B	C
IUA W13	iSiyaya	**E**	E	E	E	E	F	F	E	F	F
IUA W13	uMlalazi	**B**	C	A	B	B	B	C	B	C	B
IUA W12-c	uMhlathuze	**D**	B	D	E	E	C	E	D	F	E
IUA W12-c	Richards Bay	**D/E**	D	D	D	E	D	F	E	E	D
IUA W12-d	iNhlabane	**E**	C	F	E	F	D	E	E	F	E
IUA St Lucia	iMfolozi/uMsunduze	**D**	B	C	D	D	D	E	D	E	E
IUA St Lucia	St Lucia	**D/E**	B	F	D	C	E	C	E	D	D
IUA W70-b	uMgobezeleni	**B**	B	C	B	B	B	B	B	D	A
IUA W70-a	Kosi	**A/B**	B	A	A	A	A	B	C	C	A

7.2 ESTUARY IMPORTANCE

7.2.1 Ecological Importance

The ecological importance of an estuary is an expression of its importance to the maintenance of biological diversity and ecological functioning on a regional, national or global scale. The Estuary Importance Score (EIS) for an estuary takes size (S), the rarity of the estuary type within its biographical zone (Z), habitat (H), biodiversity importance (B) of the estuary into account (Table 7.3) (DWA, 2008). Biodiversity importance, in turn is based on the assessment of the importance of the estuary for plants, invertebrates, fish and birds, using rarity indices. These importance scores ideally refer to the system in its natural condition. The scores have been determined for all South African estuaries, apart from functional importance, which is scored by the specialists during EWR workshops (DWA, 2008). To add resolution to the national estuary importance rating the EIS for the estuaries were rated on a 1 (0 - 20) to 5 (80 - 100) scale to provide an indication of their biodiversity importance in the region (**Table 7.2** and **Table 7.3**) (DWA, 2008).

Table 7.2 Ecological Importance rating

Importance score	Rating	Comment
0 - 20	1	Little
20.1 - 40	2	Some
40.1 - 60	3	Important
60.1 - 80	4	Very important
80.1 -100	5	Extremely important

Five of the estuaries in the study area are of very high ecological importance, namely uMlalazi, uMhlathuze, iMfolozi/uMsunduze St Lucia, and Kosi (**Table 7.3**). These systems represent some of South Africa's most important estuarine estuaries. In addition, three system are also of Importance, aMatigulu/iNyoni, Richards Bay, and iNhlabane. Only two systems in the study area were evaluated of relative average importance, namely iSiyaya and uMgobezeleni, due to their smaller sizes.

Table 7.3 Estuary importance scores for the estuaries calculated on a national scale (DWAF, 2008 updated from Turpie *et al*., 2002)

#	Estuary	S	H	Z	B	I	Biodiversity Importance	Biodiversity Importance Rating
W11	aMatigulu/iNyoni	90	70	30	89	79	Important	4
W13	iSiyaya	30	60	10	47	40	Ave Importance	3
W13	uMlalazi	90	90	30	95.5	85	Very Important	5
W12	uMhlathuze	100	100	80	53.5	86	Very Important	5
W12	Richards Bay	100	0	80	85	69	Important	4
W12	iNhlabane	50	50	70	86	61	Important	4
W2	iMfolozi/uMsunduze	90	100	70	93.5	91	Very Important	5
W3	St Lucia	100	100	70	98.5	97	Very Important	5
W7	uMgobezeleni	10	80	70	37	40	Ave Importance	3
W7	Kosi	100	100	70	100	97	Very Important	5

7.2.2 Conservation/Biodiversity Importance

The National Biodiversity Assessment 2011 (NBA 2011) (Van Niekerk and Turpie, 2012; Turpie *et al*., 2012) developed a biodiversity plan for the estuaries of South Africa by prioritising and establishing which of them should be assigned partial or full Estuarine Protected Area (EPA) status. This biodiversity plan followed a systematic approach that took pattern, process and biodiversity persistence into account. While the plan has not explicitly taken social and economic costs and benefits into consideration, it used ecosystem health as a surrogate for the former to some extent. This is because estuaries where the opportunity costs of protection are likely to be high are also likely to be heavily utilised systems that are in a lower state of health.

The plan indicates that, on a national scale 133 estuaries (61 require full protection and 72 require partial protection) including those already protected, would be required to meet biodiversity targets (Turpie *et al*., 2012). Of these, 10 fall within the study area, with a subset of 9 estuaries requiring protection (see **Table 7.4** for more detail). Fully protected estuaries are taken to be full no-take areas. Partial protection might involve zonation that includes a no-take area, or it might address other pressures with other types of action. In both these cases, the management objective would be to protect 50% of the biodiversity features of the partially protected estuary. Fully protected and partially protected estuaries can be considered Estuarine Protected Areas, whereas all other estuaries should be designated Estuarine Management Areas. All estuaries require a Management Plan and these plans should be guided by the results of this assessment.

The national priority list provides recommendations regarding the extent of protection required for each estuary, the recommended extent of the estuary perimeter that should be free from development to an appropriate setback line, and the preliminary Recommended Ecological Category (or recommended future health class) as required under the National Water Act (**Table 7.4**).

All estuaries within the study area, with the exception of iNhlabane, are conservation priorities being either in formally protected areas (i.e. provincial park, iSimangaliso Wetland Park and UNESCO World Heritage Site) or desired protected area. In addition, three systems are also Ramsar sites and five systems Important Bird Areas.

Table 7.4 National priorities, the extent of protection required (Full = full no-take protection (modified from Turpie *et al*., 2012)

#	Estuary	Protected Area	Ramsar site	Important Bird Area	Priority set for conservation (National, provincial or municipal)	NBA Recommended extent of protection	NBA Minimum recommended extent of undeveloped margin	Provisional Recommended Ecological Category	Biodiversity Importance Rating
W11	aMatigulu/iNyoni	●			●	Partial	0.5	A	**5**
W13	iSiyaya	●			●	Full	0.5	B	**5**
W13	uMlalazi	●		●	●	Full	0.75	A or BAS*	**5**
W12	uMhlathuze	●		●	●	Partial	0.5	A or BAS	**5**
W12	Richards Bay				●	Partial	0.5	A or BAS	**5**
W12	iNhlabane					-	-	C	**1**
W2	iMfolozi/ uMsunduze	●	●	●	●	Full	0.75	A	**5**
W3	St Lucia	●	●	●	●	Full	0.75	A	**5**
W7	uMgobezeleni	●			●	Full	0.75	A or BAS	**5**
W7	Kosi	●	●	●	●	Full	0.75	A or BAS	**5**

* Best Attainable State

7.2.3 Key Ecosystem Services

The Ecosystem Services rating was generated by evaluating each estuary based on its carbon sequestration and nursery function value.

'Blue carbon' refers to the carbon found in three biotic habitats: mangroves, seagrasses, and salt marshes (Adams *et al.,* 2020). In addition, carbon is also stored in swamp forest, reeds and sedges. These habitats sequester carbon from the atmosphere and lock it into the soil. These habitats are unique in that the carbon that they sequester during photosynthesis is often moved from the short-term carbon cycle (10 - 100 years) to the long-term carbon cycle (1000 years) and is continuously buried as slowly decaying biomass (Barbier *et al.,* 2011). Blue carbon habitats thus have a much higher projected sequestration potential than terrestrial habitats. In addition to 'blue carbon', South Africa also supports swamp forests, reeds and sedges which are generally seen habitats which sequester 'teal carbon' as carbon captured in freshwater inland wetlands. However, these estuarine habitats are under pressure, thereby reducing their capacity to provide this ecosystem service. When these habitats are degraded, they emit large amounts of CO_2 into the atmosphere contributing to global climate change with impacts on biodiversity, water supply, drought and floods, agriculture and human health. Most of the systems in the study area play an important role in blue carbon sequestration, with uMlalazi, uMhlathuze, Richards Bay, iNhlabane,

iMfolozi/uMsunduze, St Lucia, and Kosi all rated as highly important for this ecosystem service (**Table 7.5**).

Lamberth and Turpie (2003) showed that more than half of South Africa's estuarine-associated fish species are utilised in fisheries (subsistence, recreational and commercial). At least 60% of these species are considered entirely or partially dependent on estuaries. The total landed catch of fish taken directly from estuaries (3 700 tonnes per annum) is considerably lower than the total estimated catch of inshore marine fisheries (28 000 tonnes per annum). However, depending on the biogeographical region and fishery sector, more than 80% of the catch by inshore fisheries may comprise estuary-associated species. Thus, probably the most important value of estuaries to various fisheries species relates to the provision of sheltered nursery environments (Whitfield 1992; 1994). Five key estuarine-dependent fish species important for food security and of commercial and / or recreational importance were selected as indicatos, namely, Dusky kob *Argyrosomus japonicus,* White steenbras *Lithognathus lithognathus,* Spotter grunter *Pomadasys commersonnii,* Mullet *Chelon richardsonii,* Leervis *Lichia amia and* Elf *Pomatomus saltatrix.* As part of the NBA 2018 estuarine fish-nursery contribution to estuarine and nearshore marine fisheries were categorised as High, Medium, Low based on the size of the estuaries and recruitment, diversity and abundance of exploited species in individual estuaries. Most of the systems in the study area are important fish nurseries, with uMlalazi, uMhlathuze, Richards Bay, iMfolozi/uMsunduze, St Lucia, and Kosi all rated as highly important for this ecosystem service (**Table 7.5**).

Table 7.5 Estuary importance scores for the estuaries calculated on a national scale (DWAF, 2008 updated from Turpie *et al*., 2002)

#	Estuary	Carbon sequestration	Nursery Function	Ecosystem Services Rating
W11	aMatigulu/iNyoni	Medium	High	5
W13	iSiyaya	Medium	Low	3
W13	uMlalazi	High	High	5
W12	uMhlathuze	High	High	5
W12	Richards Bay	High	High	5
W12	iNhlabane	High	Medium	5
W2	iMfolozi/uMsunduze	High	High	5
W3	St Lucia	High	High	5
W7	uMgobezeleni	Medium	Low	3
W7	Kosi	High	High	5

7.3 INTEGRATED ENVIRONMENTAL IMPORTANCE

As described above, the Ecological and Ecosystem service importance were assessed separately and then integrated with the PES to determine the Integrated Environmental Importance. The PES forms part of the Integrated Environmental Importance because estuaries in good condition are important in their own right as they assist in achieving national biodiversity targets. An estuary that is in very good condition, but of low ecological, and/or SCI; might still be important from an ecological perspective, as it could be one of a limited number of that estuary ecosystem type that is in good condition.

The Integrated Environmental Importance also provides an indication of the restoration potential. Restoration potential refers to the probability of achieving rehabilitation of the estuary to an

improved state. For example, if an estuary has very high Ecological and Socio-Cultural importance, but is in bad condition, the restoration potential is often low and that will result in a low Integrated Environmental Importance.

The EIS and ES ratings were not averaged, but the highest score of the two was used to integrate it with the PES. Integrated Environmental Importance value is calculated using a matrix that compares the EIS, SCI, and PES (**Table 7.6**).

Table 7.6 Matrix used to determine a combined EIS/SCI and PES value which provides an Integrated Environmental Importance value

EI-ES&SCI (max)								
	Very high	5	3	3	4	5	5	
	High	3-3.99	3	3	3	5	5	
	Moderate	2-2.99	2	2	3	4	5	
	Low	1-1.99	1	1	2	4	4	
	Very low	0-0.99	1	1	2	3	4	
			E/F	D	C	B	A	Category
			PES					

Six estuaries in the study area were of a very high Integrated Environmental Importance value, namely aMatigulu/iNyoni, uMlalazi, Richards Bay, St Lucia, uMgobezeleni, Kosi **(Table 7.7).**

Table 7.7 Integrated Environmental Importance of the estuaries based on their PES, Ecological importance, Biodiversity/Conservation Importance, and Ecosystem Service rating

#	NAME	Present Ecological State	Ecological Importance	Biodiversity/Conservation Importance	Combined Ecological & Conservation Importance	Ecosystem Services Value	Max (EI, ES)	Integrated Environmental Importance (IEI)
W11	aMatigulu/iNyoni	B	4	5	5	5	5	5
W13	iSiyaya	E	3	5	5	3	5	3
W13	uMlalazi	B	5	5	5	5	5	5
W12	uMhlathuze	D	5	5	5	5	5	3
W12	Richards Bay	D/E	4	5	5	5	5	5
W12	iNhlabane	E	4	1	4	5	5	3
W2	iMfolozi/uMsunduze	D	5	5	5	5	5	3
W3	St Lucia	D/E	5	5	5	5	5	5
W7	uMgobezeleni	B	3	5	5	3	5	5
W7	Kosi	A/B	5	5	5	5	5	5

7.4 ESTUARY IMPORTANCE PER SECONDARY CATCHMENT

This section provides a short summary for each secondary catchment detailing key aspects relating to the estuaries in the study area.

7.4.1 W1 Catchment (Main River: Mhlathuze)

Five estuaries occur in the W1 secondary catchment.

The aMatigulu/iNyoni Estuary is rated as ecologically important (Turpie *et al*., 2002) (**Table 7.3**), and of high importance as a fish nursery area by Department of Forestry, Fisheries and the Environment (DFFE) (Van Niekerk *et al*., 2019) (**Table 7.5**). The system forms part of the Amatikulu Nature Reserve.

The iSiyaya Estuary is average importance ecologically (Turpie *et al*., 2002) (**Table 7.3**), but forms part of a formal protected area, KZN Ezemvelo Wildlife Umlalazi Nature Reserve.

The uMlalazi Estuary is rated as ecologically highly important (Turpie *et al*., 2002) and form part of KZN Ezemvelo Wildlife Umlalazi Nature Reserve (**Table 7.3** and **Table 7.4**). The system is also a designated Important Bird Area. It is also of high importance as a fish nursery area by DFFE (Van Niekerk *et al*., 2019) (**Table 7.3**). The system is important for blue carbon sequestration and forms part of South Africa's proposed climate change mitigation strategies (DFFE, 2022).

The uMhlathuze/Richards Bay system are rated as ecologically important to highly important (**Table 7.3**), and of high importance as a fish nursery area by DFFE (Van Niekerk *et al*., 2019) (**Table 7.4**). The uMhlathuze Estuary from part of a protected area (KZN Ezemvelo Wildlife uMhlathuze Sanctuary) and is also a designated Important Bird Area. The systems are important for blue carbon sequestration and forms part of South Africa's proposed climate change mitigation strategies (DFFE, 2022).

The iNhlabane Estuary is rated as ecologically important (Turpie *et al*., 2002) (**Table 7.3**), and of medium importance as a fish nursery area by DFFE (Van Niekerk *et al*., 2019) (**Table 7.5**). The system forms part of the Nhlabane Nature Reserve, Category recreational area.

7.4.2 W2 Catchment (Main River: Umfolozi)

The iMfolozi/uMsunduze Estuary forms part of the Greater St Lucia Estuarine Lake Complex. The system is rated as ecologically of high importance (Turpie *et al*., 2002) (**Table 7.3**), and also of high importance as a fish nursery area by DFFE (Van Niekerk *et al*., 2019) (**Table 7.5**). The system is also very important for blue carbon sequestration and forms part of South Africa's climate change mitigation strategies (DFFE, 2022). Most of this system falls within the iSimangaliso Wetland Park World Heritage site, as well as being a Ramsar site and an Important Bird Area (**Table 7.4**).

7.4.3 W3 Catchment (Main River: Mkuze)

The St Lucia Estuarine Lake form part of the Greater St Lucia Estuarine Lake Complex. The system is rated as ecologically of very high importance (Turpie *et al*., 2002) (**Table 7.3**), and also of high importance as a fish nursery area by DFFE (Van Niekerk *et al*., 2019) (**Table 7.5**). The St Lucia system is also very important for blue carbon sequestration and forms part of South Africa's

proposed climate change mitigation strategies (DFFE, 2022) (**Table 7.5**). The estuary is a Ramsar site and form part of the iSimangaliso Wetland Park World Heritage site (**Table 7.4**).

7.4.4 W7 Catchment (Kosi Estuary and Sibaya Lake)

The Kosi Estuary is nationally rated as ecologically of very high importance (Turpie *et al*., 2002) (**Table 7.3**) and of high importance as a fish nursery area by DFFE (Van Niekerk *et al*., 2019) (**Table 7.5**). Kosi is also very important for blue carbon sequestration and forms part of South Africa's proposed climate change mitigation strategies (DFFE, 2022). Kosi form part of the iSimangaliso Wetland Park and is also a Ramsar site and an Important Bird Area.

The smaller uMgobezeleni system is rated of average ecological importance (**Table 7.3**) but is of high conservation value as it also falls within the iSimangaliso Wetland Park (**Table 7.4**).

8 RIVER BIOPHYSICAL NODES

8.1 INTRODUCTION

The delineation of RU is provided in the Status Quo and Delineation of Resource Units and Integrated Units of Analysis Report (DWS, 2022). Each RU is represented by biophysical nodes which are either desktop nodes, or EWR sites (**Figure 8.1**). These nodes and sites are those where an EWR assessment of appropriate level will be provided.

EWR sites have been selected during a previous Reserve study (DWS, 2014a). These eight sites are the key sites that must be used within this Classification study. The selection of sites was based on a priority process (DWS, 2014a) but without the information now available in this classification study in terms of the SCI and the WRUI. Additional to these sites, there are also historic EWR sites such as those in the Mhlathuze, Nseleni and Mfule Rivers as well as more recent EWR sites used for specific assessments.

8.2 DESKTOP NODES AND EXISTING EWR SITES

In the ideal situation, the priority of RUs would be determined prior to site selection for EWR assessment. EWR sites would be selected in High or Very High priority RUs (if possible) and the rest of the RUs would be addressed through a desktop node. During this Classification study, no new EWR sites will be selected and the following process was followed:

- The priorities of each RU were identified (**chapter 5**).
- Any EWR sites with information available were added to the RU (**Table 8.1**).
- Desktop nodes were identified for the RUs without EWR sites (or estuaries/wetlands) for EWR assessment.

Table 8.1 Biophysical nodes and EWR assessment level per RU

RU number	RU Priority	Desktop Node & EWR sites	EWR level at node	Comment
W1 Secondary Catchment (Main River: Mhlathuze)				
W11-1	**2**	11-1	Desktop	
W11-2	**2**	EWR MA1	Detailed	Although a detailed level is not required, this site will be maintained as it could be important for estuary EWR assessment.
W11-3	**2**	Estuary	n/a for rivers	
W12-1	**2**	EWR site 5 Upper Mhlathuze	Desktop with hydraulics	
W12-2	**2**	12-2	Desktop	
W12-3	**4**	12-3	Desktop	Combination of Desktop assessment and extrapolation from EWR site 5 which will result in higher confidence assessment than Rapid.
W12-4	**2**	12-4	Desktop	
W12-5	**2**	EWR8LowerMfule	Desktop with hydraulics	
W12-6	**4**	EWR3	Use existing gazetted results	As part of compulsory licensing, a total volume for EWRs have been gazetted (DWS, 2015) based on a detailed historical assessment.
W12-7	**2**	12-7	Desktop	
W12-8	**4**	EWR NS1 (EWR6LowerNseleni)	Detailed	Existing EWR site (to be reviewed) used during two previous EWR assessments.
W12-9	**4**	Nhlabane Estuary	n/a for rivers	
W12-10	**4**	Msingazi Lake and Mhlathuze Estuary	n/a for rivers	
W13-1	**2**	13-1	Desktop	
W13-2	**2**	13-2	Desktop	

RU number	RU Priority	Desktop Node & EWR sites	EWR level at node	Comment
W2 Secondary Catchment (Main River: Umfolozi)				
W21-1	**3**	21-1	Desktop	
W21-2	**3**	21-2	Desktop	
W21-3	**2**	21-3	Desktop	
W21-4	**2**	21-4	Desktop	
W21-5	**4**	EWR WM1	Detailed	Existing EWR site which will be reviewed.
W21-6	**2**	21-6	Extrap EWR BM?	Site appropriate for extrapolation to be determined later,
W21-7	**2**	21-7	Extrap EWR BM?	
W21-8	**2**	21-8	Extrap EWR BM?	
W22-1	**3**	EWR BM1	Detailed	All 3 sites in the Black Mfolozi have low confidence for low flow hydraulics. This is not an area of very high priority the necessity of reviewing all three sites will be reviewed during the EWR assessment stage.
W22-2	**2**	EWR BM2	Detailed	
W22-3	**2**	22-3	Desktop	
W22-4	**2**	MB EWR	Detailed	See W22-2.
W22-5	**3**	22-5	Extrap EWR MB	Will be an improved EWR catering for the High priority.
W23-1	**3**	23-1	Desktop	
W23-2	**2**	23-2	Desktop	
W23-3	**3**	Estuary	n/a for rivers	
W3 Secondary Catchment (Main River: Mkuze)				
W31-1	3	31-1	Desktop	
W31-2	3	31-2	Desktop	
W31-3	4	31-3	Extrap from EWR MK 1	Very High priority dealt with detailed assessment in W31-4,
W31-4	4	EWR MK1	Detailed	Existing EWR site which will be reviewed.
W31-5	3	31-5	Extrap from EWR MK 1	
W31-6	4	31-6	Desktop	
W32_1	4	32-1	Extrap from EWR MK 1	Very High priority dealt with detailed assessment in W31-4,
W32-2	3	32-2	Desktop	
W32-3	3	32-3	Desktop	
W32-4	2	32-4	Desktop	
W32-5	3	32-5	Desktop	
W32-6	4	32-6	Desktop	Very High priority based on groundwater assessment (contribution to base flow) and does not require a detailed EWR assessment.
W32-7		Estuary	n/a for rivers	
W4 Secondary Catchment (Main River: Pongola - excluding Eswatini)				
W41-1	3	41-1	Desktop	
W41-2	3	41-2	Desktop	
W41-3	2	Estuary	n/a for rivers	
W42-1	3	42-1	Desktop	
W42-2	2	EWR UP1	Comprehensive	EWR assessment will be reviewed and it caters for the High priority downstream.
W42-3	3	42-3	Extrap from EWR UP1	
W42-4	3	42-4	Desktop	
42-5	3	42-5	Desktop	
W43-1	3	43-1	Desktop	
W44-1	3	44-1	Desktop	
W45-1	4	Extrap from Floodplain requirements	n/a for rivers	
W5 Secondary Catchment (Main River: Usutu - excluding Eswatini)				
W51-1	2	51-1	Desktop	
W51-2	4	51-2	Extrap from EWR AS1	
W51-3	4	EWR AS1	Comprehensive	Existing EWR site (to be reviewed) used during two previous EWR assessments.

RU number	RU Priority	Desktop Node & EWR sites	EWR level at node	Comment
W51-4	3	51-4	Desktop	
W52-1	3	52-1	Desktop	
W53-1	3	53-1	Desktop	
W53-2	4	53-2	Desktop	No EWR site. If possible, field information for improved desktop assessment will be obtained for more detailed (than desktop) assessment.
W53-3	2	53-3	Desktop	
W54-1	4	54-1	Desktop	See W52-2.
W54-2	2	54-2	Desktop	
W55-1	3	55-1	Desktop	See W52-2.
W55-2	2	EWR Lush	Desktop with hydraulics	
W57-1	4	57-1	Desktop	Meeting EWRs will be depending on it being provided and managed from Eswatini as this is the Usuthu River downstream of Eswatini. Until these processes have been established, a more detailed EWR is not required.
W7 Secondary Catchment (Kosi Bay and Sibaya Lake)				
W70-1	**4**	70-1	Kosi Lake requirements	
W70-2	**4**	70-2	Kosi Lake requirements	
W70-3	**3**	70-3	Sibaya Lake requirements	

The table is summarised according to the secondary catchments as follows:

- W1: Seven desktop nodes. Two desktop nodes with hydraulics (i.e. higher confidence). Two active EWR sites in the Matigulu and Nseleni Rivers where EWRs will be reviewed. One historical EWR site in the Mhlathuze River where the existing gazetted results for compulsory licensing will be reviewed to ensure an acceptable monthly distribution.
- W2: Seven desktop nodes. Four desktop nodes which will be extrapolated from active EWR sites. One active EWR site in the White Umfolozi where EWRs will be reviewed. Three active EWR sites in the Black Umfolozi and EWRs will be reviewed at one or two of the sites.
- W3: Eight desktop nodes. Three desktop nodes which will be extrapolated from an active EWR site. One active EWR site in the Mkuze River where the EWRs will be reviewed.
- W4: Seven desktop nodes. One desktop node which will be extrapolated from an active EWR site. One active EWR site in the Pongola River where the EWRs will be reviewed.
- W5: Ten desktop nodes. One desktop node with hydraulics available from a historical EWR site (i.e. higher confidence). One desktop node which will be extrapolated from an active EWR site. One active EWR site in the Assegaai River where the EWRs will be reviewed.

The nodes are illustrated in **Figure 8.1**.

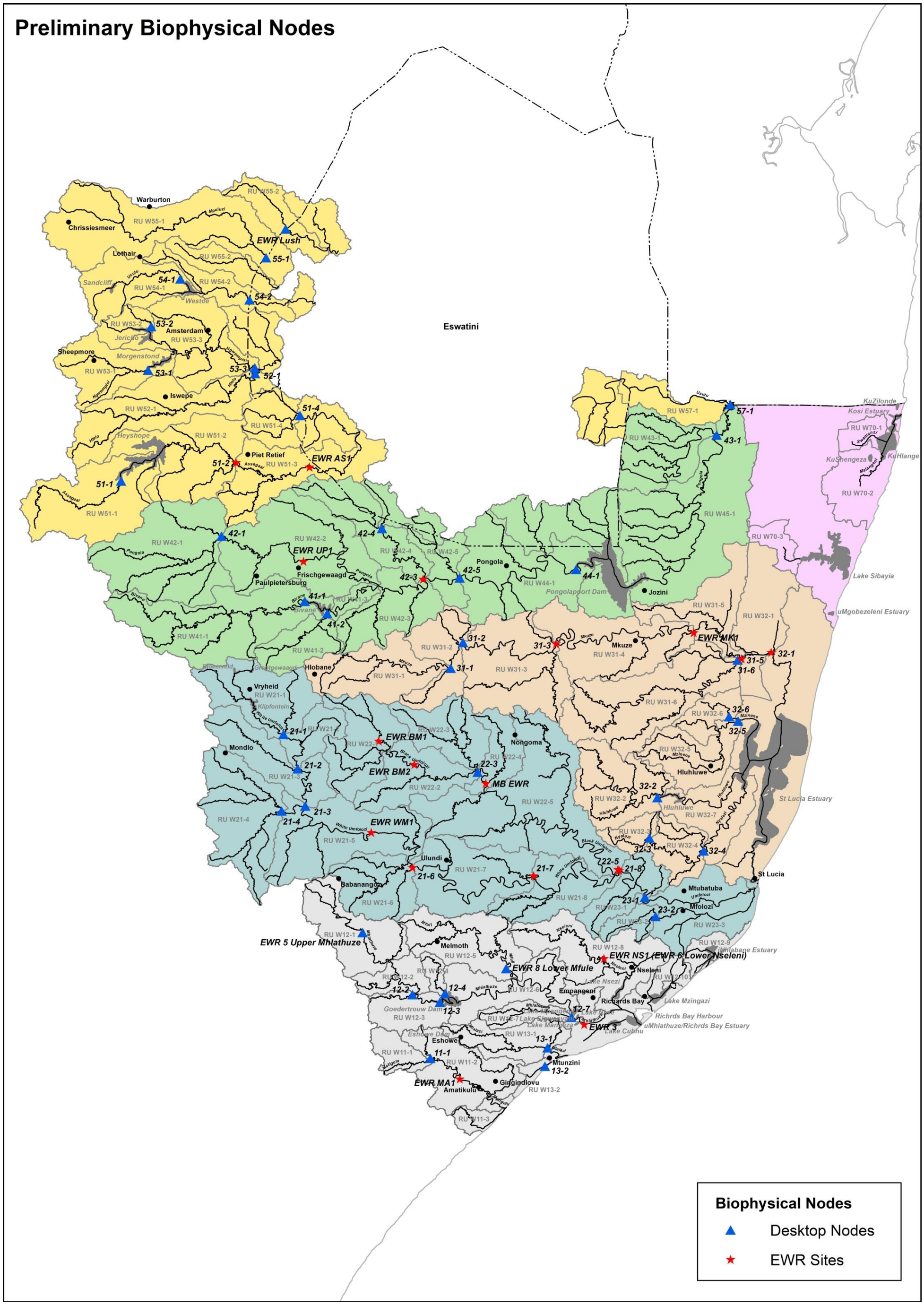

Figure 8.1 Biophysical nodes (desktop nodes and EWR sites)

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10 APPENDIX A: SUB QUATERNARY REACHES GROUPED INTO RESOURCE UNITS

Table A1 SQRs grouped into RUs in W1 (Mhlathuze)

RU number	SQR number
W11-1	W11A-03597
W11-1	W11A-03748
W11-1	W11A-03776
W11-2	W11A-03599
W11-2	W11A-03612
W11-2	W11C-03713
W11-3	W11C-03917
W12-1	W12A-03086
W12-1	W12A-03104
W12-1	W12A-03153
W12-1	W12A-03226
W12-2	W12B-03334
W12-2	W12B-03356
W12-2	W12B-03398
W12-3	W12B-03471
W12-3	W12B-03479
W12-4	W12B-03336
W12-5	W12C-03189
W12-5	W12C-03225
W12-5	W12C-03232
W12-5	W12C-03263
W12-5	W12C-03303
W12-6	W12D-03346
W12-6	W12D-03375
W12-6	W12D-03388
W12-6	W12E-03475
W12-7	W12E-03526
W12-7	W12E-03530
W12-7	W12E-03558
W12-8	W12G-03229
W12-8	W12H-03289
W12-8	W12H-03316
W12-8	W12H-03401
W12-8	W12H-03418
W12-8	W12H-03428
W12-8	W12H-03459
W12-9	W12J-03290
W12-9	W12J-03411
W12-10	W12J-03392
W12-10	W12J-03403
W12-10	W12J-03450
W13-1	W13A-03583
W13-1	W13A-03609
W13-1	W13A-03641
W13-1	W13B-03593
W13-2	W13B-03774

Table A2 SQRs grouped into RUs in W2 (Umfolozi)

RU number	SQR number
W21-1	W21A-02527
W21-1	W21A-02512
W21-1	W21B-02539
W21-1	W21B-02546
W21-2	W21B-02603
W21-2	W21B-02652
W21-2	W21B-02670
W21-3	W21C-02599
W21-3	W21F-02727
W21-4	W21D-02676
W21-4	W21D-02788
W21-4	W21D-02832
W21-4	W21D-02848
W21-4	W21D-02815
W21-4	W21E-02934
W21-4	W21E-02963
W21-4	W21E-02953
W21-4	W21E-02912
W21-4	W21E-02873
W21-5	W21F-02840
W21-5	W21G-03085
W21-5	W21G-03067
W21-5	W21G-02929
W21-5	W21G-02914
W21-5	W21G-02885
W21-5	W21G-02851
W21-5	W21H-02889
W21-5	W21H-02897
W21-5	W21H-03004
W21-6	W21J-03112
W21-6	W21J-03036
W21-6	W21J-03018
W21-6	W21J-03075
W21-6	W21J-03066
W21-6	W21J-03050
W21-6	W21J-03030
W21-7	W21K-02976
W21-7	W21K-03019
W21-7	W21K-02981
W21-7	W21K-03080
W21-8	W21L-03161
W21-8	W21L-03176
W21-8	W21L-03163
W21-8	W21L-03059
W21-8	W21L-03041
W22-1	W22A-02587
W22-1	W22A-02591
W22-1	W22A-02586
W22-1	W22A-02596
W22-1	W22A-02610
W22-1	W22B-02662
W22-1	W22B-02773
W22-1	W22B-02661
W22-1	W22B-02728
W22-1	W22B-02706
W22-2	W22C-02688
W22-2	W22D-02795
W22-2	W22F-02722
W22-3	W22E-02601
W22-3	W22E-02605

RU number	SQR number
W22-3	W22E-02595
W22-3	W22E-02702
W22-3	W22F-02726
W22-4	W22F-02748
W22-4	W22G-02624
W22-4	W22H-02846
W22-5	W22H-02844
W22-5	W22J-02942
W22-5	W22J-02918
W22-5	W22J-02807
W22-5	W22J-02910
W22-5	W22J-02817
W22-5	W22K-02761
W22-5	W22K-02636
W22-5	W22K-02629
W22-5	W22K-02783
W22-5	W22L-02916
W23-1	W23A-03098
W23-1	W23A-03160
W23-1	W23A-03058
W23-1	W23A-03083
W23-1	W23A-03149
W23-1	W23A-03113
W23-2	W23B-03250
W23-2	W23B-03222
W23-3	W23B-03231
W23-3	W23C-03287
W23-3	W23C-03272
W23-3	W23C-03254
W23-3	W23C-03180
W23-3	W23D-03108

Table A3 SQRs grouped into RUs in W3 (Mkuze)

RU number	SQR number
W31-1	W31A-02494
W31-1	W31A-02534
W31-1	W31B-02477
W31-2	W31C-02556
W31-2	W31D-02436
W31-2	W31D-02450
W31-2	W31D-02495
W31-2	W31D-02500
W31-3	W31E-02456
W31-3	W31F-02573
W31-3	W31F-02555
W31-3	W31F-02530
W31-3	W31G-02455
W31-3	W31G-02506
W31-4	W31G-02425
W31-4	W31H-02514
W31-4	W31J-02501
W31-4	W31J-02469
W31-5	W31J-02343
W31-5	W31J-02406
W31-5	W31J-02480
W31-5	W31J-02509
W31-6	W31K-02617
W31-6	W31K-02611
W31-6	W31K-02582
W31-6	W31K-02568
W31-6	W31L-02553

RU number	SQR number
W31-6	W31L-02525
W31-6	W31L-02528
W31-6	W31L-02551
W31-6	W31L-02563
W31-6	W31L-02569
W32_1	W32A-02345
W32_1	W32A-02557
W32_1	W32B-02476
W32_1	W32B-02547
W32-2	W32D-02811
W32-2	W32D-02720
W32-2	W32E-02887
W32-2	W32E-02797
W32-2	W32E-02765
W32-2	W32E-02779
W32-2	W32E-02859
W32-2	W32E-02865
W32-3	W32G-02946
W32-3	W32G-02973
W32-4	W32G-03102
W32-4	W32G-02943
W32-4	W32G-02980
W32-4	W32G-03006
W32-4	W32G-03055
W32-4	W32G-02986
W32-5	W32C-02684
W32-5	W32C-02749
W32-5	W32C-02721
W32-5	W32C-02671
W32-6	W32C-02634
W32-6	W32C-02612
W33-7	W32F-02835
W33-7	W32H-02998
W33-7	W32H-02854

Table A4 SQRs grouped into RUs in W4 (Pongola)

RU number	SQR number
W41-1	W41A-02372
W41-1	W41B-02401
W41-1	W41B-02427
W41-1	W41B-02431
W41-1	W41B-02434
W41-1	W41C-02437
W41-1	W41D-02373
W41-1	W41D-02435
W41-1	W41E-02359
W41-2	W41F-02433
W41-2	W41F-02454
W41-2	W41F-02461
W41-2	W41F-02481
W41-2	W41F-02502
W42-3	W41G-02379
W42-1	W42A-02261
W42-1	W42A-02328
W42-1	W42B-02268
W42-1	W42B-02271
W42-1	W42B-02315
W42-1	W42B-02325
W42-1	W42B-02331
W42-1	W42C-02205

RU number	SQR number
W42-2	W42D-02251
W42-2	W42D-02327
W42-2	W42E-02221
W42-2	W42F-02185
W42-2	W42G-02317
W42-3	W42H-02382
W42-3	W42H-02394
W42-3	W42H-02411
W42-3	W42H-02428
W42-3	W42J-02353
W42-3	W42J-02378
W42-3	W42J-02397
W42-4	W42K-02148
W42-4	W42K-02242
W42-4	W42K-02272
W42-4	W42L-02270
42-5	W42M-02269
42-5	W42M-02294
42-5	W42M-02352
W43-1	W43F-02013
W43-1	W43F-02053
W43-1	W43F-02072
W43-1	W43F-02076
W43-1	W43F-02089
W43-1	W43F-02099
W43-1	W43F-02104
W43-1	W43F-02107
W43-1	W43F-02113
W43-1	W43F-02142
W43-1	W43F-02159
W44-1	W44A-02332
W44-1	W44A-02386
W44-1	W44A-02389
W44-1	W44A-02410
W44-1	W44B-02248
W44-1	W44B-02351
W44-1	W44C-02338
W44-1	W44D-02304
W45-1	W45A-02216
W45-1	W45A-02245
W45-1	W45A-02246
W45-1	W45A-02256
W45-1	W45A-02275
W45-1	W45A-02282
W45-1	W45A-02285
W45-1	W45A-02310
W45-1	W45A-02316
W45-1	W45A-02356
W45-1	W45A-02367
W45-1	W45A-02368
W45-1	W45B-02029
W45-1	W45B-02105

Table A5 SQRs grouped into RUs in W5 (Usutu)

RU number	SQR number
W11-1	W11A-03597
W11-1	W11A-03748
W11-1	W11A-03776
W11-2	W11A-03599
W11-2	W11A-03612
W11-2	W11C-03713

RU number	SQR number
W11-3	W11C-03917
W12-1	W12A-03086
W12-1	W12A-03104
W12-1	W12A-03153
W12-1	W12A-03226
W12-2	W12B-03334
W12-2	W12B-03356
W12-2	W12B-03398
W12-3	W12B-03471
W12-3	W12B-03479
W12-4	W12B-03336
W12-5	W12C-03189
W12-5	W12C-03225
W12-5	W12C-03232
W12-5	W12C-03263
W12-5	W12C-03303
W12-6	W12D-03346
W12-6	W12D-03375
W12-6	W12D-03388
W12-6	W12E-03475
W12-7	W12E-03526
W12-7	W12E-03530
W12-7	W12E-03558
W12-8	W12G-03229
W12-8	W12H-03289
W12-8	W12H-03316
W12-8	W12H-03401
W12-8	W12H-03418
W12-8	W12H-03428
W12-8	W12H-03459
W12-9	W12F-03611
W12-9	W12J-03290
W12-9	W12J-03392
W12-9	W12J-03403
W12-9	W12J-03411
W12-9	W12J-03450
W12-9	W12J-03493
W12-9	W12J-03501
W13-1	W13A-03583
W13-1	W13A-03609
W13-1	W13A-03641
W13-1	W13B-03593
W13-2	W13B-03774

Table A6 SQRs grouped into RUs in W7 (Kosi Estuary and Sibaya Lake)

RU number	SQR number
W70-1	W70A-02079
W70-2	W70A-02112
W70-3	W70A-02301
W70-3	W70A-02381

11 APPENDIX B: COMMENTS AND RESPONSE REGISTER

No.	Section	Comment	From	Addressed?
1	Pg. vii	Is this statement relevant here? It applied to a case mentioned earlier.	B Madikizela	Yes.
2	Pg. ix	Should spread of boreholes in St Lucia town not contribute in WRUI? Why is Groundwater not mentioned in other RU?	B Madikizela	Yes.
3	Pg. ix	Can you explain why exclude St Lucia or brackish to freshwater-to hypersaline depending on mouth status? The role of St Lucia is probably more than other put together (ecologically/Socially/Economically)	B Madikizela	St Lucia is an estuary, which although is one of the wetlands HGMs is dealt with in specific detail by a specialist estuarine team and in a separate chapter. All estuaries were therefore excluded from the freshwater (mostly) wetland assessment.
4		There seem to be very little said about uMsunduzi? This is a presumable significant system that joins uMfolozi before they both join the St Lucia Lak system?	B Madikizela	uMsunduzi is the main river in RU W32-2 and has a Very High Importance as documented in the appropriate tables.
5	Sec 2.4, Pg. 2-4	Will this information, especially Quantity be incorporated in this study before its finalized?	B Madikizela	Yes. This study's future development scenarios will be informed by the Recon Strategy.
6	Sec 2.6, Pg. 2-5	When was the study on which these figures are based, considering the wide spread of boreholes in the Town of St Lucia? The role of eucalyptus forests?	B Madikizela	Water use data taken from WARMS and estimated schedule 1 is added. Widespread boreholes do not abstract large volumes when compared to the very high recharge in coastal sands.
7	Sec 4.1 Pg. 4-1	Is there a report, if so why not refer to it instead of individuals who may have left RQIS?	B Madikizela	Yes.
8	Sec 6.3 Pg.6-7	**Lake Sibaya:** Since its permanent mouth closure to marine, otherwise only Lake Fundudzi is really natural in South Africa?	B Madikizela	Lake Sibaya is not an estuary with a permanently closed mouth. It is a natural freshwater lake in its own right, as is Lake Fundudzi although both were formed by completely different processes.
9		Where is the WQ for the RUs	B Madikizela	Water quality data is provided in Section 2.5 - Table 2.7 and described in the previous Status Quo report.
10	Table 7.5 Pg. 7-4	Is this based Qualitative or Quantitative data sources?	B Madikizela	The national estuaries ratings provided in the document is based on a publication (Turpie et al., 2002) which was updated in 2008. The Estuaries Importance rating (Turpie et al., 2002) use a combination of both measured data and modelled data, most biological data used was 20 to 30 years old.
11	Sec 8.1	Between 2014 and 2022, massive data must have been collected	B Madikizela	This is relevant for the estuary. No additional work on St

No.	Section	Comment	From	Addressed?
	Pg. 8-1	enabling most if not all Modelling needs, including sediment loads, siltation rates of St Lucia Lake, Mouth closure/open projections, etc.		Lucia will be undertaken.
12	Pg. 1-1 and Page vi	Whilst the last sent of paragraph one states that "Section 13 of the NWA requires that Water Resource Classes and RQOs be determined for all significant water resources", I would still recommend that the first sentence of paragraph also makes reference to significant water resource (please refer to highlighted section to follow: " Thus, the Chief Directorate: Water Ecosystems Management (CD: WEM) of the Department of Water and Sanitation (DWS) initiated a study for determining the Water Resource Classes and RQOs for significant water resources in the Usutu to Mhlathuze Catchment.	R Pillay	Yes.
13	Table 2.3 and 2.4	Please indicate the source of the data (irrigation water use information and afforestation hectares). Is this from WARMS?	R Pillay	Addressed.
14	Pg. 2-1 to 2-3	The word run-off unit is referred to in pages 2-1 to 2-3. Clarity is sought on whether it is meant to be resource units or if run-off units is the correct terminology.	R Pillay	Addressed (Resource unit is correct)
15	Table 2.7	The sugar mill which I believe is located in RU W11-2. There is also some agricultural land use. The WQ Planning report flagged phosphates as exceeding tolerable limits.	R Pillay	Table 2.7 represents the water quality score for the WRUI. Water quality priority areas for this purpose are identified by poor water quality status and low assimilative capacity, and are drawn from the *Status Quo* and *Delineation Report*. Not being listed on Table 2.7 does NOT mean the site is not a Water Quality Priority Area. The sites listed in Table 2.7 are a sub-set of the full set of water quality priority areas. The full set, as listed in Chapter 5 of the Status Quo report, includes the points listed by Ms Pillay and will form the basis of discussions towards setting RQOs for water quality. An explanatory sentence has been added to the report.
16		RU W12-6: 2 sewage works located near Empangeni (Empangeni WWTW & Ngwelezane WWTW). Is there any specific reason for its exclusion from this table?	R Pillay	
17		The St Lucia oxidation ponds and some agricultural land use is located in this RU W32-7 (looks to be located within RU W32-7). The WQ Planning report flagged EC, Sulphates, Chorides and ammonia as exceeding the tolerable limits for selected water uses. This is near the Mpate forest reserve. Is there a reason why it's not considered in the water quality priority area?	R Pillay	
18		W42A and W42B (which I think falls within RU W42-1) also has mines including abandoned coal mines (impacts the Tsakwe and Pandana rivers) – Makateeskop area – Based on this I would assume this would be a priority water quality area. The PSP can obtain further information on the Makateeskop area from the Acting Deputy Director (WQM) – Mr Strini Govender (govenders2@dws.gov.za). RU W70-3 – there is also the uMseleni oxidation ponds located in this RU.	R Pillay	

No.	Section	Comment	From	Addressed?
19		RU W31-1 – The coal mines referred to in the Mfolozi catchment also impact on the water quality of the Mkuze catchment. This is due to mine-water decants into the upper reaches of the Mkuze which results in low pH and high TDS river flows. Requires RQOs to be set for the water quality component.	R Pillay	
20	Table 5.4	W42-2 has been given a priority of 2. However, there are mines in the area that are abandoned and impact on water quality. I suggest increasing the RU priority to 3 (high priority) or if it remains at priority level 2, can RQOS at least be set for the water quality component. The PSP can consult the Acting Deputy Director (WQM) – Mr Strini Govender (govenders2@dws.gov.za) if he supports this.	R Pillay	
21	Pg. 5-4	I am aware that the PSP has included which RUs comprise each IUA in the Final Status Quo Report. Can this table also be included in the report? I suggest the PSP also reference in the report that should the reader require information on the Sub quaternary reaches within each RU, that this can be found in Appendix B of the Status Quo Report.	R Pillay	Addressed.
22		Whilst it is acknowledged that all raw data, shapefiles, etc. will be made available at the close of the project, the KZN Office would really appreciate it if the GIS shapefile for the IUAs, RUs and Sub Quaternary reaches per RU (including biophysical nodes/EWR sites) can be sent to the Region as soon as it becomes available.	R Pillay	GIS Shapefiles for SQs are available on the DWS website as a DWS development. Will arrange through the DWS project manager to provide the shapefiles for the RUs and also the list of the nodes.
23		It would be great if your maps that shows quinaries of high importance (e.g. Fig 6.2) can also include the major towns and rivers. It is hard to orientate oneself without these elements.	L. Pretorius	Major towns are included as well as main river names. Individual maps that are available for each secondary catchment include more detail.
24	Table 6.10	Not sure if I am misunderstanding the table 6.10, but it seems like RU W70-1 is scored as high (4, in red) but on the map is only indicated as orange. If I am missing something, perhaps the relation between the table and the map can be made clearer? I have extensive experience in the wetlands around Kosi Bay and would agree that that catchment should be red (very high priority) and not orange.	L. Pretorius	Noted, the orange on the map is an error, it should be red to reflect very high priority. The map in the report has been rectified.
25		It would be good to have a synthesis map for all the priority wetlands across all the catchments, like for the rivers (fig 5.3)	L. Pretorius	Noted, a synthesis map has been added to the report.
26		I struggle to believe that the SCI for the W7 catchment is only High and not very high. I think that is because it is done for rivers, and not wetlands? I might be wrong though. But if this is the case I have to remind the authors that there are no 'real' rivers in W70	L. Pretorius	The score for W 7 is “high” not “very high” as the score largely reflects the feeder component (W70A-02079 and W70A-02112). The pass through highly modified and dense Manguzi and greater dense settlement areas. The

No.	Section	Comment	From	Addressed?
		and the water resources there are all groundwater (and wetland) driven. The people there are almost completely dependent on these water sources, for livelihoods, income, and cultural practices. But perhaps something else skewed the data to only be "high" and not "very high". I didn't interrogate the data. But I thought to just highlight this, in case there is an error in the assumptions.		settlements have grown exponentially in the last years and resource pressures diminish significance of individual household returns. While resource dependence related to the lakes is key the actual broader livelihoods component in the resource area under consideration is linked to current living patterns. From 2016 Community Survey data (last national data set) it appears as if the most significant livelihood linkage is to state grants and other income streams. Had this area been scored 2 decades ago then the comment is correct it would have been within the parameters of “very high”
27		Title of report should read as in Contract – Resource Units **Delineation and** Prioritization Report.	M Mnisi	Addressed.
28		For some reason I think the list of Acronyms should follow the Authors page so that when one reads the Background already they would have seen what some of these abbreviations mean.	M Mnisi	Yes: The acronyms in the exec summary are written out now.
29	Pg. vii	Is there no SCU rating of high importance for ritual, resource dependence and historical and cultural value use in the whole W catchment?	M Mnisi	There are a number of “high” scoring units just not that are very high. This is largely related to reason as set out in comment 26 above.
30	Sec 2.1 Pg. 2-1	Is the score based on 6 or 7 variables? Please reconcile.	M Mnisi	Addressed.
31	Table 2.3	Fill in empty spaces. Do not leave empty spaces in the table.	M Mnisi	Addressed.
32	Table 2.8	Is there any significance for the grey shaded area?	M Mnisi	Yes.
33	Table 8.1	Fill in the blank spaces in the comment section of the table	M Mnisi	Cannot be filled in. The comment section is only for where there are specific comments required. The blank spaces have no comments.
34		W22-4 – see above: Above is an empty row. Please fill in a comment. Same with w54-1 and W55-1.	M Mnisi	Refer to comment 33.
35		Fill comments for W70-1 to W70-3.	M Mnisi	Refer to comment 33.