



DRAFT TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

KSA 1&2:	Water Resources and Ecosystems
THRUST 2:	Hydrological and Ecosystem Processes
PROGRAMME 2:	Data and Hydro-informatics
TITLE:	Updating the 2011 Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) Database for Secondary Catchments on a Sub-Quaternary Scale including the Significant Tributaries of the Main Stem Rivers, instream wetlands and estuaries within a Sub Quaternary Reach.

Objectives:

General:

Updating South Africa's 2011/2014 PES and EIS Database for Primary, Secondary Catchments on a Sub-Quaternary Reach Scale (SQRS).

Specific:

Populating the PES and EIS Database using a standardized baseline spreadsheet/model (that will be provided) according to the designated study areas assigned to the specific groups (refer to the Table below for Study Groups). The specific objectives will entail:

1. A comprehensive literature search/assessment that will be part of the **Inception phase**. It should include **amongst others**, Preliminary Reserves conducted, Gazetted Reserves, previous and current RDM studies, EWR assessment sites, River Eco-status Monitoring Program (REMP) information, Resource Quality Objectives (RQOs), ecological configurations, transboundary studies (ORASECOM, LIMCOM etc), Environmental Impact Assessments (EIAs), relevant and related publications, dissertations etc, or any other **credible relevant available information/data post the 2011/2014 PES/EIS database** to provide the required and validated data to update the present 2022/2025 PES/EIS database.
2. To assess and update the 2011/2014 PES/EIS data for lotic systems i.e., rivers, riverine wetlands and estuaries that are located within the delineated sub-quaternary reaches, for appropriate use in the Eco-categorisation process that is central to the population of the PES/EIS spreadsheet.
3. Compile a **Gap Analysis** report using information obtained from assessing the **recommendations made and challenges** experienced and documented during and after the 2011/2014 PES/EIS study.
4. Produce a trend analysis report as part of the standardised "to be provided" factsheets per Primary, Secondary and or Quaternary reach (to generate "data output" formats for assessing the **trends of the state of the water resources per sub quaternary reach from the 2011/2014 to the present**).
5. To produce a **populated** Integrated Final PES/EIS 2022/2025 database for the study area for which the proposal is being drafted, and document the relevant metadata in the standardised factsheets for use and referral post the completion of this study.
6. Capacity development for the main users of the data which will include the Reserve officials, DWS officials in the regions, the officials in the CMAs or proto-CMAs, the DWS and CMA Officials that are involved in the REMP and other monitoring programmes etc. A dedicated budget for the capacity building will be allocated to each group.

Background:

The availability of water resources in South Africa is shrinking in terms of quantity and quality due to increasing requirements and the vastly changing land uses. This reality necessitates the close management of natural resources and specifically water resources in a holistic manner and continuously monitoring from source to sea.

Section 24(b) of the Constitution places the responsibility on the government to make *use of reasonable legislative and other measures to protect the environment* (specifically to prevent pollution and ecological degradation, to promote conservation, and to secure ecologically sustainable development). Chapter 3 (Section 14-17) of the National Water Act (NWA) assigns the right to water use only to (a) basic human needs (BHN) and (b) environmental water requirements (EWR) which together are expressed as the Reserve (the quantity and quality of the freshwater that is required to ensure the maintenance of the natural functioning of the riparian vegetation and the instream biota and habitat).

Chapter 3 of NWA further obligates the government to determine the Class, set Resource Quality Objectives (RQOs), and determine a suite of associated Reserve categories and ecological configurations for significant water resources in the related Sub-Quaternary Reaches (SQRs). This study is largely focusing on the Ecological Water Requirements (EWRs) that are expressed in terms of the Present Ecological State (PES), the water resource's Ecological Importance (EI) and Sensitivity (ES) together expressed as the (EIS). The aim further, is to derive (if not already done by means of higher confidence Reserve studies) the Recommended Ecological Category (REC) at a representative point in a river reach or at a fixed representative point in the water resource. These EWRs parameters (PES, EIS and REC) represent the baseline information set, that is required for various legislative environmental processes, and they must be regularly updated.

Therefore, the main objective of this study is to update the 2011 PES/EIS database that curated information for the main rivers in 1946 Quaternary Catchments in South Africa. The study will focus largely on primary, secondary and quaternary catchments and should include the significant water resources in the proclaimed **strategic water resource areas** on sub-quaternary reaches (SQRs) level which include the associated lotic wetlands i.e. floodplain wetlands, channelled valley bottoms and estuaries situated in the SQR. The wetlands database must be addressed in detail where e.g. seeps, unchanneled valley bottoms, pans and lakes that are not connected to a river. A standardised approach for obtaining and reflecting the latter mentioned information will be provided, assessed and the approach agreed upon during the inception phase.

Proposals are hence invited for each of the Study Area Groups that are described in Table 1. The non-stream related wetlands and the estuaries located within the Sub-quaternary Reach with a high importance, conservation state or type will have to be addressed as well. The specification as how to report on the non-lotic systems (wetlands not linked to a river, groundwater dependent ecosystems and estuaries) will be dealt with as specified in the inception phase of the project.

The country is divided into Five (5) Study Areas, each with its budget allocation over three (3) years, as detailed in the Table below. A lead organisation may submit a proposal for one Study Group only i.e. a lead organization cannot tender for more than one Study Area. The lead representative of each Study Group will act as the project leader for that group. The project leader and the research team must be able to operate the *Excel 365* and *Google Earth Pro* 5. The five (5) studies will run simultaneously, and the deliverables and target dates will largely be similar. Each Study Group must allocate R500 000.00 for capacity building.

The technical support to the Study Groups will be provided by a specialist *PES & EIS Model/Spreadsheet* development team that will be appointed separately.

Table 1: Description of Study Area Groups

STUDY GROUP	STUDY AREA		TOTAL BUDGET
	WMA	Boundary Description	
GROUP 1	WMA 1: Limpopo	Primary Drainage Region A	3 325 000
	WMA 2: Olifants	Primary Drainage Region B	

	WMA 3: Inkomati/Usuthu	Primary Drainage Region X (it forms part of Inkomati-Usuthu) WMA. Include the SQRs in eSwatini	
GROUP 2	WMA 3: Inkomati/Usuthu	Tertiary Drainage Regions W51 to W56 Include the relevant SQRs in eSwatini .	3 230 000
	WMA 4: Pongola/ Mtamvuna	<ul style="list-style-type: none"> ○ Primary Drainage Regions U and V, and ○ Secondary Drainage Regions W1 to W4 ○ Secondary Drainage Regions T4 and T5 	
GROUP 3	WMA 5: Vaal	Primary Drainage Regions C and D including portions in Lesotho.	3 135 000
	WMA 6: Orange		
GROUP 4	WMA 7: Mzimvubu/ Tsitsikamma	Primary Drainage Regions P, Q, R, S, L, M and N.	3 230 000
		Secondary Drainage Regions T1, T2, T3, T6, T7, T8 and T9.	
		Secondary Drainage Regions K8 and K9	
GROUP 5	WMA 8: Breede/ Gourit	<ul style="list-style-type: none"> • Primary Drainage Regions H and J. • Secondary drainage regions K1 to K7. • Quaternary drainage regions: F50D, F60B, F60C, F60D, F60E • Secondary Drainage Regions F1 to F4, • Quaternary Drainage regions F50A, F50B, F50C, F50E, F50F and F60A 	3 515 000
	WMA 9: Berg/ Olifants	Primary Drainage Regions E and G	

Suggested Deliverables (with suggestive target dates):

1. Inception Workshop (part of the Inaugural Reference Group Meeting) - August 2022.
2. Inception Report - September 2022.
3. Second Reference Group Meeting (presentation of Inception Reports, and presentation by the Technical Support Team) - September 2022.
4. Technical workshop report - February 2023
5. Gap Analysis Report - 2023.
6. Refinement and Updating of PES/EIS information including organising Regional technical stakeholder/specialist workshops per drainage region in each study area - 2023.
7. Trend Analysis (and some Rapid Reserve determination) Reports - 2024.
8. Capacity Building Report from each Study Area Group – 2024.
9. Populated PES/EIS Database with Fact Sheets and associated graphs and maps for each Study Area Group - 2024.
10. Final Report from each Study Area Group – January 2025

Timeframes: July 2022 to March 2025

Budget Breakdown for the five (5) Study Groups is as follows:

	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	TOTAL
YEAR 1	1 178 000	1 178 000	1 178 000	1 178 000	1 178 000	5 890 000
YEAR 2	1 201 000	1 132 000	1 051 000	1 132 000	1 307 000	5 823 000
YEAR 3	946 000	920 000	906 000	920 000	1 030 000	4 722 000
TOTAL	3 325 000	3 230 000	3 135 000	3 230 000	3 515 000	16 435 000



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PROGRAMME 2:	Data and Hydro-informatics
TITLE:	Updating of the 2011 Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) Database with reference to the Enhancement of the PES & EIS Model/Spreadsheet Database and Specialist Support to the Study Groups.

Objectives:

General:

Updating South Africa's 2011/2014 PES and EIS Database for Primary, Secondary Catchments on a Sub-Quaternary Reach Scale (SQRS).

Specific:

Enhancement and setting up of the PES & EIS Model/Spreadsheet Database and its supporting User Manual, and consolidation of PES & EIS Reports and Databases. Some specific objectives will include:

- 1) **Preparing the baseline PES & EIS Model/Spreadsheet with the required overlays using e.g. Excel 365 and Google Earth Pro to:**
 - KML files (landcover information, groundwater status and condition information, mainstems and tributaries, instream wetlands and estuaries in the SQR)
 - establish a metric rating system related to SQR based on the 2011/201 approach.
 - provide guidance on the scientific naming convention for fish and macro invertebrate taxa.
 - ensure that coding of the data complies with internal and external data quality and legal standards for data accreditation requirements.
 - develop a comprehensive User Manual for the updated 2025 PES & EIS Model/Spreadsheet.
 - etc
- 2) Provide technical support and training to the Study Area Groups on the use of PES & EIS Model/Spreadsheet
- 3) Review of documents and technical processes related to populating the 2022/2025 PES/EIS Database.
- 4) Work with a model developer to set parameters for developing a future PES & EIS Modelling system
- 5) Maintenance of the PES & EIS Database for 12 months after the completion of the study (2025 to 2026)

Background:

The availability of water resources in South Africa is shrinking in terms of quantity and quality due to increasing requirements and the vastly changing land uses. This reality necessitates the close management of natural resources and specifically water resources in a holistic manner and continuously monitoring from source to sea.

Section 24(b) of the Constitution places the responsibility on the government to make *use of reasonable legislative and other measures to protect the environment* (specifically to prevent pollution and ecological degradation, to

promote conservation, and to secure ecologically sustainable development). Chapter 3 (Section 14-17) of the National Water Act (NWA) assigns the right to water use only to (a) basic human needs (BHN) and (b) environmental water requirements (EWR) which together are expressed as the Reserve (the quantity and quality of the freshwater that is required to ensure the maintenance of the natural functioning of the riparian vegetation and the instream biota and habitat.

Chapter 3 of NWA further obligates the government to determine the Class, set Resource Quality Objectives (RQOs), and determine a suite of associated Reserve categories and ecological configurations for significant water resources in the related Sub-Quaternary Reaches (SQRs). This study is largely focusing on the Ecological Water Requirements (EWRs) that are expressed in terms of the Present Ecological State (PES), the water resource's Ecological Importance (EI) and Sensitivity (ES) together expressed as the (EIS). The aim further, is to derive (if not already done by means of higher confidence Reserve studies) the Recommended Ecological Category (REC) at a representative point in a river reach or at a fixed representative point in the water resource. These EWRs parameters (PES, EIS and REC) represent the baseline information set, that is required for various legislative environmental processes, and they must be regularly updated.

Therefore, the main objective of this study is to assist the updating of the 2011/2014 PES & EIS Database by enhancing the Model/Spreadsheet that curated information for the main rivers in 1946 Quaternary Catchments in South Africa, and to provide specialist/technical support to the five (5) Study Area Groups that will collect the information. The five (5) Study Area Groups will focus largely on primary, secondary and quaternary catchments and should include the significant water resources in the proclaimed **strategic water resource areas** on sub-quaternary reaches (SQRs) level which include the associated lotic wetlands i.e. floodplain wetlands, channelled valley bottoms and estuaries situated in the SQR. The wetlands database will be addressed in detail where e.g. seeps, unchanneled valley bottoms, pans and lakes that are not connected to a river. A standardised approach for obtaining and reflecting the latter mentioned information will be provided, assessed and the approach agreed upon during the inception phase.

Proposals are therefore invited for a Specialist/Technical PES & EIS Model/Spreadsheet developer to enhance the PES & EIS Model/Spreadsheet for curating the information that will be collected by the Study Area Groups that are described in Table 1 of the associated TOR. The Model/Spreadsheet developer will also provide guidance and technical support to the five (5) Study Groups as well as consolidating their Databases and technical reports into a single report and PES & EIS Database. The recommended software for the Model/Spreadsheet enhancement is the *Excel 365* and *Google Earth Pro 5*.

The work of the Model/Spreadsheet developer will largely run simultaneously and synchronously with the five (5) Study Area Groups that will update the 2011/2014 PES & EIS Database. A budget of R500 000.00 must allocated for capacity building over the duration of the study.

Suggested Deliverables with suggestive target dates:

1. Guidance report on the approach to updating the PES & EIS Database – September 2022
2. Technical Report 1 on the support to the Study Area Groups on the use of PES & EIS Model/Spreadsheet – October 2022
3. Review and Training report on populating the 2022/2025 PES/EIS Database – November 2022.
4. Interim Report with updated database, PES & EIS Model/Spreadsheet and GIS maps - 2023.
5. Technical Report 2 on the support to the Study Area Groups on the use of PES & EIS Model/Spreadsheet - 2023
6. Capacity Building Report for the Main Users of the PES/EIS Database (2024)
7. Proposed Coding for future PES & EIS system - 2024
8. Consolidated Print-Ready Final Report, User Manual and Updated Integrated PES/EIS Database and GIS maps (2025).
9. Maintenance of the PES & EIS Database for 12 months after the completion of the study (2025 to 2026)
10. A close-out report on the 2025 PES & EIS Database (2026)

Timeframes: **2022 to 2026**

Total Budget: **R2 565 000.00**

Budget Breakdown

YEAR 1	760 000
YEAR 2	827 000
YEAR 3	578 000
YEAR 4	400 000
TOTAL	2 565 000