



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA



TERMS OF REFERENCE

A CASE STUDY FOR LINKING THE SETTING OF WATER QUALITY LICENSE CONDITIONS WITH RESOURCE QUALITY OBJECTIVES AND/OR SITE-SPECIFIC CONDITIONS IN THE VAAL BARRAGE AREA AND ASSOCIATED RIVERS WITHIN THE LOWER SECTIONS OF THE UPPER VAAL RIVER CATCHMENT

OBJECTIVES:

General: To undertake a joint catchment study in the Vaal Barrage area and associated rivers: lower catchments of the UI (Klip River, Gauteng), Suikerbosrant River, Rietspruit, Vaal River (from the Vaal dam to end of UM), and Vaal Barrage discharge as primary catchments of focus, within the lower section of the upper Vaal River catchment to better understand the linkages between Source-Directed Controls (SDCs) like the setting of water quality license conditions and Resource Quality Objectives (RQOs) and/or sites-specific conditions, in a way that water quality standards are adopted for better management of water resources. The above catchments are the primary focus of the study, but from a load perspective the following catchments should also be consider UJ (Taaibospruit), Leeuspruit and Kromelmbogruit, which are of secondary focus.

Specific objectives

- Undertake a comprehensive and thorough assessment of existing practices, data (extant and potentially modelled), approaches, methods, and tools including relevant catchment literature, with regard to Source-Directed Controls (SDCs) and Resource Quality Objectives (RQOs)) and other applicable water quality objectives and instruments in the proposed study area. The assessment should include analysis



of all current tools, practices/methods/approaches of setting water quality license conditions and their scientific defensibility/or otherwise within the proposed study area. The assessment should be undertaken with both key water users in the catchment and regulators.

- Develop an appropriate robust and scientifically defensible but flexible method/tool/decision support system (DSS) (e.g. a mass balance model) for transparently setting water quality license conditions (point and diffuse) taking account of receiving resource quality objectives/ site specific conditions. The tool developed/refined should address issues of multiple users and competition as well as submission of data by water users to the regulator. Alternatively, guidance should be given on how to apply existing tools/models for setting and monitoring water quality license conditions, considering receiving site-specific condition and RQOs. In developing new tools/methods/DSS/ or refining existing ones, issues relating to scientific assumptions, confidence, limitations and quality assurance/control, should be addressed. The tool/method/DSS developed/refined, should be embedded within a broader framework that provides guidance for both regulators and water users for setting and implementing water quality license conditions linked to RQOs and/or site-specific conditions for both point and diffuse emissions and monitoring compliance. As a minimum, it should guide both regulators and users on
 - (i) process of engagement in the context of a water quality license application and/or amendment (WUL)
 - (ii) scientific/ecological and social-economic considerations for inclusion of water quality variables and ecological indices (e.g. FRAI (Fish response assessment index), MIRAI (macroinvertebrate response assessment index), SASS5 (South African Scoring System version 5)) in license conditions
 - (iii) selection of appropriate monitoring and sampling points as well as frequency of monitoring and sampling
 - (iv) quality assurance measures
 - (v) what needs to be done in cases where the RQOs are yet to be set (e.g. the application of the South African Water Quality Guidelines)

- (vi) the process for amending issued WUL. It should also address alternative strategies for improving in-stream water quality other than WUL e.g. through offsets, co-and-self regulation.

The process of developing the tools/methods/DSS should be multi-stakeholder, drawing on technical expertise from both the regulators and resource users (where applicable). It is important to note that not all chemical constituents of concerns, which may be required for a license condition (based on the activity of the resource user), are gazetted as part of the RQOs. In such cases, the development of the method/tool/decision support system (DSS) should consider other instruments such as the South African Water Quality Guidelines.

- Demonstrate and test the implementation and applicability of the developed method/tool/DSS under multiple water quality conditions, temporal/ spatial, site-specific/RQOs scenarios (i.e. scenario analysis) with catchment stakeholders including the relevant units within the Department of Water and Sanitation, catchment management forums and water users e.g. Sasol, ESKOM, Rand Water, Local governments/municipalities. As part of the scenario analysis, demonstrate how the developed tool could be implemented such that a water user is able to determine the likely impacts on water quality objectives and/or site-specific conditions.
- Communicate widely with catchment stakeholders and build capacity of the relevant units/sections within the Department of Water and Sanitation, and water users through training on the use and application of the developed method/tool/DSS. The purpose of this objective is to ensure that the entire process is consultative and widely communicated to ensure that the outcome of the project is widely accepted by all stakeholders.

Rationale

The National Water Act, 1998 (Act No. 36 of 1998) is founded on the core objectives that South Africa's water resources are to be protected, used, developed, conserved, managed and controlled, in such a way that use and development, and protection are balanced. It

therefore provides a legal basis for protecting the nation's water resources, while at the same time providing for administrative licensing process for lawful use of water. To give effect to the core objective of balancing use and protection, the Resource Directed Measures (RDM) and Source Directed Controls (SDCs) are used as complementary approaches. The RDM involved cooperatively defining the appropriate/desired level of protection for a resource and involved a classification system, classification and setting of resource quality objectives (RQOs) as well as the Reserve (Human and Ecological). The process is consultative whereby the same level of consideration is given to inputs and views from all stakeholders/affected and interested parties. The SDCs aim to control the use of water and associated impacts (e.g. discharges) through regulatory measures such as water use licenses (WUL). Once the in-stream RQOs are set, WUL license conditions are derived so as to meet the in-stream objectives. That is, the RQOs should inform the water quality license conditions. However, the difficulty arises in situation where water quality license conditions are to be derived in catchments where RQOs have not been set or will be set. In this context, it is important to note that in setting WUL conditions, RQOs do not necessary preclude the need for site-specific water quality assessment that should inform license conditions or the use of generic fitness for use objectives as surrogate RQOs, based on the South African Water Quality Guidelines. There is also the question on how RQOs in larger catchments impact on smaller sub-quaternary reaches. For example, can large catchments be allowed to have worse water quality due to the large amount of dilution that should occur before the point where an RQO is set? Although RQOs can inform water quality discharge standards and vice versa, the link between the two is still not clear to many users and regulators, particularly how RQOs inform water quality variables and discharge standards in WUL considering the imperative for social-economic development and environmental sustainability. This lack of clarity is a source of concern with regard to scientific defensibility of methods (SDCs and RQOs) as well as meeting license conditions. Because catchments are complex social-ecological systems, the process of setting water quality license conditions must be as inclusive, transparent and consultative as possible to avoid/and or minimise contestations.

The NWA prescribes the balancing of protection and use of all water resources, e.g. groundwater, wetlands, rivers etc. This is in line with Integrated Water Resource

Management (IWRM). However, the focus of this project is on rivers, with the hope that its success can inform similar projects for other water resources and their interactions. Therefore, using the proposed study area i.e. the Vaal Barrage area and associated rivers catchments UI (Klip River, Gauteng), Suikerbosrant River, Rietspruit, Vaal River (from the Vaal dam to end of UM), and Vaal Barrage discharge (see Figure 1) as a catchment joint study within the lower section of the Upper Vaal River catchment, the overall aim of this project is to link and clarify the setting of water quality license conditions to Resource Quality Objectives (RQOs)/ site-specific conditions (including variables with no RQOs and resource units with no RQOs) in a way that water quality discharge standards are clarified for better management of water resources.

Deliverables

1. An assessment and option analysis report detailing existing practices (in South Africa and internationally), data, tools/methods/approaches used for setting water quality conditions linked to RQOs and /or site-specific conditions. This report should also indicate how standards for water quality variables with no RQOs are set in WUL conditions, and how WUL conditions are set for resource units with no RQOs. Attention should be paid to the credibility and scientific defensibility of the current tools/methods/approaches and data used. The report should also include stakeholders consulted and those to be engaged throughout the study.
2. A preliminary report on the development of an appropriate robust and scientifically defensible method/tool/decision support system (DSS) for setting water quality license conditions (point and diffuse sources) for variables of concern linked to RQOs and/or site-specific conditions as well as setting standards in WUL for water quality variables of concerns for which no RQOs are gazetted, and WUL conditions for resource units with no RQOs. Alternatively, a report on the refinement of existing method/tool/decision support system (DSS) addressing all the requirements stated above. Since the process of developing the new method/tool/DSS or refining existing ones is envisaged to be consultative, this report should also detail the input of stakeholders.
3. Final report on the developed or refined tool/method/DSS, including demonstration of implementation, application, scenario analysis. This report should also include the

accompanying software for implementation and it should address all the elements specified in objectives 2 and 3.

4. Communication and catchment stakeholder capacity building report. This report should detail the training given to all relevant stakeholders (regulators and resource users) in the catchment.
5. Draft project final report
6. Final project report, including any software developed or refined.

Impact Area: Environment, Economy and Society

Time Frame: 2 years

Suggested Budget: R 1.5M

Suggested Total Funds for Year 1: R 800 000