

TERMS OF REFERENCE FOR A SOLICITED PROJECT

KEY STRATEGIC AREA	KSA 1-2
THRUST: 5	Resource quality and management
PROGRAMME :1	Water pollution, depletion and human health
TITLE	Revision of the 1996 South African Water Quality Guidelines: Development of risk-based approach using aquatic ecosystems responses

Objectives:

General:

To review and develop an electronic based decision support system (software) able to provide both site-specific and generic risk-based water quality guidelines for South African aquatic ecosystems

Specific:

1. Review the South African Water Quality Guidelines: Aquatic Ecosystems Vol:7 of the 8-volumes using the latest credible local/international knowledge
2. Align with parallel projects on the development of water quality guidelines for other water users, such as industry, mining, agriculture, recreational, etc.
3. Consolidate indices developed in the last two decades, including projects underway
4. Develop the technologically based decision support system or appropriate software in the application of the guidelines
5. Pilot test the guidelines in consultation with water sector managers, practitioners, business and citizen scientists

Rationale:

The then DWAF developed eight volumes of the interim guidelines, called South African National Water Quality Guidelines in 1996 for use in the water sector. The recommendation by authors was that the guidelines must be reviewed periodically as the researched information is generated improving the understanding of water quality drivers (new and unlisted at the time) and their impacts/risks on the aquatic environment. In 2004 and later 2008, a report on effects of selected pollutants on ecosystem was published. The aim of the review was to synthesize documented research on the effects of various aspects of water quality on aquatic ecosystems. The scarcity of published literature in South Africa still meant that much information in the review was obtained from international literature, mainly USA. It is not always ideal to copy paste such guidelines into SA fundamentally different climatic conditions. Indeed, research on the effects of pollutants on ecosystems, rather than on species, is limited world-wide, hence a huge research gap. The gaps continue to exist, especially on persistent organic pollutants and emerging contaminants. South African Water Quality Guidelines for Aquatic Ecosystems in 1996 dealt with atrazine (herbicide) and endosulfan (an insecticide) only. A lot has since been published, but not consolidated into a single manual and source of reference. This creates inconsistency in interpretation and application, therefore standardization is urgently required. Most important is to include estuaries (brackish water) which was almost totally left out in the 1996 guideline version

A Phase 1 DWS project was completed in 2008 that performed a needs assessment, developed

a general philosophy and described the general specifications of a decision support system (DSS) for revised water quality guidelines for South Africa.

The new guidelines will be different in a number of fundamental ways. Firstly, they will be risk-based – a fundamental change in philosophy from the 1996 guidelines. Secondly, they will allow for much greater site-specificity – a widely-recognised limitation of the generic 1996 guidelines. Thirdly, they will be inclusive of previously unidentified pollutants or not detected. Lastly, they will be made available primarily in a software-based decision support system.

General Methodology and Specifications:

The work must be based on the recommendations of Phase 1 (available from DWS) and the requirements of the overall DWS ToR for all water users. These are summarised below.

The DSS must be aligned with selected contexts, projects and programmes, such as the water resource classification system, water quality monitoring networks, etc.

The methodology must achieve the maximum possible synergy and compatibility with other projects that may run in parallel with this one which will develop the guidelines for other water uses.

The primary tool for determining the guidelines should be in hard copy manuals and a software-based DSS with three tiers:

1. Tier 1 is equivalent to 1996 generic guidelines. It communicates the status and trends as minimum coarse information required by users, highlighting potential problems if these are not met
2. Tier 2 allows for site specificity in specified contexts and is facilitated by the DSS.
3. Tier 3 allows for site specificity that link to detailed needs, such as Reserve determinations, NWRCS, RQO's, EIA, licensing

Deliverables:

Deliverables should include at least the following:

1. Review report based on local/international literature, demonstrating the risk-based guidelines developmental approach. Data capturing procedures and database management, through to reporting. Case studies will enhance the new approach, i.e. the associated software development.
2. Consolidated and aligned report based on various indices which have a risk-based effects established, and not contradicting with monitoring networks, such as Tier approach. DSS is critical in streamlining the guidelines with operating monitoring networks.
3. Case studies where revised guideline version has been piloted, with evidence of user/client interactions report.
4. Final reports as separate volumes, one on the reasoning behind the revised guidelines design (decisions support document or Technical Manual) another as a user-friendly implementation manual associated with the DSS,
5. Recommendations for further research

Impact Area:

As per WRC knowledge tree, with focus on those directly affecting the project

Time Frame: 3 years
Total Funds Available: R 2 000 000
First Year Budget: R 500 000

