Integrated Water Quality Management Plan











TION 3

IWQMP FOR THE OLIFANTS RIVER SYSTEM NEWSLETTER









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PURPOSE OF THIS DOCUMENT

The purpose of this document is to provide water users in the Olifants River Water Management Area (WMA) with information about the Department of Water and Sanitation's project to develop an Integrated Water Quality Management Plan for the Olifants River system. This document provides feedback on the project and a summary of the most recent tasks as well as an opportunity for comment by stakeholders. Please contact the following Project Team members for more information:

DWS Project Managers:

Dr B Mwaka: Project Director: <u>mwakab@dws.gov.za</u> Mr P Viljoen: Project Leader: <u>viljoenp2@dws.gov.za</u> Ms MW Mosoa: Project Manager: <u>mosoal@dws.gov.za</u> Website: <u>https://www.dwa.gov.za/projects/iwqmp/default</u>. Aspx

Golder Project Team:

Technical support: Mr T Coleman: Project Leader: <u>tcoleman@golder.co.za</u> Ms L Boyd: Project Manager: <u>lboyd@golder.co.za</u> Stakeholder engagement: Ms A Pietersen: <u>apietersen@golder.co.za</u>

INTRODUCTION

In terms of the National Water Act (NWA) (Act 36 of 1998) and in line with the Department of Water and Sanitation's (DWS) obligation to ensure that the country's water resources are fit for use on an equitable and sustainable basis, it has adopted the approach of the progressive development and implementation of catchment management strategies (CMS) to fulfil this mandate. The development of the Integrated Water Quality Management Plan (IWQMP) for the Olifants WMA is being undertaken by the National Office in consultation with the Proto CMA, DWS P Office and stakeholders in the WMA. This will ultimately be a sub-strategy that will support the CMS.

An important deliverable from the study will be a set of integrated Water Quality Planning Limits (WQPLs).

APPROACH TO DEVELOPING WATER QUALITY PLANNING LIMITS

The quality of any body of surface water or groundwater is a function of both natural and human influences. If there were no human influences water quality would be determined by the weathering of bedrock minerals, by the atmospheric processes of evapotranspiration and the deposition of dust and salt by wind, as well as by natural leaching of organic matter and nutrients from soil, hydrological factors that lead to run-off and by biological processes within the aquatic environment that can alter the physical and chemical composition of water.

The water quality of a particular body of water is determined by measuring the physical, chemical, aesthetic and biological characteristics of the water and typically, the fitness for use of the water is determined by comparing these characteristics against water quality guidelines or standards for a particular water use. In South Africa, the South African Water Quality Guidelines series (DWAF, 1996) is essentially a series of documents that was developed based on different user specifications (including use by the following sectors: domestic, industrial, livestock watering, irrigation and aquatic ecosystems) and were based on scientifically assessed acceptable levels of toxicity to either humans or aquatic organisms.

Based on factors such as land use and water users, climatic, hydrogeological and geographical zones, management units have been proposed for each of the six sub-catchments, as illustrated as an example for the Steelpoort catchment in Figure 1.



Figure 1: Example of MU delineation for the Steelpoort sub - catchment

RATIONALE FOR USING WOPL

Part 1 of the NWA provides for the first stage in the protection process, which is the development by the Minister of a system to classify the nation's water resources. The system provides guidelines and procedures for determining different classes of water resources. Once the classification has been done, the Minister is required to use the classification system established to determine the class and resource quality objectives (RQO) of all or part of water resources considered to be significant. The purpose of the RQO is to establish clear goals relating to the quality, quantity and ecological components of the relevant water resources. In determining RQOs a balance must be sought between the need to protect and sustain water resources on the one hand, and the need to develop and use them on the other.

In the Olifants WMA the classification and development of RQO has been completed and gazetted (GN 466, National Water Act, 1998 (Act No.36 Of 1998) Classes And Resource Quality Objectives Of Water Resources For The Olifants Catchment, 22 April 2016).

A question therefore arises as to why WQPLs should be set when RQO have already been gazetted for the Olifants WMA.

Considering that RQOs have been set at a very high spatial level, setting of WQPLs will therefore help to achieve the management class and RQOs for a particular area, as WQPLs are set at a finer resolution, and take local users and uses into account.

For example, WQPLs at a finer spatial scale will assist the Environmental Official to for example, assess an IWULA as well as set relevant conditions and manage and control the water users in the sub-catchment in a manner that will allow for sustainable use and development.



Figure 2: Groot Letaba, upstream of the confluence with the Klein Letaba

OVERARCHING POLICY

The Department of Water and Sanitation's policy (DWAF, 2006) regarding WQPLs is that they should:

- · Ultimately allow realisation of the catchment vision;
- Give effect to the water quality component of gazetted RQOs;
- Where necessary, express more detailed stakeholder requirements than those accounted for by the RQOs;
- Equal the gazetted RQOs, however may be set at a finer spatial/ or temporal resolution; and
- Dictate the tolerable level of impact collectively produced by upstream users.

The Department recognises the importance of a strong technical basis for defining WQPLs and in this respect a detailed situation assessment was undertaken (Report No P WMA 04/B50/00/8916/3) and on which this WQPL report is based.

The determination of WQPLs is underpinned by the principle of sustainable development and is informed by the principles which formed the foundation for the following (DWAF, 2006a):

- The Precautionary Principle: a risk averse and cautious approach that recognizes the limits of current knowledge about the environmental consequences of decisions or actions.
- The default rule described in the *Resource Directed Measures documentation*: the management class is determined in relation to the present state, but at a level which represents a goal of no further degradation to improvement for water resources that are slightly, to largely modified, and at least a move toward improvement for water resources that are critically modified.
- The National Water Resource Strategy: any water resource which demonstrates 'unacceptable' conditions is deemed to be unsustainable. In these cases the management class will be determined as a minimum of 'heavily used/ impacted' (the lowest management class), and management will aim to rehabilitate the water resources to this state or better.
- Water required to meet basic human needs and to maintain environmental sustainability will be guaranteed as a right, while water use for all other purposes will be subject to a system of administrative authorisation, such as an integrated water use licence or General Authorisation.
- *Environmental rights* as described in the South African Constitution (Act 108 of 1996)

BALANCING THE NEEDS OF DOWNSTREAM WATER USERS WITH UPSTREAM WATER USE AND DEVELOPMENT

In setting WQPLs, the Department strives to achieve a balance between protecting the water resource for the downstream users and allowing use and development of the water resource upstream of the river reach selected for the WQPLs. For the downstream water users, the focus is on protecting the water quality in order to ensure a healthy functional aquatic ecosystem, while also meeting the water user groups such as domestic, agricultural, industrial, recreation and aquatic ecosystem downstream of the WQPLs point.

However, the selected WQPL set may also restrict the type and extent of water use upstream of the point, where water uses refer to those described in Section 21 of the NWA (Act 36 of 1998).

FITNESS FOR USE

Water quality is interpreted to mean 'fitness for use'. In other words, those aspects of water that would allow a certain user to use the water for a particular purpose without causing harm, such as a human health impact due to a specific variable or combination of variables in the water.

Fitness for use is a scientific judgement that has been determined by evaluating specific evidence, and determining how suitable the quality of the water is for its intended use. Water quality can therefore only be expressed in terms of fitness for use. Water quality assessment to determine fitness for use is based on using limits, in this case, WQPL, that have been set for the water resource and that have been based on the needs of specific water users of that area.

In South Africa, the South African Water Quality Guidelines (SAWQGs) (DWAF, 1996) were developed as specific values for a suite of variables for different water use sectors (domestic industrial, irrigation, livestock watering, aquatic ecosystems, recreation and aquaculture) that depict the change from one category of fitness for use to another.

Currently the SAWQGs recognise only the Target Water Quality Range (TWQR). Above this value/ range, the categories describe an ever increasing negative impact with respect to the use of the water.

The following fitness for use categories (based on current knowledge) are linked to the South African Water Quality Guidelines (SAWQG) (DWAF, 1996):

Ideal – the use of water is not affected in any way; 100% fit for use by all users at all times; desirable water quality (TWQR);

Acceptable – there may be slight to moderate problems encountered on occasion or for short periods of time;

Tolerable – moderate to severe problems are encountered; usually for a limited period only; and

Unacceptable – water cannot be used for its intended use under normal circumstances at any time (DWAF, 2006c).

Assuming that a linear distribution in the data was used to derive the TWQRs (DWAF, 1996), the acceptable category was interpolated to be the average of the Ideal category (i.e. TWQR) and the tolerable level. The unacceptable category is regarded as any concentration/ level above the upper limit (i.e. Tolerable) (DWAF, 2006c). Figure 3 illustrates the potential for allocation of water quality within a resource and on which the WQPLs have been determined.

The assessment of the water resource to rate its current water quality status in terms of fitness for use, supports or links to water quality management related targets and goals, a management action or objective that is required to either maintain or improve water quality at a desired level. This can range from no action (ideal) to immediate intervention (unacceptable).



Figure 3: Illustration showing how the WQPLs are determined

PROPOSED WOPLS FOR SURFACE WATER

Fitness for use assessments were carried out on data analysed at specific sampling points for each of the management units, considering the main tributaries. As the water users in the catchment are mostly related to domestic, irrigation, aquaculture and recreation; in most cases the acceptable limit for these uses was used as the limit against which compliance was undertaken.

It is important to note:

- In the case where a present state (5, 50 or 95 percentile) is considerably lower than the acceptable or even the ideal water quality guideline value, it does not automatically assume that the limit is set as being equal to the guideline, rather the present value is used, with a small buffering margin;
- In the case where the present state is higher (poorer quality) than the ideal or acceptable water quality guideline (TWQR), the tolerable levels were considered; and
- In the case where the present state is at an unacceptable level it may be necessary to bring in a phased approach. In these unacceptable cases the modelling that is to follow will give a better indication of what load needs to be removed, which will allow the determination of what management measures will need to be implemented to reduce the load to an acceptable level, and at what cost. The limits could then be adjusted accordingly.

MAIN STEM OLIFANTS RIVER

Currently the TDS concentrations along the main stem will not meet the WQPLs proposed. Comparing the TDS to the sulphate (Figure 4) (predominantly mining related) and chloride (Figure 5) (predominantly agriculture related) graphs (see figures below) shows the impacts from both mining and irrigation return flows. Management actions will therefore need to be set to reduce these in the short to medium term to a level that is acceptable and then maintain and improve over the longer term with further management actions. As the TDS is high throughout the catchment all sectors (mining, urban and agriculture) will need to contribute to the reduction. The highest limit proposed is 500 mg/L which is aligned to the RQOs for the Olifants.

Sulphate WQPLs are high in the Upper Olifants, but reduce further downstream until the river reaches Phalaborwa where the severe impacts of the industries and mines in the area are seen and have an impact well into the KNP.

Orthophosphate WQPLs have been set at limits that will limit the eutrophication potential, particularly in the Middle and Lower Olifants. The concerns are downstream of Witbank Dam and Loskop Dam as well as in the Phalaborwa area and into the KNP. Consideration of whether to reduce these limits to the limit at which the potential for eutrophication is low (< 0.015) needs to be discussed, and the economic aspects assessed.



Figure4: Illustration WQPLs for TDS and sulphate along the Olifants main stem



Figure 5: Illustration of WQPLs for TDS and chloride along the Olifants main stem

TRIBUTARIES

WQPLs for the tributaries have been set at limits less than or equal to those of the main stem Olifants River System so will support the achievement of the WQPLs of the main stem and ultimately the RQOs for the WMA.

Except for orthophosphate, and nitrate to a lesser extent; the WQPLs for the lower catchments of the Letaba and Shingewdzi sub-catchments are in most cases well below those of the Olifants River. The concerns are related more to eutrophication from poorly managed urban areas.

GROUNDWATER

It would be very difficult to set WQPLs for groundwater, as groundwater, unlike surface water, with a certain chemical quality, cannot easily be changed, for example by dilution. It is therefore important to represent groundwater as having a particular fitness for use and to note that the water may then require treatment if used for a different use.

STAKEHOLDER ENGAGEMENT PROCESS

It is important to note that as part of the setting of the WQPLs, consultation was being done as follows:

- Project Management Committee: 17 November 2016;
- Project Steering Committee: 23 November 2016; and
- Broader Stakeholders: 24 November.

In addition, on-going consultation with focus groups will allow for refinement as the process progresses so that the subcatchment plans will have the full set of finalised WQPLs for that particular area, and the overall IWQMP for the Olifants WMA will contain the full set of WQPLs.



Participation at the broader stakeholder meeting, 24 November 2016

WHAT NEXT?

The following key aspects will follow on the WQPLs development:

- Evaluation of Management Options including the effectiveness of existing options and proposed additional options;
- Sub-catchments integrated water quality management plans will be developed to address the localised WQ issues and achieve the WQPLs that have been set. These sub-catchment plans will address the thematic strategies that need to be developed and will be informed by the water resource management activities and initiatives already in place within a catchment area. The IWQMPs will take account of influences of cascading effects, neighbouring catchment dynamics and international requirements; and will be aligned to the overarching system IWQMP.
- Assessment and development of a Water Quality Monitoring Programme. Monitoring needs for immediate attention will be described and a short term priority monitoring programme as well as a longer term plan, will be developed in consultation with the Client and stakeholders, considering budget requirements, for implementation by DWS, the Catchment Management Agency and other partners identified as part of the Plan. The programme will also identify and make provision for events that are triggered by observations of the status of the water quality at key points in the system that will support the auditing of the IWQMP.
- Compilation of an overall IWQMP including the sub-catchment management plans; and
- A practical and detailed implementation plan.



Dwars River in the Steelpoort sub-catchment

Please contact the Public Participation Office should you wish to be kept informed of the project and progress: Antoinette Pietersen Email: <u>PPoffice@golder.co.za</u> or Tel: (011) 254 4805