POLICY BRIEF

March 2025
The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

Piloting the implementation of the Waste Discharge Charge System in the Crocodile (East) Catchment: A non-point source perspective

The Waste Discharge Charge System (WDCS) is an economic instrument in support of the management of water quality in South Africa, and is aimed at promoting waste reduction and water conservation in support of an integrated approach to managing the resource quality problems within specific catchments, accounting for both point and non-point source impacts. A Water Research Commission (WRC) pilot project was aimed at determining waste mitigation charge rates through charge distribution model developed based on the water quality threat(s) identified, and the development of a WDCS business plan and draft implementation framework for the Crocodile (East) catchment, which falls within the jurisdiction of the Inkomati-Usuthu Catchment Management Agency.

The project has highlighted that while the WDCS encompasses non-point sources associated with water uses registered in terms of Section 21 (e), (g) and (h), the loads contributed by these uses are not easily convertible to a catchment resource load. These loads are analogous to a point source (on land) determined through the non-point source calculator, which does not relate back the quantification of the load to the resource. In addition, it became evident in this study that much of the total catchment resource load is attributable to other non-point sources, such as irrigation return flows and urban and industrial run-off which may be quite large and are not covered by the net of water uses in terms of the Section 21 under the NWA. These sources are thus not included in the WDCS, and the load from these sources while included in the total load quantification of the resource and associated mitigation option and charges, the charges cannot be apportioned or attributed to the non-point source users.

Background

The Waste Discharge Charge System (WDCS), a polluter pays system established in terms Section 56 (1) of the National Water Act (NWA), 1998, (Act 36 of 1998) in respect of the Section 21 related water uses, provides an economic instrument to support the management of water quality in the country. It is a component of the Department of Water and Sanitation's (DWS) Draft National Pricing Strategy (Version 3: 2022) and is to be implemented on a catchment basis as part of a water resources management planning process that includes regulatory, economic and other instruments.

The WDCS is aimed at promoting waste reduction and water conservation in support of an integrated approach to managing the resource quality problems within specific catchments (reduction at source or in the resource). The Polluter Pays Principle is a well-recognised and globally celebrated environmental law principle and the overall objective of the WDCS is to address the problem of water pollution. In attaining this objective several other objectives would be achieved, including efficient resource utilisation (incentive objective), cost recovery for activities related to pollution abatement and damage reparations (financial objective), discouraging of excessive pollution (deterrent objective), and promotion of sustainable water use (social objective). The WDCS mitigation charge is therefore proposed as an economic incentive mechanism where the primary impact is associated with the cumulative impacts from several dischargers in a catchment, rather than localised impacts from a single discharger.

Initially, the WDCS was developed to be implemented as two distinct water use charges, either or both of which may be applied in a specific catchment:

- **Waste Mitigation Charge,** which covers the charging for discharge of water containing waste into a water resource or onto land, i.e., charges to cover the quantifiable costs of administratively implemented measures for the mitigation of waste discharge related impacts, and
- **Waste Discharge Levy** or charges that provide a disincentive or deterrent to the discharge of waste, based on the use of the resource as a means of disposing waste.

According to the NWA (Section 1 (1)(iv)), a charge includes a fee, price or tariff imposed under the Act. It is not a tax, levy or duty (Section 57 (5)). It is therefore a direct payment for a service, namely, to use the assimilative capacity of the water resource, as well as cost recovery of expenses incurred by another party, such as water resource management costs, losses incurred through abstracting water of poor quality, and costs of downstream infrastructure to deal with the waste.

In terms of the updated revised version of the Draft National Pricing Strategy for Raw Water Use Charges (Version 3: 2022), the Waste Discharge Levy has been excluded as the NWA does not currently make provision for a tax or levy. Thus, only the catchment-based waste mitigation charge of the WDCS is to be implemented.

In terms of the WDCS only registered waste discharge related water use in terms of Sections 21 (e), (g), and (h) of the NWA will be liable for waste mitigation charges. This is applicable to point and non-point sources.

- For non-point (diffuse) sources (NPS) associated with Section 21 (e), (g) and (h) the charge will be calculated as per point sources – based on the load discharged from the site, and a desktop estimation of loads entering the resource will need to be made, and what load is being contributed to the resource by that source.
- For point sources, these are easily measurable, and charges will be based on the monitored loads added to the resource.

The WDCS mitigation charge is differentiated from the Water Resource Management Charge (WRMC) for waste, also now included in the Draft National Pricing Strategy (Version 3:2022) – which is a payment for the day-to-day management of water quality and the authorisation of waste discharge activities. The WRMC is based on volume of waste discharge and is applied on a Water Management Area (WMA) basis. Whereas the WDCS aims to finance strategic interventions to address specific targeted water quality interventions in threatened areas.

The differential rates for waste discharges may be set depending on the geographical area, characteristics and amount of waste discharged, and the nature and extent of the impact on a water resource and its users (Section 56(5) of the Act). The determination of the waste mitigation charge must account for the class and resource quality, i.e., the Resource Quality Objectives (RQOs) of the water resource in question. The approach to the mitigation charge development requires that the various sub-catchments warrant their own charge rate due to the nature of the water uses and identified impacts (water quality threat posed).

The key objective of this project was to pilot the implementation of the ***mitigation charge component*** of the WDCS in the Crocodile (East) catchment based on the waste related water uses (Section 21 (e), (f) (g) and (h)) captured on the water use authorisation and registration management system (WARMS) and determination of the waste discharge charge rates.

Non-point sources and implementation of the WDCS

The following statements in relation to the non-point sources for the Waste Mitigation Charge are relevant:

- Registered discharge or disposal to land or facilities (representing non-point sources) will be calculated as the product of the charge rate and the total monitored (or estimated) discharger charge load – related to the source management system.
- For the (DWS) government contribution related to other non-registered nonpoint sources will be the product of the charge rate and the total remaining nonpoint sources load in the catchment. DWS together with other stakeholders are also obliged to implement regulatory and/or non-regulatory approaches to reduce the load from these nonpoint sources.

Desktop load estimation for non-point sources will need to be proven before it can be implemented which means that adequate up and downstream monitoring for all users will be needed.

The NPS calculator has been developed for registered water uses on the Water Use Authorisation and Registration Management System (WARMS), in accordance with Section 21 of the NWA, and treats registered NPS as point sources,

whereby it seeks to calculate the load discharged or disposed of onto land of a facility, to determine the potential impact of such a load. The objective of the NPS calculator is to estimate the load being disposed of, for:

- Section 21 (e): engaging in a controlled activity, and
- Section 21 (g): disposing of waste in a manner which may detrimentally impact on a water resource.

The data required for the calculator are:

- Waste volume and quality variables and concentrations to calculate load.
- Management practices being implemented:
- Best available technology leading to zero impact (BATZI)
- Standard requirements (standard practices)
- Poor management practices.

It has become evident through this study that the non-point source (NPS) load calculator was developed for the 21(g) and 21(e) water uses relating to the incentive charge, which has been removed from the WDCS. This calculator relates to a pollution load emanating from a specific water use only (discharge or disposal to land or facilities) and does not consider the up and downstream catchment resource loads that would be required for the assessment of contribution and associated mitigation charge calculation. This is considered a key gap and results in underestimation of the water quality impact (the load) to the resource and the incorrect or inconsistent apportionment of the load and charge back to these users in terms of the WARMs.

Section 21(h) is related to point sources, with an associated 21(g), so clarity is needed on what is meant here.

The current situation is that there is inadequate up and downstream monitoring in many cases and where users are monitoring, there is no database to which it can be uploaded. Registration of these sources to include water quality parameters is necessary. Currently in many instances only volumes or tonnages are specified.

The availability of the data to support application of the calculator and the accuracy of the calculator outputs is not clear. This calculator also requires testing and validation to be accepted. Correct information must be available and monitoring data must be applied. Results can be easily contested.

Land uses in a catchment all contribute to some non-point source (NPS) pollution source, for example:

Agricultural areas

- Run-off from extensive animal feedlots, where only a portion may be captured by 21(g) water use, in the form of for example, oxidation/ evaporation ponds.
- Return flows from irrigated areas where the irrigated water is seen as clean water (such as raw water or municipal water) but is then contaminated by pesticides, herbicides and fertilisers (nutrients).

Urban areas (essentially via stormwater drains)

- Run-off from roads including hydrocarbons and metals.
- Run-off from municipal industrial areas including hydrocarbons and metals
- Overflowing sewers including nutrients and microbiological contaminants
- Run-off from areas at the wastewater treatment works such as sludge drying beds/ composting areas that are not adequately bunded
- Mining/ Industrial areas such as smelters – while these areas are covered under GN 904 which means that clean and dirty areas should be adequately separated so that only clean stormwater leaves the mine/ industrial area, the reality is that considerable airborne contaminants such as sulphates and metals, are deposited outside of the dirty areas and accumulate in the run-off from the so-called clean areas

Non-point sources in the Crocodile (East) catchment

The NPS in the Crocodile (East) catchment relate to:

- *Extensive agricultural areas*
- Runoff from feedlots
- Return flows from irrigated areas
- *Urban centres including Mbombela, White River, Barberton and Kanyamazane*
- Runoff from roads
- Runoff from municipal industrial areas
- Overflowing sewers
- Runoff from poorly operated wastewater treatment works. There are at least sixteen in the catchment and the 2021/ 2022 Green Drop scores indicate major areas of concern, including sludge drying beds/ composting areas.
- *Existing and historical gold mining operations in the Kaap catchment, with large tailings facilities*
- *Sappi Ngodwana irrigated areas, and*
- *Forestry which may cause increased sedimentation.*

While it was difficult to ascertain the proportion of load attributable to these non-point sources, the extensive forestry, agriculture, including extensive irrigated areas (in the Upper Crocodile catchment), current and historical mining areas (and specifically historical tailings facilities

in the Kaap catchment), and urban areas, with densely populated areas and poorly managed wastewater treatment works (WWTW) throughout the catchment, they are quite large and cannot be ignored. These sources of contamination are therefore not included in the sections 21(g), (h) and 21 (e) water uses that are registered, and are often, related to a management practice that has not been implemented or has / inadequately implemented.

As these sources are not registered, they are not included in the WDCS, and the load from these sources while included in the total load quantification of the catchment water resources and associated mitigation options and charges, the charges cannot be apportioned or attributed to the non-point source users, which could be considered a 'fatal flaw' to the system. In terms of the WDCS principles government will be responsible for the costs associated with load that cannot be charged to registered water users. This needs to be tested to assess viability of this option.

It is apparent that a non-point strategy is required to adequately address and capture the non-point sources of pollution within the WDCS.

National Water Resource Strategy 3

The following strategic objectives described briefly in the National Water Resource Strategy 3, are relevant to the development of a non-point source strategy.

Regulating the water and sanitation sector: 8.4.3 Strategic Objective 3
To protect resource quality and the integrity of water ecosystems, the following strategic actions must be undertaken in respect of NPS regulation:

- Develop and implement a targeted discharge regulatory strategy inclusive of non-point sources of pollution especially in agricultural and urban areas as well as for the implementation of RQOs in areas where RQOs have been determined. Ensure regulation of storm water quality management especially from urban areas.
- Promote environmental planning through Environmental Management Frameworks (EMFs) and other tools especially on catchments to ensure protection of water source areas; and
- Recognise sector-specific best management practices for the beneficial reuse of biodegradable wastewater via irrigation to agricultural land to allow for the benefits and risks to be managed accordingly.

Improving water quality: 11.4.5 Strategic Objective 5

To improve coordination of water quality management planning (WQM), the following strategic actions must be undertaken in respect of NPS regulation:

- Develop an IWQM plan for national priority catchments, ensuring consideration of trans boundary WQ concerns.
- Develop a strategic action plan for the financing, rehabilitation and upgrade of prioritized WWTWs.
- Develop a strategic action plan for the implementation of the mine-water management policy.
- Develop strategic action plans to reduce non-point source pollution.
- Develop a protocol for the management of industrial discharge within the municipal environment.
- Develop an IWQM plan at catchment and regional level for each water management area as part of the CMS.
- Integrate IWQM and water resource planning with Regional Mining Plans in priority areas; and
- Ensure that WSDPs, IDPs and SDFs reflect WQM priorities and management responses.

Strategic objectives and strategic actions: 12.4.4. Strategic Objective 4
To prevent pollution of water resources from point and non-point source pollution by managing at source, the following strategic actions must be undertaken in respect of NPS regulation:

- Secure funds for restoration and ongoing maintenance of ecological infrastructure through operationalising the water pricing strategy.
- Develop and implement technologically based monitoring embracing 4IR.
- Implement the "polluter pays" principle and develop capacity in the water services authorities to implement this principle.
- Undertake Green Drop Auditing.
- Ensure reduction and removal of pollutants at source.
- Ensure law enforcement and compliance of discharge standards by water sector institutions.
- Exclude mining activities from watercourses and water resources via the establishment of riparian buffers.
- Develop a non-point source strategy.

Cooperative governance
With respect to non-point source pollution, cooperative governance is essential. The reason is that land use activities requiring non-point source management are often the mandate or competency of other government departments. While the National Water Act recognises this by enabling a responsible authority to promote arrangements with other organs of state to combine their respective licence

requirements (Chapter 4, 22(1)(4)), this opportunity has not been pursued in respect of water resource protection, as water resource management, if implemented as integrated water resources management, is complex and the current water use authorisations or environmental permits do not always cover the non-point source contributions to the catchment, especially in respect of adequate catchment monitoring and the associated enforcement and compliance. The authorisations/ permits are often site- specific.

Several planning processes are required by national and provincial government, particularly for urban areas. These provide an important mechanism for influencing spatial land use and infrastructure development, to mitigate the non-point source impacts of various land use activities.

Policy recommendations

A properly implemented and maintained water resource management system, such as is catered for in the National Water Act (1998) (Act 36 0f 1998) should encourage desirable activities from waste dischargers, namely abatement of pollution at source, recycling of waste streams and wastewater, re-use of water, water conservation and return of good quality water to resources so that RQOs are achieved, and only in the event when this has been done and there is still excess load in the system, should WDCS mitigation charge come into play.

Based on the analysis and outcomes of this project, it is noted that several non-point sources, such run-off from urban and industrial areas, so-called clean areas on a mine, and agricultural run-off including irrigation return flows, may contribute largely to the load in the catchment, however, are not required to be registered as a water use under Section 21 of the NWA, and thus are not captured through the WDCs.

In addition, for the uses that are addressed through Section 21 (e), (g) and (h) uses and WARMS registration, the loads contributed by these uses are not easily convertible to a catchment resource load, and thus apportionment back to the water user. These uses thus do not easily lend themselves to a mitigation charge. The incentive charge, which is no longer part of the WDCS, better addresses these non-point source 'water uses'.

It is concluded that non-point sources have not been well assessed, described and quantified in many catchments. This is in part because there has been a steady decline of water monitoring in South Africa of recent years and well as limited regulation of these water uses and until these systems are re-activated, extended, and updated, the contribution of non-point sources to catchment loads, will continue to be very generically described. It is also not possible to attribute their contribution to catchment excess loads with much certainty, that would be defensible specifically in terms of apportioning the mitigation charge.

Recommended actions:

- A comprehensive water monitoring programme for quality and quantity needs to be put in place where gaps exist, so that non-point source contribution component of a catchment can be better understood. This should be done in a cooperative manner with other relevant government departments and water users to develop a comprehensive situation assessment for each Water Management Area.
- A non-point source strategy, based on the considerations set out in the NWRS3 needs to be developed considering the results of the situational assessments. This will then inform the development of catchment-based plans for non-point source management, and the associated waste mitigation charges that can be applied.

Related project:
Piloting the implementation of the Waste Discharge Charge System in the Crocodile Catchment (**WRC Project No. C2021/2022-0159**). For content-related queries please contact Dr Eunice Ubomba-Jaswa (euniceuj@wrc.org.za) or Dr Shafick Adams (shaficka@wrc.org.za).