

## Marine outfalls monitoring at the CSIR: Evaluating the impact of wastewater discharge on our marine environment

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### BACKGROUND

The CSIR Marine Outfalls Monitoring Programme has a history of 45 years, and comprises a suite of projects in KwaZulu-Natal and Cape coastal waters. Previous work has also been conducted in the Southern African Development Community and the West Indian Ocean. The aim of the programme is to develop a comprehensive understanding of how wastewater discharge impacts marine waters.

The concept of wastewater discharge to the marine environment may seem unacceptable, but this practice is used in coastal cities throughout the world and, if correctly managed, is recognised as an acceptable disposal option from multiple perspectives, including human and environmental health, social acceptability, and economic prudence. However, wastewater contains contaminants that can affect the ecological functioning of the marine environment and compromise human health. The impact of wastewater discharge therefore requires careful monitoring. The CSIR uses a wide suite of indicators to monitor wastewater discharge impacts, including toxicity testing, environmental chemistry, benthic community status and bio-accumulation studies. The CSIR laboratories are accredited for the analysis of marine water, sediment and biological tissue.

### Benefits of the programme

For our clients:

- Corporate citizenship: Industry and business that use the assimilative capacity of marine environments, which provide ecosystem goods and services to the wider society, have a responsibility to comply with the spirit of the law, ethical standards and international norms. Monitoring programmes form the basis for ensuring that this responsibility is met
- Fit-for-purpose environmental monitoring of marine outfalls demonstrates compliance with wastewater discharge permits, and determines whether discharges are unacceptably impacting the marine environment. The monitoring results provide wastewater managers with strategic information for managing discharges and informing the public on the health of marine waters.

For society:

- Environmental monitoring reassures the public that measures are in place to ensure that the marine waters they use recreationally, or depend on for their livelihood, are being monitored. The findings of monitoring are reported in meetings where the public can inquire about marine water quality, provide input to the findings and raise issues that should be addressed in future monitoring.

For science:

- Involvement in a set of related projects dealing with a variety of marine outfalls on different coasts allows the CSIR to identify key indicators that can be used to track the long-term health of marine receiving waters. It also gives us the opportunity to test and report on the usefulness of new monitoring techniques and strategies. Such research provides training opportunities for young scientists and students
- The experience and learning gained by focused long-term involvement in the field of marine outfalls monitoring informs policies and best management practices for marine disposal of wastewater in South Africa and the continent at large. This provides coastal systems researchers at the CSIR with a 'space' for meaningful research at regional scales.

### REAL PROBLEMS, RELEVANT SOLUTIONS

Marine pollution is a growing issue in South Africa and elsewhere on the continent. With increasing demands made on our coastal resources, this is set to become more problematic. In addition to providing guidance on the environmental performance of individual outfalls, the Marine Outfalls Monitoring Programme has, and continues to, built capacity in the field of marine pollution research and management. The programme has directly or indirectly provided significant CSIR input into the development of:

- An operational policy for disposal of land-derived wastewater to the marine environment of South Africa
- South African marine water quality guidelines
- South African sediment quality guidelines for the disposal of dredged sediments
- Status reports of marine pollution in South Africa and the West Indian Ocean
- Guidelines for the establishment of environmental quality objectives and targets in the coastal zone of the Western Indian Ocean
- Protocols for long-term monitoring of marine water quality in the West Indian Ocean
- South Africa's National Programme of Action to protect the marine environment from land-based activities.



### TRANS-DISCIPLINARY RESEARCH AND DEVELOPMENT

The CSIR's coastal systems research group is different from other coastal science organisations and institutions in South Africa insofar as we study the coast as a system – thus integrating across the different disciplines – to provide outcomes on a system scale rather than in single disciplines.

We have offices in Durban and Stellenbosch, South Africa. For more information, contact Dr Louis Celliers at lcelliers@csir.co.za or +27 31 242 2412.

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**Laboratory and data analysis allows for the identification of potential problems and makes more informed management decisions possible**