



Project summary - 2043

A risk-based framework for cost-effective environmental protection from WWTP discharges

Synopsis

The study focused on evaluating individual and relative risks to the environment posed by wastewater discharges - to transparently guide an appropriate utility and regulator response. A framework is used to assess the relative benefits of different disposal/treatment options and their impacts on the receiving environment.

Industry Driver

Environmental regulators draw on a variety of different guidelines and policies to develop licence conditions to administer the discharge of treated wastewater directly or indirectly into marine or freshwater ecosystems. These guidelines/policies are derived from both State and Commonwealth legislation and are interpreted in different ways across the country. A main driver of these policies/guidelines is the establishment of environmental values, which consider the social, economic and environmental impacts associated with wastewater discharges. There are, however, substantial differences between States in how these environmental values are defined and this shows the complexity that exists in the interpretation of the guidelines/policies.

Most States agree that a standard risk assessment framework that could be applied across Australia would have merit in providing a transparent method for assessing risks of wastewater discharge, and would allow both the regulator and the utility to meet the objectives of maintaining sustainable water resources. It would also benefit the utilities by providing greater visibility of the rules and framework behind decision making processes, which in turn would lead to better asset management and forecasting of upgrades.

The overall objective of this project was to develop a risk-based framework for assessing the relative benefits

of different disposal/treatment options and their impacts on the receiving environment that could form an objective basis for discussions and negotiations between utilities and regulators.

This framework considers both the treatment plant characteristics and values of the receiving environment, and integrates the four major classes of pollutants of concern: nutrients, micropollutants, total suspended solids and pathogens.

Approach

The first task of the project was to review regulatory approaches to wastewater treatment plant (WWTP) discharge impacts across the country, to determine the type and level of consistency in methods used for assessing environmental risk and performance, and to establish what evidence exists that current methods are achieving the desired socioenvironmental outcomes (Kildea and van de Merwe 2016).

Fourteen water utilities and environmental regulators from around Australia were contacted and provided a series of questions, which were developed to assess the current policies/guidelines used to regulate wastewater discharges to aquatic environments.

Ten companies responded to the questionnaire, from five of the seven states/territories in Australia.

The next key task was to organise a workshop to discuss the structure of a risk-based framework for wastewater treatment plant discharges. Representatives from research institutes, water utilities and regulatory organisations from five states and territories discussed the feasibility of developing a risk framework that could be utilised across the country. The workshop's

intentions were to initiate the development of a draft risk framework. The aim was to end the workshop with a general agreement on the structure of a draft, which could be developed and expanded upon over time.

Research Summary

The framework is designed as an Excel workbook for ease of use and applicability across a number of different operating platforms. There are four worksheets within the Excel workbook: 1) Read me - for instructions and disclaimers; 2) Receiving Environment Risk; 3) Facility Risk; and 4) Mean Risk

The framework structure includes 15 separate questions for Receiving Environment Risk and 17 for Facility Risk. For each question, a choice of low (score = 1), medium (score = 2) or high (score = 3) risk is provided for the user. Once the questions have been addressed, the Mean Risk is automatically calculated for the Receiving Environment and the Facility and an overall scheme risk is calculated.

Based on the review of the current situation, the prioritisation method often receives the greatest criticism from both the regulator and utility operators. It is hoped that, by providing a standard format for assessing risk, tension is reduced when plant performance is discussed, particularly when dealing with multiple wastewater treatment facilities. The risk valuation process may also provide a national benchmark against which to assess wastewater treatment plants and thus provide both State utility companies and regulators a tool to determine overall environmental performance across the country.

Key Findings

The intention of this framework is to provide a nationally consistent and defensible process to assess the relative risk of wastewater discharge by considering both receiving environmental values and plant characteristics. The mean risk calculated in the framework allows users to judge where the greatest risk lies in regards to environmental performance based on treatment plant capabilities and the nature of the receiving environment.

The framework will particularly assist in asset management and optimisation of treatment performance, highlighting the treatment plant attributes that need most attention to reduce overall environmental risk.

Identifying high risk plants may provide the impetus to focus further resources on assessing the overall environmental impact of a plant using methods outlined in the ANZECC guidelines. It may also encourage conversations between regulators and plant operators on the prioritisation process - and determining which are the high risk wastewater treatment plants. Economics often competes with the environment, and it is finding the balance that often poses the greatest challenge for regulators and utility operators. This framework may provide a path to finding the optimal balance.

It is acknowledged that there are limitations to the framework, but it is hoped that it provides a sound basis for prioritising asset management and environmental performance. The indicator criteria and thresholds are broad but this is to encompass different ecosystems and treatment process as well as acknowledging that the receiving environment not only has environmental but social, cultural and economic value.

Impacts / Benefits / Adoption

The framework can be used by utilities to:

- better anticipate regulatory requirements,
- proactively develop programs of investigation and monitoring,
- inform negotiations with regulators and
- guide infrastructure investment planning.

The framework also has potential for use by regulators to provide a more transparent and standardised (and hence defensible) approach to wastewater discharge regulation.

Partners

SA Water

Griffith University

Water Research Australia