Marine Biodiversity Hub

National Environmental Science Programme

Australian Coastal Sewage Outfalls and Data Transparency: Public Access to Government Information

John Gemmill, Andrew M. Fischer, Qurratu A'yunin Rohmana
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clean ocean foundation

UNIVERSITY of TASMANIA

Enquiries should be addressed to:
John Gemmill
CEO Clean Ocean Foundation
0409 425 133
johng@cleanocean.org
www.cleanocean.org

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Contents

List of Figures

List of Tables

EXECUTIVE SUMMARY

To improve management of the environment, governments and managers need to know what other researchers and agencies have found and how they have found it. Accurate data and transparent methods are needed for governments to make good policy decisions and for the general public. Providing a comprehensive understanding of nutrient and pollutant loads into the marine environment around Australia is difficult given the different sampling and reporting requirements. The aim of the National Outfall Database (NOD) was to facilitate cross-institutional data sharing among federal, state, local governments and the community to promote transparency and openness of governance for managing pollutants from WWTPs. The NOD also provides data and information that could be helpful for integrating infrastructure planning and decision making of sewage effluent impacts on marine environment. This categorizes outfall types and summarizes data collection from water treatment authorities for each outfall type. Of the seven states and territories examined there were 42 WTAs and 181 outfalls. Queensland has the highest number of WTAs at 18 followed by NSW at 12 and Victoria at 8. Water quality parameters monitored at each of the outfall sites varies and depended on the conditions set out in the Environmental Protection Authority licenses. However, at all sites, nutrient concentration and flow rates were reported. NOD data collection has been running since 2015. After the fourth year of data collection (2018) most WTAs (98%) have met these basic criteria for supplying the data. The data collection is comprehensively presented in a public database which facilitates transparency and data sharing among water treatment authorities, government agencies and the general public. Promoting the transparency of monitoring data and pollutants entering the marine environment is important for managing marine biodiversity. This report highlights several needs and challenges that have been overcome and that still need to be addressed in order to provide easily accessible data and help promote insight-driven decisions and reduce pollutant impacts to the marine environment.

1. INTRODUCTION

The concept of data transparency has played an important role across aspects of society and disciplines. "Openness" of government has been associated with not only economic prosperity, but also improvements to social capital and the environment (Lee et al., 2019). In the sciences there has also been a desire to improve scientific research through increasing the availability of quality data sources and facilitating the reproducibility of published research (Stagge et al., 2019). To improve management of the environment, governments and managers need to know what other researchers and agencies have found and how they have found it. Accurate data and transparent methods are needed for governments to make good policy decisions and for the general public to, for example, assess health risks and make informed decisions about sustainable use of the environment (Friess and Webb, 2011).

The Australia State of Environment Report (2016) identified a significant deterioration in a number of components of the coastal environment (Clark and Johnston, 2017). A key finding of Coasts Theme highlights that the current degradation of the coastal environment is "tightly correlated" with human population, and agriculture or industrial development. These stressors my impact coastal systems in complex and synergistic ways across a variety of temporal and spatial scales. In addition, other key findings state that, "data are insufficient to assess many aspects of the state of the environment of the coast." The "Coastal Waters" section of the report highlighted the two pathways for nutrients to enter the coastal waters. These were sewage outfalls and the diffuse sources, such as runoff. These inputs can lead to degraded state in the coastal environment such as eutrophication, harmful algal blooms, low-oxygen dead zones, the disruption of biogeochemical cycling and disturbance of the ecological balance of marine ecosystems (e.g. crown-of-thorns) (Clark and Johnston, 2017).

A key contributor to the decline of many of those components is sewage effluent from wastewater treatment plants (WWTPs) (Burridge and Bidwell, 2002, Doblin and Clayton, 1995, Fowles et al., 2018, Munksgaard et al., 2018, Smith et al., 1996). WTPs are an essential part of any urban environment and the effective treatment of sewage that minimises pollutants that contribute to the above is critical. A thorough understanding of how WWTP's interact with the coastal environment is an integral part of managing their impacts and improving the State of Environment into the future. Authority in Australia for outfalls and WWTPs primarily lie as matter for state jurisdiction. This follows from the constitution that allocates responsibility for waters and river to the states (Kildea and Williams, 2010).

> *The Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of a State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation. (Commonwealth of Australia Constitution Act 1900 s 100)*

However, national interests overlap in relation to international treaties (e.g. EPBC and Matters of National Environmental Significance), transboundary pollution concerns, inter-jurisdictional water resources and of course scientific and environmental concerns.

States and territories around coastal Australia have various bodies set up to oversee and report wastewater discharge from WWTPs. These vary significantly and are also subject to change because of state government policy. State Environmental Protection Authorities (EPA) use licences to ensure that existing WWTPs are managed in a way that minimises environmental harm. Wastewater Treatment Authorities (WTAs) are required to report effluent quality based on the requirements set out in their license (EPA NSW, 2015, EPA VIC, 2017). The license is based on an initial assessment by the EPA, who decides which parameters need to be reported, and the guidelines set out in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Due to these reasons, each State/Territory has a different method for determining water quality trigger values and subsequent monitoring requirements. As stipulated in the license agreements, each WTA is required to report water quality monitoring results to the relevant State's EPA. Each state has different reporting requirements for providing data to the general public. For example, New South Wales EPA requires WTAs to publish four years of water quality data online. Other states do not require the publication of their information online.

Providing a comprehensive understanding of nutrient and pollutant loads into the marine environment around Australia is difficult given the different sampling and reporting requirements. The lack of consistency across reporting methods exemplify the lack of transparency or openness in governance, which can have negative consequences on Australia's coastal environment. Australia is obligated to manage resources of National Interest and as a signatory to the Convention on Biological Diversity, is required to safeguard its biological diversity, as well as manage the impacts of nutrients on ecosystem function and structure (Aichi Biodiversity Targets (8)) (Natural Resource Management Ministerial Council, 2010). An improvement in reporting requirements that align with national and regional interests, MNES, transboundary pollutions and environmental concerns is warranted.

The aim of the National Outfall Database (NOD) was to facilitate cross-institutional data sharing among federal, state, local governments and the community to promote transparency and openness of governance for managing pollutants from WWTPs. The NOD also provides data and information that could be helpful for integrating infrastructure planning and decision making of sewage effluent impacts on marine environment. This transparency report discusses the major issues/challenges in achieving its aim and provides a summary of what was found and provides suggestion for future outfall effluent management.

1.1 Major issues and challenges

Since there is no legislative requirement at a national level for the collection, transmission and sharing of standardised data, much less the public release of such data related to WWTP discharges, the NOD had to work across many levels of government to begin the process of facilitating cross-institutional data sharing. Firstly, using endorsements from the Federal Minister of Environment and other Members of Parliament (MP), water authorities

within Australian states and territories were identified and approached in writing to request discharge pollutant data. Part of the request explained the intention of the NOD, as well as a description of the process to integrate WWTP discharge data at a national scale (Rohmana et al., 2019). These initial contacts requests were received in various ways. In some cases, the NOD was referred to an overarching governing body such as, in the case of Tasmania the Environmental Protection Authority (EPA) and in the case of Queensland, the Department of Environment and Science (DES) (Appendix A). In other cases, such as in New South Wales, Victoria, Western Australia, South Australia and the Northern Territory, individual WTAs were contacted. Requests made to individual WTAs were met with the suggestion to contact the respective state EPA. In turn, the EPA contacts suggested going back to the individual WTAs. Regardless, at each level the we had to recommunicate, justify and reassure the stakeholders of the legitimacy of our process. The NOD team found that a centralised agency, that collected data through their existing channels, such as the EPA (Western Australia, South Australia, and Tasmania) and DES (Queensland), somewhat easier to deal with, while states, such as New South Wales and Victoria, with a mix of authorities were more time consuming. NSW was the most difficult requiring interaction with a mix of 12 water authorities and councils. Interaction with these was particularly time-consuming because they were sometimes extremely reticent to supply information. This is probably largely influenced by individual authorities being adversely biased against supplying information to "outsiders." Frequently, at first contact, authorities would refer to the EPA license as the resource for public information. These licenses, which of course lacked monitoring data, were not of sufficient detail, so further communication was usually needed. In some cases, data were reported as either financial or calendar years, resulting in inconsistent data sets. Further contact was made to rectify the request. Some WTAs never responded to the request for data (Rohmana et al., 2018).

When specifically working with WTAs, the WTAs were contacted through an identified contact point. This point was either nominated by the WTAs or alternatively by a phone call to reception or often initially by filling out a general request for help form on the WTA's website. Subsequent follow up requests for data were often by phone call with a final call via email. The amount of time and effort varied significantly depending on the predisposition and/or management structure of the agency contacted. Often scarce resources were cited as the main impediment to information supply often resulting in two to three months waiting times for the appropriate personnel to at the WTA or state agency to execute the request. Other impediments to the data collection related to a lack of willingness to collaborate and coming to an agreement that requested variables could be made public.

Through the initial steps of making contacts at the various WTAs, the NOD managed to establish a list of reliable contacts useful for future correspondence. Water Services Association of Australia (www.wsaa.asn.au) also assisted with informal contact to their members – (mainly the larger metropolitan water providers). These contacts are still the main portals of communication to the various authorities and agencies and repeated requests for data have been successful.

A key anticipated obstacle to data collection was the Clean Ocean Foundation reputation as a fierce campaigner for community rights. In some instances, this first approach (and sometimes subsequent approaches as well) was met with some suspicion by water authorities and state bureaucracies. However, overall, we found the combination of credible scientific research conducted under the auspice of the NESP Marine Biodiversity Hub coupled with an engaged community group seeking to cooperatively develop a transparent reporting process a remarkably ideal alliance to encourage water authorities to voluntary disclose data hitherto not disclosed to the public.

2. NATIONAL OUTFALL DATABASE DEFINITIONS AND DATA COLLECTION

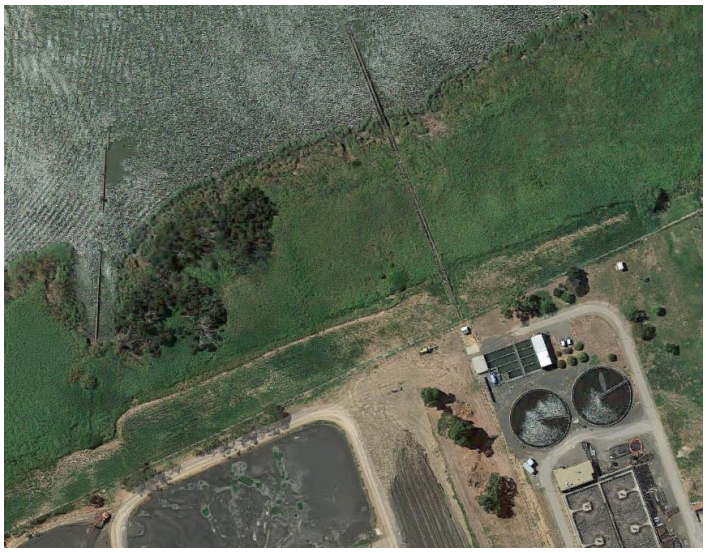
2.1 Definitions

After some discussion the NOD settled on defining outfalls in three different ways. First there are the **ocean outfalls** (Figure 1). These are outfalls that discharge water from a wastewater treatment plant directly into the open ocean environment. Examples of this include submerged outfalls such as the Bondi outfall managed by Sydney water. The Bondi outfall diffuser sits at 63m depth in the Pacific Ocean, 2.2 kilometers from the shoreline. Another example includes the North Head ocean outfall also managed by Sydney Water. This outfall is located 3.7 kilometers from the shoreline east of Blue Fish Point near Manly in 65 m of water. These ocean outfalls typically service major metropolitan areas. The second type of outfall are **estuary/river outfalls** (Figure 2). These outfalls discharge into brackish estuarine/riverine environments that typically exchange water with the open ocean. An example of this type of outfall is the Ti-tree Bend Outfall on the Tamar estuary in Northern Tasmania. Combined sewage and storm water runoff discharge 60 m off of the shoreline of the 200m wide estuary. Effluent is moved by tidal action and seaward flow away from the point of discharge. Another example is the Gibson Island outfall in Queensland. The outfall discharges via a diffuser into a 450m wide, tidally influenced section of the Brisbane River. Lastly are **coastal outfalls** (Figure 3). These outfalls discharge directly into the coastal environment near the shore. They are not located within estuaries and rivers and are also not located at some distance from the shoreline in the open ocean. For example, the Luggage Point outfall, managed by the Queensland Urban Utilities, discharges directly into the ocean at the mouth of the Brisbane River. Another example of a coastal outfall is the Port Welshpool outfall in Victoria. It also discharges directly into coastal waters of Corner Inlet southeast of Melbourne.

Figure 1. An example of a deepwater ocean outfall.

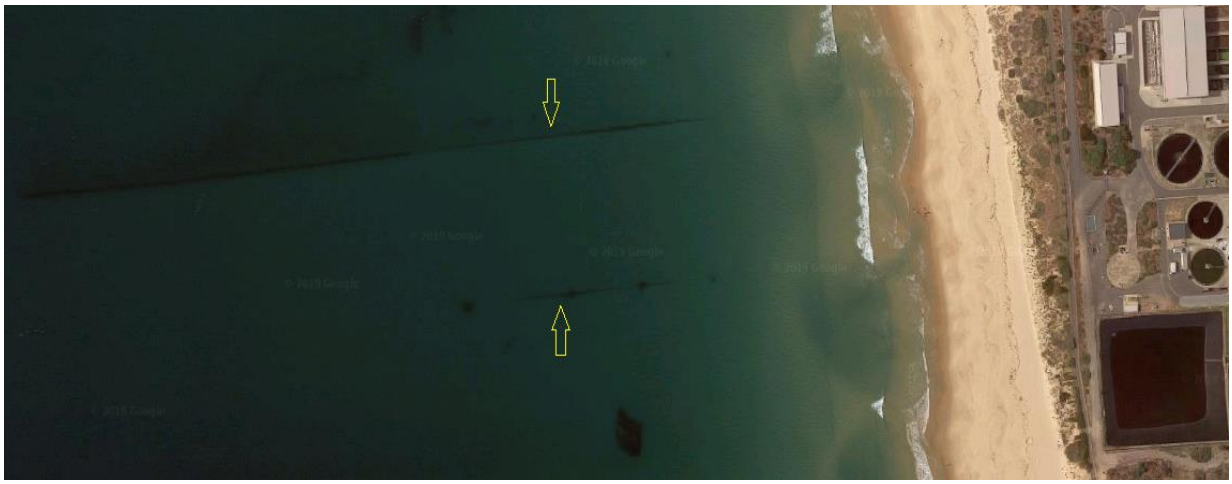
Source: Surfrider Foundation (2015)

Figure 2. An example of a river/estuary outfall from Ti-tree Bend WWTP, Tasmania.



Source: Google Maps (2019b).

Figure 3. An example of a coastal outfall for Christies Beach WWTP, South Australia.



Yellow arrows point to the two outfalls (black line). (Source: Google Maps (2019a)).

2.2 Data Collection

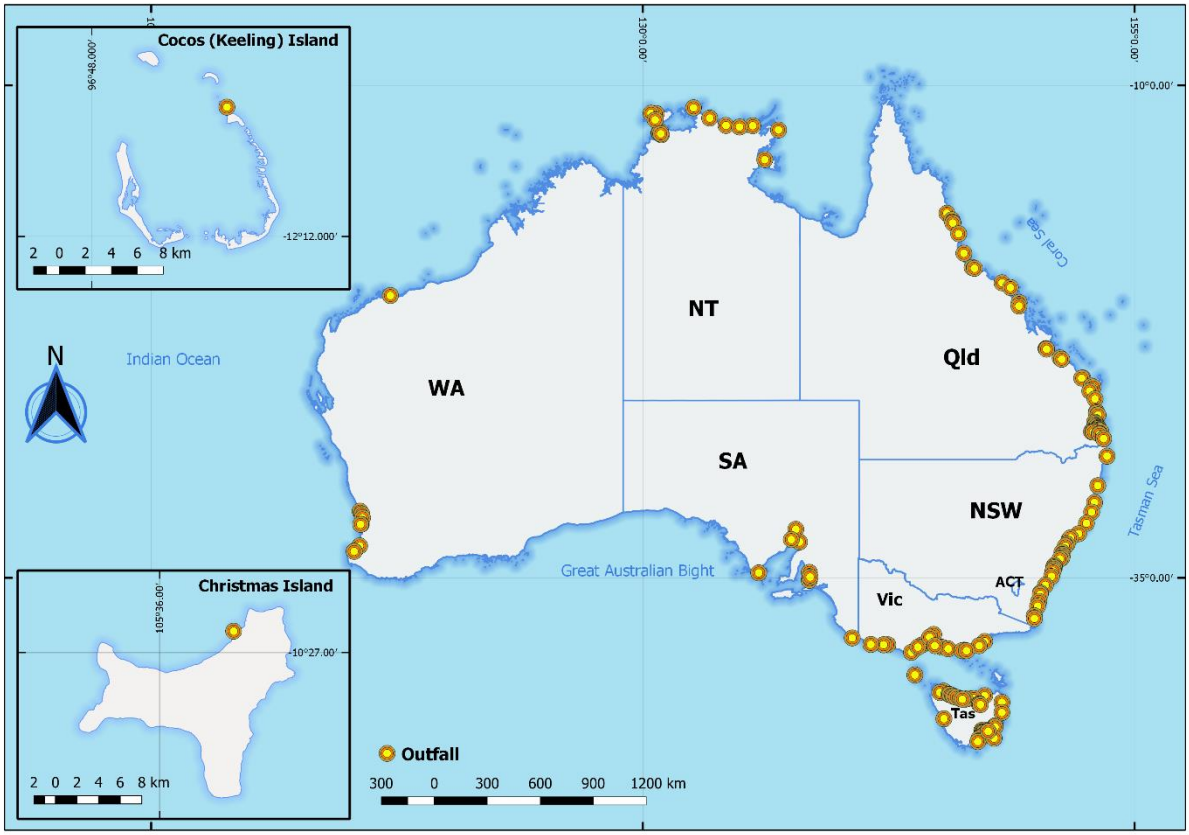
A key component of the data collection process was the identification of data to be collected, definitions (standards) involved, and what could be realistically supplied by water authorities. The variability of data collected by authorities was startling. Ultimately it depended on what was required by the licensing authority (normally a state-based EPA) and the license agreement between the EPA and the WTA for each particular outfall. The relationship of how water treatment plants operate, licensing conditions and its impact on the marine environment can be seen from different perspectives and the parameters to be measured depended largely on the judgement of members of the EPA and the WTAs. While WWTP operators are largely interested in minimising expense and staying within their license conditions, the EPA has an interest in regulating "developments and activities that may impact on environmental quality and to promote best practice, sustainable environmental management." These conflicting priorities across different outfall locations in Australia, and also considering the varying condition of receiving environments, each license has a different set of parameters that require measurements. There are other stakeholders which are concerned primarily with the minimisation of impact on the marine environment while others, such as recreational users wish to use waters with low risk of contamination for both aesthetic and health reasons. Overall, Default Guideline Values (DGVs) of Water Quality for Aquatic Ecosystems are developed in accordance with the National Water Quality Management Strategy

The NOD research planned to gather comprehensive data on a comprehensive set of water quality and effluent related parameters. Of primary concern were the **effluent related parameters**, which contain monitoring data regarding the quantity and quality of the effluent

come from discharge locations. Other parameters of interest included **plant performance parameters**, such as operating costs and engineering parameters to assess the efficiency of the WWTP in treating its water. Lastly, **community/environment parameters** related were also considered important. These parameters include the number of out of license discharges (i.e. the pollutant concentration discharged exceeds license concentration and load limit) and data from marine ecological surveys. Given the scope of the available data and the limited resources and timeframe of the project, it very quickly became apparent that the comprehensive systematic collection of information related plant performance and community/environment was unachievable. The NOD, in turn, focused on the collection of the effluent related parameters.

3. DATA COLLECTION OUTCOMES

Of the seven states and territories examined there were 42 WTAs and 181 outfalls. The Australian Capital Territory (ACT) was not considered in this analysis because it does not have any ocean, coastal or estuarine outfalls and has a high rate of water recycling. Currently in the ACT about 4,360 ML/yr of treated effluent is recycled for use as irrigation water and almost all of the water used in the sewerage system is returned to the Murrumbidgee River after a high level of treatment and is available for various downstream uses (Icon Water, 2018). The distance of the sewage discharge point to the point where the



Murray Darling system enters Lake Alexandria is sufficiently long enough for effluent parameters to change from their initial state and be influenced by other biogeochemical factors along the way.

Queensland has the highest number of WTAs at 18 followed by NSW at 12 and Victoria at 8 (Table 1). In total, there are 181 outfalls recorded in the NOD website (Figure 4). Highest number of outfalls is located in Queensland (51), then Tasmania with 41 outfalls distributed around the island (Table 1). Approximately 34, 19, 12 and 10 outfalls are spread around the

coastal border of New South Wales, Victoria, Western Australia, and South Australia respectively. The Northern Territory has about 14 outfalls, however, due to some circumstances, the NOD has only four outfall data recorded in the database.

Table 1. Number of relevant authorities which interacted with the NOD.

State	No. of water authorities	No. of outfalls
New South Wales	12	34
Northern Territory	1	14*
Queensland	17	51
South Australia	1	10
Tasmania	2	41
Victoria	8	19
Western Australia	1	12

*Number of outfalls recorded according Power and Water licenses are 14, data received by NOD is 4.

3.1 Effluent water quality parameters

A comprehensive list of water quality data collected from WTAs is listed in Table 2. As part of the data collection process, the NOD provided prepared a document outlining a predefined format in which the data was to be delivered (Rohmana et al., 2019). The initial data request for the WTAs consisted of a variety of parameters, including flow volumes (ML), pH, and total dissolved solids, etc. (Table 2). The basic criteria for the NOD for suitable water quality was a requirement to have at least flow volume (ML), total phosphorus (mg/L), and total nitrogen (mg/L). These basic criteria were further used for calculating the nutrient loads and its impact towards the marine environment (Rohmana et al., 2019).

As stated earlier, the collection process was not always straight forward. In practice, a key problem for water authorities is the cost involved in collecting and collating data. There is an inevitable tension between minimising costs and their ability and willingness to provide comprehensive data in a timely manner. We found that centralised water authorities, such as Queensland, Tasmania, South Australian, and Western Australia, tended to produce a more standardised set of parameters and reporting times while WTAs in New South Wales (outside the centralised Sydney Water catchment area in the treatment plants run by councils), Victoria and Northern Territory provided data in less consistent formats. Even with this minimal set, some WTAs had difficulty supplying the information requested. There were various reasons cited by the WTAs in order to avoid data submission to the NOD. Often the WTAs did not collect certain parameters as they were not required in the license. In some point, the WTAs were not prepared to publish the data to general public. The limited resources might also be a barrier in providing data for the WTAs to collate and prepare the data. Overall, each WTA tended to provide its own customised dataset reporting varying combinations of variables presented in Table 2. This variability was based on the reporting requirements set out in their licenses.

Table 2. Initial request of water quality data parameter for 2015 data.

Parameter	Unit
Flow volume	**ML**
pH	pH
Total Dissolved Solids	mg/L
Total Suspended Solids	mg/L
Total Phosphorus	**mg/L**
Total Nitrogen	**mg/L**
Oil and grease	mg/L
Surfactants (MBAS)	mg/L
E. coli	org/100mL
Enterococci	org/100mL
Faecal coliforms	org/100mL
Turbidity	NTU
Colour	Pt. Co. Units
Algal blooms	Frequency
Blue Green algal bloom	Frequency

Water quality parameters collected by all WWTPs appear in bold.

NOD data collection has been running since 2015. After the fourth year of data collection (2018) most WTAs (98%) have met these basic criteria for supplying the data (Table 3). Across these four years, Queensland, South Australia, Tasmania, and Western Australia were able to maintain consistency in providing water quality data. Despite having various WTAs, Victoria has been successfully maintaining the data submission to the NOD. New South Wales has shown significant improvement with more time enabling trust and effective communication to yield benefits across a number of stakeholders. The Northern Territory appears under resourced to supply the requested information.

Table 3. Data collection progress from 2015 to 2018

States/Territory	Number of outfalls	2015	2016	2017	2018
New South Wales	29	32%	83%	97%	98%
Northern Territory	14	30%	30%	30%	30%
Queensland	51	100%	100%	100%	100%
South Australia	10	100%	100%	100%	100%
Tasmania	41	100%	100%	100%	100%
Victoria	19	100%	100%	100%	100%
Western Australia	12	100%	100%	100%	100%

The NOD water quality data is publicly accessible through two sites:

General Public:

https://www.outfalls.info/

Metadata UTas:

http://metadata.imas.utas.edu.au/geonetwork/srv/eng/metadata.show?uuid=21448123-01704aff9b56-2b6aa21c73ed

3.2 Plant performance, community and environment related parameters

The collection of this data is especially relevant for recreational water users that may be in the water near or very close to outfalls. From a WWTP point of view, license conditions may specify that a certain number of readings or samples of effluent are required to be within a certain specification within a certain time frame. This means out of specification readings require prompt action to bring effluent back into tolerance. Over a longer period, these out of specification incidents may be immaterial to the broader environment. However, to the individual recreational user present in the area at this time, the risk to their health may be significantly increased. An example of this difference in perspective is the waste water treatment in Warriewood, New South Wales. In extreme weather events, partially treated sewage is discharged at the outfall and can potentially affect water quality at nearby beaches. Over time, an arrangement has been made where Sydney Water contacts members of the local Surfrider group by text to notify them of an out of license discharge. A member of the group then plants a sign in the sand advising potential users that water quality may be affected. Though this discharge may not have impacted the broader environment, they were critical conditions relating to human health that required prompt action.

Based on anecdotal discussions with other WWTP operators and community groups, out of license discharges are regular occurrences, albeit transitory. Reporting of these events is not consistent across WWTPs, WTAs and councils and licenses do not always specify whether an out of specification readings or the out of license discharges has to be reported in a particular way. For example, in the case of Coffs Harbour, results of particular events that reached the council's the 90th and 100th percentile limits were highlighted in red and comments were added indicating the potential cause of the exceedance (CHCC, 2017). These events were typical the result of engineering issues, such as, "torn filter cloths" and "transient faults". However, not all WWTPs were as thorough in their reporting as Coffs Harbour. For example, aside from the agreement established above, the Warriewood treatment plant, provides at most monthly reports of their outfall concentrations and loads. In pollution monitoring summaries they indicate whether they were within or outside the limit for primarily total suspended solids and faecal coliform based on six samples over a one-month period (Sydney Water, 2018). Other parameters were sampled once (metals) per month. Inconsistent reporting between WWTPs and WTAs prevented the further analysis of these parameters.

4. DISCUSSION

4.1 Towards Transparency

The NOD researchers built an interactive online database to facilitate cross-institutional data sharing among federal, state, local governments and the community to promote transparency and openness of governance for managing pollutants from WWTPs. The data were collated, verified, analysed and finally uploaded to the database. To develop a sense of trust between the NOD and WWTP, WTAs and councils the relevant WTAs were notified and given access to the relevant database to check the data for accuracy before the data were release to the public. Any errors detected were quickly remedied. In one instance a WTAs had given the NOD more than most other bodies (monthly e-coli readings). When reviewing data and realizing they were exceptional in both this regard (and also the magnitude) they requested their data be removed from the public database. For the sake of building goodwill this was done but illustrates the natural inclination of WTAs to be reticent with transparency. In an ideal system their candour should have been celebrated.

With regard to the potential acute health impacts of bypass events, community organizations (e.g. Surfrider) have called for a more immediate notification text to all members of the local community and the implementation of a standard method of reporting across all WWTPS. This could be integrated into existing safety notification applications such as the existing "Shark Smart" in Western Australia (Shark Smart, 2019). Effectively this would have two outcomes: Firstly, it would ensure all recreational users are properly informed in a timely matter of changes to water quality but also this would educate the community on the state of the infrastructure at WWTPs such as Warriewood and potential costs (environmental, health and tourism) of leaving the wastewater system in its current state.

Access to data on events, incidences and plant performance would allow suitable systematic analysis at a national level of the state of WWTPs infrastructure. It would also help allay community concerns related to water quality changes that may have nothing to do with outfalls but due to the lack of public information may have create an unwarranted mistrust by stakeholders who feel that they have not been adequately informed of plant operations. This increased transparency would not only improve the relationship between communities and WTAs but also provide evidence-based objective benchmarks for funding of water treatment plants into the future. Adopting the Industry 4.0 (Department of Industry, 2019) approach to future upgrades, replacement and maintenance of WWTP and related infrastructure can deliver real time monitoring and reporting systems that can be integrated into a standardized reporting system, provided national standards for WWTP and outfalls reporting are developed now. The aim should be to create a dependable and comprehensive reporting system that provides an effective feedback mechanism for decisions makers and provides transparency for the general public.

As it currently stands, given the level of variability in reporting requirements and varying levels of data accessibility, it is difficult to comprehensively manage and assess effluent impacts on biodiversity from a national perspective. The State of Environment 2016, as previously mentioned, has highlighted a deterioration in the quality of coastal waters around Australia. A national approach to identify, assess and mitigate the impacts causing this deterioration will require accurate, standardized data from the waste water sector.

The NOD project will support greater data transparency in the future by:

1) Embracing data formats that are easily accessible, promote insight-driven decisions and reduce compliance burdens.

    a. For example, the NOD website enables the comprehensive visualization of available water quality parameters throughout Australia, facilitating cross institutional coordination across Federal, State/Territory, and local authorities to integrate infrastructure planning and decision making of wastewater effluent from ocean outfalls in Australia.

2) A data repository that is accessible to everyone. By replacing documents (such as online PDF documents) with standardized open data, Federal and State/Territory governments and water authorities will improve transparency within the community and provide more useful data to Governments, supporting their prioritisation of infrastructure and environmental needs.

3) Evolving community awareness, scientific research (e.g. drug consumption as measured by influent to WWTP by the sewAus project (O'Brien et al., 2016) cost opportunities for recycling wastewater (upgrade proposals etc.) and environmental concerns including those related to around emerging contaminants (e.g. microplastics and heavy metals) and process efficiencies (through Industry 4.0) of environmental datasets.

4) Promoting data transparency, as in the case of the NOD,

    a. The general public will feel more informed and involved and can act as stewards of the marine and coastal environment.

    b. Will allow for the identification of problem hotspots and the effective decision making and resource allocation for conservation measures.

    c. Will encourage WTAs and governments to build trust with the general communities.

In order to facilitate transparency between WTAs and the community, the NOD identifies that what is needed is:

- Adequate mechanisms be developed to allow the co-operation and exchange of information with other water authorities in cases where discharges of wastewater have a transboundary effect on water quality of jurisdictions shared waters.

- Enhancing the reporting process and the generation of information for policy makers, interested parties and the general public.

- The adoption and maintenance by authorities of the right of everyone to receive environmental information that is held by public authorities to enhance the public's ability to participate in environmental decision-making.

- A representative body of industry, academic, community and government should be established to develop National Wastewater Treatment Plant Performance, Discharge and Transparency Standards to report to Federal and State Environment Ministers.

- The NOD receives ongoing support to assist with the development of reporting standards that encompass points detailed in the Discussion section. Ideally it would

be more appropriate for a statutory agency to adopt this role once an appropriate framework has been established.

- The status of water treatment performance be reported bi-annually to State governments and to the Federal government once every 5 years as part of the State of Environment report.

The NOD has made a start but more needs to be done to maintain the existing progress and to extend the reporting to all WTA and the minimum set of variables.

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APPENDIX A – WATER AUTHORITIES

Table 4. Outfalls in the six states and Northern Territory examined in this study listed along the associated management body (water authority) with the names of the organization from which data was collected.

State	Water Authority	Data collection	Outfalls
New South Wales	Ballina Shire Council	Ballina Shire Council	Skennars Head
New South Wales	Bega Shire Council	Bega Shire Council	Bermagui
New South Wales	Bega Shire Council	Bega Shire Council	Eden
New South Wales	Bega Shire Council	Bega Shire Council	Merimbula
New South Wales	Central Coast Council	Central Coast Council	Winney Bay (Kincumber)
New South Wales	Central Coast Council	Central Coast Council	Norah Head (Toukley)
New South Wales	Central Coast Council	Central Coast Council	Wonga Point (Bateau Bay)
New South Wales	Clarence Valley Council	Clarence Valley Council	Iluka
New South Wales	Clarence Valley Council	Clarence Valley Council	Yamba
New South Wales	Coffs Harbour City Council	Coffs Harbour City Council	Coffs Harbour
New South Wales	Eurobodalla Shire Council	Eurobodalla Shire Council	Batemans Bay
New South Wales	Eurobodalla Shire Council	Eurobodalla Shire Council	Narooma
New South Wales	Eurobodalla Shire Council	Eurobodalla Shire Council	Tomakin
New South Wales	MidCoast Water	MidCoast Water	Forster
New South Wales	Hunter Water	Hunter Water	Belmont
New South Wales	Hunter Water	Hunter Water	Boulder Bay
New South Wales	Hunter Water	Hunter Water	Burwood Beach
New South Wales	Kempsey Shire Council	Kempsey Shire Council	Crescent Head
New South Wales	Port Macquarie-Hastings	Port Macquarie-Hastings	Camden Head
New South Wales	Shoalhaven City Council	Shoalhaven City Council	Penguin Heads (REMS)
New South Wales	Shoalhaven City Council	Shoalhaven City Council	Ulladulla
New South Wales	Sydney Water	Sydney Water	Bellambi
New South Wales	Sydney Water	Sydney Water	Bombo
New South Wales	Sydney Water	Sydney Water	Bondi
New South Wales	Sydney Water	Sydney Water	Coniston Beach (Wollongong)
New South Wales	Sydney Water	Sydney Water	Diamond Bay 1
New South Wales	Sydney Water	Sydney Water	Diamond Bay 2
New South Wales	Sydney Water	Sydney Water	Malabar
New South Wales	Sydney Water	Sydney Water	North Head
New South Wales	Sydney Water	Sydney Water	Port Kembla
New South Wales	Sydney Water	Sydney Water	Potter Point (Cronulla)
New South Wales	Sydney Water	Sydney Water	Shellharbour
New South Wales	Sydney Water	Sydney Water	Vaucluse
New South Wales	Sydney Water	Sydney Water	Warriewood
Northern Territory	Power and Water Corp.	Power and Water Corp.	Berrimah
Northern Territory	Power and Water Corp.	Power and Water Corp.	Leanyer Sanderson
Northern Territory	Power and Water Corp.	Power and Water Corp.	Ludmilla
Northern Territory	Power and Water Corp.	Power and Water Corp.	Palmerston

Queensland	Bundaberg Regional Council	DES	East Bundaberg
Queensland	Bundaberg Regional Council	DES	Millbank
Queensland	Cairns Regional Council	DES	Edmonton
Queensland	Cairns Regional Council	DES	Marlin Coast
Queensland	Cairns Regional Council	DES	Woree
Queensland	Cassowary Coast R. C.	DES	Innisfail
Queensland	City of Gold Coast	DES	Coombabah
Queensland	City of Gold Coast	DES	Elanora
Queensland	City of Gold Coast	DES	Merrimac
Queensland	Douglas Shire Council	DES	Port Douglas
Queensland	Gladstone Regional Council	DES	Gladstone
Queensland	Gladstone Regional Council	DES	South Trees Inlet
Queensland	Gympie Regional Council	DES	Tin Can Bay
Queensland	Hinchinbrook Shire Council	DES	Lucinda
Queensland	Logan Water	DES	Beenleigh
Queensland	Logan Water	DES	Loganholme
Queensland	Mackay Regional Council	DES	Mackay North
Queensland	Mackay Regional Council	DES	Mackay Southern
Queensland	Queensland Urban Utilities	DES	Bundamba
Queensland	Queensland Urban Utilities	DES	Carole Park
Queensland	Queensland Urban Utilities	DES	Fairfield
Queensland	Queensland Urban Utilities	DES	Gibson Island
Queensland	Queensland Urban Utilities	DES	Goodna
Queensland	Queensland Urban Utilities	DES	Karana Downs
Queensland	Queensland Urban Utilities	DES	Luggage Point
Queensland	Queensland Urban Utilities	DES	Oxley
Queensland	Queensland Urban Utilities	DES	Sandgate
Queensland	Queensland Urban Utilities	DES	Wacol
Queensland	Queensland Urban Utilities	DES	Wynnum
Queensland	Redland City Council	DES	Capalaba
Queensland	Redland City Council	DES	Thorneside
Queensland	Redland City Council	DES	Victoria Point
Queensland	Rockhampton R. C.	DES	North Rockhampton
Queensland	Rockhampton R. C.	DES	South Rockhampton
Queensland	Rockhampton R. C.	DES	West Rockhampton
Queensland	Townsville Regional Council	DES	Cleveland Bay
Queensland	Townsville Regional Council	DES	Mt St John
Queensland	Unity Water	DES	Burpengary East
Queensland	Unity Water	DES	Caboolture South
Queensland	Unity Water	DES	Coolum
Queensland	Unity Water	DES	Kawana
Queensland	Unity Water	DES	Landsborough
Queensland	Unity Water	DES	Maroochydore
Queensland	Unity Water	DES	Murrumba Downs

Queensland	Unity Water	DES	Nambour
Queensland	Unity Water	DES	Redcliffe
Queensland	Whitsunday Regional Council	DES	Bowen
Queensland	Whitsunday Regional Council	DES	Cannonvale
Queensland	Wide Bay Water	DES	Eli Creek
Queensland	Wide Bay Water	DES	Maryborough
Queensland	Wide Bay Water	DES	Pulgul Creek
South Australia	SAWater	SAWater	Bolivar Desalination Plant
South Australia	SAWater	SAWater	Finger Point
South Australia	SAWater	SAWater	Glenelg
South Australia	SAWater	SAWater	Christies Beach-Northern outfall
South Australia	SAWater	SAWater	Port Augusta
South Australia	SAWater	SAWater	Port Lincoln
South Australia	SAWater	SAWater	Port Pirie
South Australia	SAWater	SAWater	Christies Beach-Southern outfall
South Australia	SAWater	SAWater	Bolivar WWTP
South Australia	SAWater	SAWater	Whyalla
Tasmania	Port Arthur M.H.C.	EPA Tasmania	Port Arthur
Tasmania	TasWater	EPA Tasmania	Bicheno
Tasmania	TasWater	EPA Tasmania	Blackmans Bay
Tasmania	TasWater	EPA Tasmania	Boat Harbour
Tasmania	TasWater	EPA Tasmania	Bridgewater
Tasmania	TasWater	EPA Tasmania	Bridport
Tasmania	TasWater	EPA Tasmania	Cambridge
Tasmania	TasWater	EPA Tasmania	Cameron Bay
Tasmania	TasWater	EPA Tasmania	Currie
Tasmania	TasWater	EPA Tasmania	Cygnet
Tasmania	TasWater	EPA Tasmania	Dover
Tasmania	TasWater	EPA Tasmania	Electrona
Tasmania	TasWater	EPA Tasmania	George Town
Tasmania	TasWater	EPA Tasmania	Hoblers Bridge
Tasmania	TasWater	EPA Tasmania	Macquarie Point
Tasmania	TasWater	EPA Tasmania	Margate
Tasmania	TasWater	EPA Tasmania	Midway Point
Tasmania	TasWater	EPA Tasmania	Newnham
Tasmania	TasWater	EPA Tasmania	Orford
Tasmania	TasWater	EPA Tasmania	Pardoe
Tasmania	TasWater	EPA Tasmania	Port Sorell
Tasmania	TasWater	EPA Tasmania	Prince of Wales Bay
Tasmania	TasWater	EPA Tasmania	Richmond
Tasmania	TasWater	EPA Tasmania	Risdon
Tasmania	TasWater	EPA Tasmania	Riverside
Tasmania	TasWater	EPA Tasmania	Rokeby
Tasmania	TasWater	EPA Tasmania	Rosny

Tasmania	TasWater	EPA Tasmania	Round Hill
Tasmania	TasWater	EPA Tasmania	Selfs Point
Tasmania	TasWater	EPA Tasmania	Sisters Beach
Tasmania	TasWater	EPA Tasmania	Smithton
Tasmania	TasWater	EPA Tasmania	Somerset
Tasmania	TasWater	EPA Tasmania	Sorell
Tasmania	TasWater	EPA Tasmania	St Helens
Tasmania	TasWater	EPA Tasmania	Stanley
Tasmania	TasWater	EPA Tasmania	Strahan
Tasmania	TasWater	EPA Tasmania	Ti-tree Bend
Tasmania	TasWater	EPA Tasmania	Triabunna
Tasmania	TasWater	EPA Tasmania	Turners Beach
Tasmania	TasWater	EPA Tasmania	Ulverstone
Tasmania	TasWater	EPA Tasmania	Wynyard
Victoria	Barwon Water	Barwon Water	Anglesea
Victoria	Barwon Water	Barwon Water	Apollo Bay
Victoria	Barwon Water	Barwon Water	Black Rock
Victoria	Barwon Water	Barwon Water	Lorne
Victoria	City West Water	City West Water	Altona
Victoria	Gippsland Water	Gippsland Water	Delray Beach (ROS)
Victoria	Gippsland Water	Gippsland Water	McGaurans (SWOP)
Victoria	Melbourne Water	Melbourne Water	Boags Rock (ETP)
Victoria	Melbourne Water	Melbourne Water	Port Phillip Bay (WTP)
Victoria	South East Water	South East Water	Boags Rock (Boneo)
Victoria	South Gippsland Water	South Gippsland Water	Baxters Beach
Victoria	South Gippsland Water	South Gippsland Water	Foster
Victoria	South Gippsland Water	South Gippsland Water	Port Welshpool
Victoria	South Gippsland Water	South Gippsland Water	Toora
Victoria	Wannon Water	Wannon Water	Port Fairy Dom
Victoria	Wannon Water	Wannon Water	Port Fairy Ind
Victoria	Wannon Water	Wannon Water	Portland
Victoria	Wannon Water	Wannon Water	Warrnambool
Victoria	Westernport Water Corp.	Westernport Water Corp.	Philip Island
Western Australia	Water Corporation	Water Corporation	Alkimos
Western Australia	Water Corporation	Water Corporation	Beenyup
Western Australia	Water Corporation	Water Corporation	Bunbury
Western Australia	Water Corporation	Water Corporation	Christmas Island
Western Australia	Water Corporation	Water Corporation	East Rockingham
Western Australia	Water Corporation	Water Corporation	Home Island
Western Australia	Water Corporation	Water Corporation	Busselton - North Wetlands
Western Australia	Water Corporation	Water Corporation	Point Peron
Western Australia	Water Corporation	Water Corporation	Busselton - South Wetlands
Western Australia	Water Corporation	Water Corporation	Subiaco
Western Australia	Water Corporation	Water Corporation	Wickham

Western Australia	Water Corporation	Water Corporation	Woodman Point

APPENDIX B – DATA AVAILABILITY

Table 5. Data availability by variable and states/territory.

State	Water quality pollutant	Unit	Data availability
New South Wales	Ammonia	mg/L	Online or upon request
	BOD 5-days	mg/L	Online or upon request
	Colour	Pt.Co. Units	Online or upon request
	E. coli	org/100mL	Online or upon request
	Electrical conductivity	µS/cm	Online or upon request
	Enterococci	org/100mL	Online or upon request
	Faecal coliforms	org/100mL	Online or upon request
	Flow volume	ML	Online or upon request
	Nitrate nitrogen	mg/L	Online or upon request
	Oil and grease	mg/L	Online or upon request
	pH	pH	Online or upon request
	Total dissolved solids	mg/L	Online or upon request
	Total nitrogen	mg/L	Online or upon request
	Total phosphorus	mg/L	Online or upon request
	Total suspended solids	mg/L	Online or upon request
	Turbidity	NTU	Online or upon request
Northern Territory	*E. coli*	org/100mL	Upon request
	Electrical conductivity	µS/cm	Upon request
	Enterococci	org/100mL	Upon request
	Flow volume	ML	Upon request
	pH	pH	Upon request
	Total nitrogen	mg/L	Upon request
	Total phosphorus	mg/L	Upon request
	Total suspended solids	mg/L	Upon request
	Turbidity	NTU	Upon request
Queensland	*E. coli*	org/100mL	Upon request
	Enterococci	org/100mL	Upon request
	Faecal Coliforms	org/100mL	Upon request
	Flow volume	ML	Upon request
	Oil and grease	mg/L	Upon request
	pH	pH	Upon request
	Surfactants	mg/L	Upon request
	Total nitrogen	mg/L	Upon request
	Total phosphorus	mg/L	Upon request
	Total suspended solids	mg/L	Upon request
	Turbidity	NTU	Upon request
South Australia	*E. coli*	org/100mL	Upon request
	Flow volume	ML	Upon request

	pH	pH	Upon request
	Total dissolved solids	mg/L	Upon request
	Total nitrogen	mg/L	Upon request
	Total phosphorus	mg/L	Upon request
	Total suspended solids	mg/L	Upon request
	Turbidity	NTU	Upon request
Tasmania	Enterococci	org/100mL	Upon request
	Faecal coliforms	org/100mL	Upon request
	Flow volume	ML	Upon request
	Oil and grease	mg/L	Upon request
	pH	pH	Upon request
	Total nitrogen	mg/L	Upon request
	Total phosphorus	mg/L	Upon request
	Total suspended solids	mg/L	Upon request
Victoria	Algal bloom	Cells/mL	Upon request
	Ammonia	mg/L	Upon request
	Blue-green algal bloom	Frequency	Upon request
	BOD 5-days	mg/L	Upon request
	BOD Filtered	mg/L	Upon request
	Calcium	mg/L	Upon request
	Chemical oxygen demand	mg/L	Upon request
	Colour	Pt.Co. Units	Upon request
	E. coli	org/100mL	Upon request
	Electrical conductivity	µS/cm	Upon request
	Enterococci	org/100mL	Upon request
	Flow volume	ML	Upon request
	Magnesium	mg/L	Upon request
	Nitrate nitrogen	mg/L	Upon request
	Oil and grease	mg/L	Upon request
	pH	pH	Upon request
	SAR	SAR	Upon request
	Sodium	mg/L	Upon request
	Surfactants	mg/L	Upon request
	Total kjeldahl nitrogen	mg/L	Upon request
	Total algae count	Cells/mL	Upon request
	Total blue-green algae count	Cells/mL	Upon request
	Total coliforms	org/100mL	Upon request
	Total dissolved solids	mg/L	Upon request
	Total nitrogen	mg/L	Upon request
	Total phosphorus	mg/L	Upon request
	Total suspended solids	mg/L	Upon request
	Turbidity	NTU	Upon request
Western Australia	Colour	Pt.Co. Units	Upon request
	E. coli	org/100mL	Upon request

	Enterococci	org/100mL	Upon request
	Flow volume	ML	Upon request
	Oil and grease	mg/L	Upon request
	pH	pH	Upon request
	Surfactants	mg/L	Upon request
	Total dissolved solids	mg/L	Upon request
	Total nitrogen	mg/L	Upon request
	Total phosphorus	mg/L	Upon request
	Total suspended solids	mg/L	Upon request
	Turbidity	NTU	Upon request

Table 6. Pollutant parameter of each outfall per state/territory.

State	Outfall	Parameter	Unit
New South Wales	Batemans Bay	BOD 5-days	mg/L
		Flow volume	ML
		Oil and grease	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Bellambi	Flow volume	ML
	Belmont	BOD 5-days	mg/L
		Flow volume	ML
		Oil and grease	mg/L
		Total suspended solids	mg/L
	Bermagui	Ammonia	mg/L
		BOD 5-days	mg/L
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Bombo	Ammonia	mg/L
		BOD 5-days	mg/L
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Bondi	BOD 5-days	mg/L
		Flow volume	ML
		Oil and grease	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Boulder Bay	BOD 5-days	mg/L
		Flow volume	ML
		Oil and grease	mg/L
		Total suspended solids	mg/L
	Burwood Beach	BOD 5-days	mg/L
		Flow volume	ML

	Oil and grease	mg/L
	Total suspended solids	mg/L
Camden Head	Ammonia	mg/L
	BOD 5-days	mg/L
	Electrical conductivity	µS/cm
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Coffs Harbour	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Coniston Beach (Wollongong)	BOD 5-days	mg/L
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Crescent Head	Ammonia	mg/L
	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Diamond Bay 1	Flow volume	ML
Diamond Bay 2	Flow volume	ML
Eden	Ammonia	mg/L
	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML

	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total suspended solids	mg/L
Forster	Ammonia	mg/L
	BOD 5-days	mg/L
	Electrical conductivity	µS/cm
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Iluka	Ammonia	mg/L
	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Kincumber (Winney Bay)	BOD 5-days	mg/L
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Malabar	BOD 5-days	mg/L
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Merimbula	Ammonia	mg/L
	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L

	Total suspended solids	mg/L
Narooma	BOD 5-days	mg/L
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
North Head	BOD 5-days	mg/L
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Penguin Heads	Ammonia	mg/L
(REMS)	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Port Kembla	Flow volume	ML
Potter Point	Ammonia	mg/L
(Cronulla)	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Shellharbour	Ammonia	mg/L
	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Skennars Head	Ammonia	mg/L
	BOD 5-days	mg/L
	Colour	Pt.Co. Units
	E. coli	org/100mL
	Faecal coliforms	org/100mL

	Flow volume	ML
	Nitrate nitrogen	mg/L
	Oil and grease	mg/L
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Tomakin	BOD 5-days	mg/L
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Toukley	BOD 5-days	mg/L
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total suspended solids	mg/L
Ulladulla	BOD 5-days	mg/L
	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Vaucluse	Flow volume	ML
Warriewood	BOD 5-days	mg/L
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Wonga Point	BOD 5-days	mg/L
(Bateau Bay)	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total suspended solids	mg/L
Yamba	Ammonia	mg/L
	BOD 5-days	mg/L

		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
Northern Territory	Berrimah	E. coli	org/100mL
		Electrical conductivity	µS/cm
		Enterococci	org/100mL
		Flow volume	ML
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
	Leanyer Sanderson	E. coli	org/100mL
		Electrical conductivity	µS/cm
		Enterococci	org/100mL
		Flow volume	ML
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
	Ludmilla	E. coli	org/100mL
		Electrical conductivity	µS/cm
		Enterococci	org/100mL
		Flow volume	ML
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
	Palmerston	E. coli	org/100mL
		Electrical conductivity	µS/cm
		Enterococci	org/100mL
		Flow volume	ML
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
Queensland	Beenleigh	Enterococci	org/100mL

	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Bowen	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Bundamba	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Burpengary East	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Caboolture South	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Cannonvale	E. coli	org/100mL
	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Capalaba	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH

	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Carole Park	E. coli	org/100mL
	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Cleveland Bay	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Coolum	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Coombabah	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
East Bundaberg	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Edmonton	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L

	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Elanora	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Eli Creek	E. coli	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Fairfield	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Gibson Island	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Gladstone	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Goodna	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Ph	pH
	Total nitrogen	mg/L

	Total phosphorus	mg/L
	Total suspended solids	mg/L
Innisfail	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Karana Downs	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Kawana	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Landsborough	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Loganholme	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Lucinda	Faecal coliforms	org/100mL
	Flow volume	ML
	Ph	pH

	Total suspended solids	mg/L
Luggage Point	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Mackay North	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Mackay Southern	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Marlin Coast	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Maroochydore	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Total nitrogen	mg/L
	Total phosphorus	mg/L
Maryborough	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Merrimac	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L

Millbank	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Mt St John	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Murrumba Downs	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Nambour	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
North Rockhampton	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Oxley	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Port Douglas	Faecal coliforms	org/100mL

	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Pulgul Creek	Flow volume	ML
Redcliffe	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Sandgate	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
South Rockhampton	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
South Trees Inlet	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Thorneside	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Tin Can Bay	Flow volume	ML
Victoria Point	Faecal coliforms	org/100mL
	Flow volume	ML
	pH	pH

		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Wacol	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	West Rockhampton	Faecal coliforms	org/100mL
		Flow volume	ML
		Ph	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Woree	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Wynnum	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		pH	pH
		Surfactants	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
South Australia	Bolivar (Desalination Plant)	E. coli	org/100mL
		Flow volume	ML
		pH	pH
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
	Finger Point	E. coli	org/100mL
		Flow volume	ML

	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Glenelg	E. coli	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Christies Beach (Northern outfall)	*E. coli*	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Port Augusta	*E. coli*	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Port Lincoln	*E. coli*	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Port Pirie	*E. coli*	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Christies Beach (Southern outfall)	*E. coli*	org/100mL
	Flow volume	ML

		pH	pH
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
	Bolivar WWTP	*E. coli*	org/100mL
		Flow volume	ML
		pH	pH
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
	Whyalla	*E. coli*	org/100mL
		Flow volume	ML
		pH	pH
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
Tasmania	Bicheno	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Blackmans Bay	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Boat Harbour	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L

	Total suspended solids	mg/L
Bridgewater	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Bridport	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Cambridge	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Cameron Bay	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Currie	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Cygnet	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Oil and grease	mg/L
	pH	pH

	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Dover	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Electrona	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
George Town	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Hoblers Bridge	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Macquarie Point	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Margate	Enterococci	org/100mL
	Faecal coliforms	org/100mL

	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Midway Point	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Newnham	Enterococci	org/100 mL
	Faecal coliforms	org/100 mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Orford	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Pardoe	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Port Arthur	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L

	Total phosphorus	mg/L
	Total suspended solids	mg/L
Port Sorell	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Prince of Wales Bay	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Richmond	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Risdon	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Riverside	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Rokeby	Enterococci	org/100mL
	Faecal coliforms	org/100mL

	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Rosny	Enterococci	org/100 mL
	Faecal coliforms	org/100 mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Round Hill	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Selfs Point	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Sisters Beach	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Smithton	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L

	Total phosphorus	mg/L
	Total suspended solids	mg/L
Somerset	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Sorell	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
St Helens	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Stanley	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Strahan	Enterococci	org/100mL
	Faecal coliforms	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Ti-tree Bend	Enterococci	org/100mL
	Faecal coliforms	org/100mL

		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Triabunna	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Turners Beach	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Ulverstone	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Wynyard	Enterococci	org/100mL
		Faecal coliforms	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
Victoria	Anglesea	*E. coli*	org/100mL
		Enterococci	org/100mL
		Flow volume	ML
		pH	pH
		Total dissolved solids	mg/L
		Total nitrogen	mg/L

	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Apollo Bay	*E. coli*	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Altona	Colour	Pt.Co. Units
	E. coli	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Baxters Beach	Ammonia	mg/L
	BOD 5-days	mg/L
	Bod filtered	mg/L
	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Nitrate nitrogen	mg/L
	pH	pH
	Total kjeldahl nitrogen	mg/L
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Black Rock	Colour	Pt.Co. Units
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Boags Rock (ETP)	Ammonia	mg/L
	Colour	Pt.Co. Units

	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Boags Rock (Boneo)	Colour	Pt.Co. Units
	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	pH	pH
	Total coliforms	org/100mL
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Cowes	*E. coli*	org/100mL
	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total coliforms	org/100mL
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Delray Beach (ROS)	Algal bloom	Cells/mL
	Blue Green algal bloom	Cells/mL
	Colour	Pt.Co. Units
	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	pH	pH
	Surfactants	mg/L
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Foster	Algal bloom	Cells/mL
	Ammonia	mg/L
	Blue Green algal bloom	Cells/mL
	BOD 5-days	mg/L

	Bod filtered	mg/L
	Chemical oxygen demand	mg/L
	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Nitrate nitrogen	mg/L
	pH	pH
	Total kjeldahl nitrogen	mg/L
	Total algae count	Cells/mL
	Total blue-green algae count	Cells/mL
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Lorne	*E. coli*	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
McGaurans (SWOP)	Blue Green algal bloom	Cells/mL
	Colour	Pt.Co. Units
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Port Fairy	Colour	Pt.Co. Units
	E. coli	org/100mL
	Electrical conductivity	µS/cm
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Port Welshpool	Ammonia	mg/L
	BOD 5-days	mg/L

	Calcium	mg/L
	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Magnesium	mg/L
	Nitrate nitrogen	mg/L
	pH	pH
	Sar	SAR
	Sodium	mg/L
	Total kjeldahl nitrogen	mg/L
	Total algae count	Cells/mL
	Total blue-green algae count	Cells/mL
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Portland	Colour	Pt.Co. Units
	E. coli	org/100mL
	Electrical conductivity	µS/cm
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Toora	Algal bloom	Cells/mL
	Ammonia	mg/L
	Blue Green algal bloom	Cells/mL
	BOD 5-days	mg/L
	Calcium	mg/L
	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Magnesium	mg/L
	Nitrate nitrogen	mg/L
	pH	pH
	SAR	SAR
	Sodium	mg/L
	Total kjeldahl nitrogen	mg/L
	Total algae count	Cells/mL
	Total blue-green algae count	Cells/mL
	Total dissolved solids	mg/L
	Total nitrogen	mg/L

		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Warrnambool	Colour	Pt.Co. Units
		E. coli	org/100mL
		Electrical conductivity	µS/cm
		Flow volume	ML
		pH	pH
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
		Turbidity	NTU
	Port Phillip Bay (WTP)	Ammonia	mg/L
		Colour	Pt.Co. Units
		Flow volume	ML
		Surfactants	mg/L
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
Western Australia	Alkimos	*E. coli*	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Surfactants	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Beenyup	*E. coli*	org/100mL
		Flow volume	ML
		Oil and grease	mg/L
		pH	pH
		Surfactants	mg/L
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L
	Bunbury	*E. coli*	org/100mL
		Flow volume	ML
		pH	pH
		Total dissolved solids	mg/L
		Total nitrogen	mg/L
		Total phosphorus	mg/L
		Total suspended solids	mg/L

Christmas Island	*E. coli*	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
East Rockingham	*E. coli*	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Home Island	*E. coli*	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
North Wetlands	*E. coli*	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Point Peron	*E. coli*	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Surfactants	mg/L
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
South Wetlands	*E. coli*	org/100mL
	Enterococci	org/100mL
	Flow volume	ML

	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Subiaco	*E. coli*	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
Wickham	Colour	Pt.Co. Units
	E. coli	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Surfactants	mg/L
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L
	Turbidity	NTU
Woodman Point	*E. coli*	org/100mL
	Enterococci	org/100mL
	Flow volume	ML
	Oil and grease	mg/L
	pH	pH
	Surfactants	MBAS
	Total dissolved solids	mg/L
	Total nitrogen	mg/L
	Total phosphorus	mg/L
	Total suspended solids	mg/L

www.nespmarine.edu.au

Contact:
Name
Organisation

Address | xx |xx
email |
tel | +61 xxx