

CLEAN OCEAN FOUNDATION
EMERGING PRIORITIES PROJECT

Interim Report National Environmental Science Program
Emerging Priorities Project: National Outfalls Database

June 2021



Interim Report National Environmental Science Program Emerging Priorities Project: National Outfalls Database

Summary

Task	Status	For Completion
Microplastics and emerging contaminants	Paper and Survey sent	Review responses propose options for reporting Sep 21
Inland river system outfall discharges	List of WTPs attained	Survey for WTA sent by end of June 21 Summarise future steps to begin collection of data Sep 21
Preliminary Review on collecting data on ocean industrial outfalls	Current Public access to license data identified	Review and understand steps required to integrate into NOD with baseline parameters Sep 21
Understanding recycling of water by wastewater treatment plants	Paper and Survey sent	Review responses propose options for reporting Sep 21
Continuity of National Outfalls Database (NOD)	Complete for 2019/2020 FY	Completed
Standard on National Outfalls – Baseline Standard Draft	Draft of parameters from and report card completed	Paper to be sent to EPAs for comment by June 21 Analyse feedback and further consultation if necessary. Final draft produced Sep 21.

Microplastics and other emerging contaminants

Contribute to an understanding of how microplastics (and other emerging contaminants) enter the marine environment from wastewater treatment plants (WTPs). The project will conduct a national survey of water treatment authorities (WTAs) to evaluate what resources and data are currently available to study microplastics and other emerging contaminants and what options exist for future provision of data from a national perspective.

A paper reviewing the issues is published and a survey was developed and sent to all WTAs on 7/6/21. This is a progression from previous input¹.

Although the survey will close on 30th June we have already received 7 responses from different WTAs.

For expediency, the paper and survey also included discussion of related to the other research topic, recycling of water from wastewater plants. (below).

Paper can be viewed here: <https://www.cleanocean.org/microplastic-emerging-pollutants-and-water-recycling.html>

Survey can be viewed here: <https://www.surveymonkey.com/r/EPP-COF>

¹ p14, Gemmill et al C4 Towards a national standard and guidelines for reporting wwtp outfall data_final https://www.nespmarine.edu.au/system/files/Gemmill%20et%20al%20C4%20Towards%20a%20national%20standard%20and%20guidelines%20for%20reporting%20wwtp%20outfall%20data_final.pdf

Results from the survey will be analysed as discussed in the final report.

Inland river system outfall discharges

Develop the process of understanding how inland outfalls impact on the environment. The project will continue to collect data on a trial river system; the Nepean - Hawkesbury as well as identify and survey relevant NSW water treatment authorities discharging into rivers on their capacity to supply similar data in future years. This is intended as a step towards developing the ability to collect data on key inland river system nationally.

The project has enabled an important collaboration with Dr Ian Wright and PhD student Katherine Morrison (UWS) who is investigating NSW sewage outfalls in the Southern Highlands and their impact on water and sediment quality, river invertebrates, riparian vegetation and river platypus.²

All inland WTAs in NSW have been identified (Appendix 1) and the initial survey is still being drafted. It will be sent out by the of end June to gauge their willingness and ability to supply basic parameters. These parameters will be based on data collected for coastal outfalls³ established in the NOD but adapted for riverine environments. It will also consider the variation from city-based authorities to regional authorities in terms of resources and challenges.

The survey will also include and question the cost of improving testing to include emerging contaminants and microplastics to gage local government commitments and ability to implement changes. These questions will include aims in improving water treatment effluent, reductions in traditional and emerging contaminants, as well as finding better uses for recycled water to support community needs, as these aims vary from shire to shire. For example, the budget and funding available from water treatment authorities such as Hunter Water and Sydney water will be significantly different to the Warrumbungle Shire.

A summary of its findings will be published at the end of September 21.

Preliminary review on collecting data on ocean industrial outfalls.

Consult with all relevant state and territory bodies on what data is available to by the NOD and propose a plan for future collection of this data.

It was found that each state/territory has its own licensing system with no standardisation in terms of accessibility and parameters readily available (Appendix 2).

	License Online			Annual Report Online		
	Yes/No	Pollutants	Example	Yes/No	Pollutant Loads	Example
QLD	Yes	Yes	Here	No	No	No
NT	No	No	No	No	No	No
WA	Yes	Yes	Here	No	No	No
SA	Yes	Yes	Here	Yes	No	No

² <https://www.cleanocean.org/news/clean-ocean-foundation-goes-upriver>

³ Table 3, p8. Gemmill et al C4 Towards a national standard and guidelines for reporting wwtp outfall data_final https://www.nespmarine.edu.au/system/files/Gemmill%20et%20al%20C4%20Towards%20a%20national%20standard%20and%20guidelines%20for%20reporting%20wwtp%20outfall%20data_final.pdf

VIC	Annual	Annual	Annual	Yes	Yes	Here
TAS	No (Mapped)	ID # only*	No	No	No	No
NSW	N/A	N/A	N/A	N/A	N/A	N/A

* ID # only – License number on map, no link to license etc.

Tasmania has a site mapped which makes identification of coastal discharges easier, but there is no online register of licenses. With the exception of Tasmania and Northern Territory, all have some form of online search function and types of waste discharges could be identified by using existing search functions (e.g.: process or industry) and cross referencing with licenses. NSW data was not accessed as the links on the website appear not functional at this time and Victoria's will have a significant upgrade that will be available on the 1st July 21.

Yearly pollutant loads appear in most licenses accessed. Victoria's EPA is the only authority publishing "Annual Performance Statements" in which average values of pollutants and volumes along with compliance/noncompliance issues are included.

Licenses or reports if accessible were in PDF form.

The project will now enquire from each authority:

If not already, when are licenses are intended to be made available online? If not in the near term, what processes can be undertaken to access these licenses with discharge parameters specified?

If not available online already, are annual reports detailing pollutant loads available?

Can the discharge point be reliably located and be mapped?

Once these issues uncertainties are resolved an accurate a plan can be made to establish a trial NOD for industrial outfalls. This will be completed by September 21.

Understanding recycling of water by wastewater treatment plants.

The project will survey all WTAs as to how they classify, calculate and report on water recycled from their wastewater treatment processes. This will provide a basis for developing benchmarks in future years related to reporting of the of wastewater recycling.

(See comments for Microplastics and other emerging contaminants above)

Continuity of National Outfall Database (NOD)

Provide continuity of the NOD by collecting outfall data for 2019 -2020 in similar format to previous years and releasing to decision makers and other end users.

The purpose of this milestone is to continue the NOD by collecting outfall data for 2019/2020 financial year in similar format as previous years.

Table 1. Gantt chart of NOD data collection for 2019/2020 financial year.

Year	2020	2021
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Month	December	January	February	March	April	May	June
Data collection	■						
Analysis			■				
Report				■			

The outcome report provides an analysis of the Australian coastal outfalls and ranks them according to the total flow volume and nutrients load to prioritise the potential degree of impact of each source to the environment and human health. Water quality data were collected from 43 Water Treatment Authorities (WTAs) around Australia (Figure 1) by either downloading the water quality data reports directly from WTA websites or by formally requesting the data through email.

Figure 1. The location of 185 wastewater discharge points managed by 43 water treatment authorities around Australia.



The pollutant contribution index, based on nitrogen and phosphorous loads, was calculated for each outfall. Nitrogen and phosphorous loads were calculated according to the Load Calculation Protocol of New South Wales Department of Environment and Climate Change. Outfalls were ordered from lowest to highest index value to rank them according to their

relative pollutant contribution to the coastal and marine environment. The index is based on a total nutrient load discharge using the variables of flow, nitrogen and phosphorous (Appendix 2).

In general, the outfalls contributing higher nitrogen and phosphorous loads vary more than those delivering lower loads. There may be many reasons for this, but it could be related to the capacities of the treatment plants and storm water management in urban areas, resulting in increased discharge at metropolitan outfall sites. There are some exceptions to this pattern with rural/regional sites contributing higher nutrient loads than urban areas. The reasons for them may vary, however, they may primarily be due to the conditions set out in their licenses. This ranking of nutrient loads from Australian outfalls by site at a national scale can therefore be useful in prioritizing treatment upgrade resources to manage biodiversity impacts and human health concerns.

Standard on National Outfalls Database Reporting – Baseline Standard Draft

Continue development of standards related outfall reporting (note: a milestone but not described in Project Plan).

The project progresses the findings from NODs⁴ previous work that sought input from WTAs on a proposed standard for outfall reporting (REF-Similar to Microplastics etc). A modified list of parameters to report on and a proposed report card concept is in Appendix 3.

By the end of June 21, the NOD will send these new proposals to regulatory authorities in each state and territory and consult with them to further refine the standards. Results will be discussed in the final report Sep 21.

⁴ Gemmill et al C4 Towards a national standard and guidelines for reporting wwtp outfall data_final https://www.nespmarine.edu.au/system/files/Gemmill%20et%20al%20C4%20Towards%20a%20national%20standard%20and%20guidelines%20for%20reporting%20wwtp%20outfall%20data_final.pdf

Appendix 1

NSW Riverine wastewater treatment plants.

Albury City Council	Hume Weir Village System	437	Albury City Council	Frank Zaknich	02 6023 8111	info@alburycity.nsw.gov.au
Albury City Council	Kremur Street Treatment Plant		Albury City Council			
Albury City Council	Lara Lakes System		Albury City Council			
Albury City Council	Waterview Treatment Plant		Albury City Council			
Armidale Regional Council	Armidale Dumaresq Cou	1722	Armidale Regional Council	James Roncon	1300 136 833	council@armidale.nsw.gov.au
Armidale Regional Council	Guyra Sewage Treatment	1671	Armidale Regional Council			
Ballina Shire Council	Alstonville Wastewater T	199	Ballina Shire Council	Paul Hickey	6686 4444	council@ballina.nsw.gov.au
Ballina Shire Council	Ballina Wastewater Treat	588	Ballina Shire Council			
Ballina Shire Council	Lennox Head Wastewater	590	Ballina Shire Council			
Ballina Shire Council	Wardell Wastewater Treat	5785	Ballina Shire Council			
Bathurst Regional Council	Bathurst Sewage Treatment	1647	Bathurst Regional Council	David Sherley	(02) 6333 6111	council@bathurst.nsw.gov.au
Bega Valley Shire Council	Bega Sewage Treatment	4120	Bega Valley Shire Council	Leanne Barnes	(02) 6499 2222	council@begavalley.nsw.gov.au
Bega Valley Shire Council	Bermagui Sewage Treatment	1738	Bega Valley Shire Council			
Bega Valley Shire Council	Eden Sewage Treatment	1740	Bega Valley Shire Council			
Bega Valley Shire Council	Merimula Sewage Treatment	1741	Bega Valley Shire Council			
Bega Valley Shire Council	Tathra Sewage Treatment	347	Bega Valley Shire Council			
Bega Valley Shire Council	Tura Beach Sewage Treatment	4367	Bega Valley Shire Council			
Bellingen Shire Council	Bellingen Wastewater Treatment	1274	Bellingen Shire Council	Liz Jeremy	02 6655 7315	council@bellingen.nsw.gov.au
Bellingen Shire Council	Dorrigo Wastewater Treatment	1273	Bellingen Shire Council			
Bellingen Shire Council	Urunga Wastewater Treatment	1275	Bellingen Shire Council			
Bland Shire Council	Bland Shire Sewage Treatment	4077	Bland Shire Council	Ray Smith	02 6972 2266	council@blandshire.nsw.gov.au
Blayney Shire Council	Blayney Sewage Treatment	1648	Blayney Shire Council	Glen Wilcox	(02) 6368 2104	council@blayney.nsw.gov.au
Bogan Shire Council	Nyngan Sewage Treatment	3298	Bogan Shire Council	Derek Francis	(02) 6835 9000	admin@bogan.nsw.gov.au
Bourke Shire Council	Bourke Sewage Treatment	11570	Bourke Shire Council	Leonie Brown/M	02 6830 8000	bourkeshire@bourke.nsw.gov.au
Brewarrina Shire Council	Brewarrina Sewage Treatment	1748	Brewarrina Shire Council	Jeff Sowiack	(02) 6830 5100	breshire@brewarrina.nsw.gov.au
Byron Shire Council	Bangalow Sewage Treatment	2522	Byron Shire Council	Ken Gainger	02 6626 7000	council@byron.nsw.gov.au
Byron Shire Council	Bruswick Valley STP	13266	Byron Shire Council			
Byron Shire Council	Byron Bay Sewage Treatment	3404	Byron Shire Council			
Byron Shire Council	Ocean Shores***	784	Byron Shire Council			
Cabonne Council	Canowindra Sewage Treatment	1750	Cabonne Council	Brad Byrnes	(02) 6392 3200	council@cabonne.nsw.gov.au
Cabonne Council	Molong Sewage Treatment	1623	Cabonne Council			
Campbelltown Council	Glenfield Sewage Treatment	372	Campbelltown Council	Lindy Deitz	(02) 4645 4000	council@campbelltown.nsw.gov.au
Central Coast Council	Mooney Mooney Sewage Treatment	12633	Central Coast Council	David Farmer	1300 463 954	ask@centralcoast.nsw.gov.au
Central Coast Council	Bataeu Bay Sewage Treatment	1942	Central Coast Council			
Central Coast Council	Charmhaven STP	2647	Central Coast Council			
Central Coast Council	Gwandalan STP	2647	Central Coast Council			
Central Coast Council	Kincumber STP	1802	Central Coast Council			
Central Coast Council	Manning Park STP	2647	Central Coast Council			
Central Coast Council	Toukley STP	2647	Central Coast Council			
Central Coast Council	Woy Woy STP	1802	Central Coast Council			
Central Coast Council	Wyangulla	2647	Central Coast Council			
Charlotte Pass Snow Resort	Perisher Valley Sewage Treatment	1591	Charlotte Pass Snow Resort	Lachlan Maclean	02 6457 1555	ski@charlottespass.com.au
City of Lithgow Council	Lithgow Sewage Treatment	236	City of Lithgow Council	Craig Butler	(02) 6354 9999	council@lithgow.nsw.gov.au
City of Lithgow Council	Portland Sewage Treatment	597	City of Lithgow Council			
City of Lithgow Council	Wallerawang Sewage Treatment	598	City of Lithgow Council			
Clarence Valley Council	Clarenza Sewage Treatment	2760	Clarence Valley Council	Ashley Lindsay	02 6643 0200	council@clarence.nsw.gov.au
Clarence Valley Council	Coutts Crossing STP	807	Clarence Valley Council			
Clarence Valley Council	Iluka Sewage Treatment	20323	Clarence Valley Council			
Clarence Valley Council	North Grafton Sewage Treatment	717	Clarence Valley Council			
Clarence Valley Council	Woodford Island Sewage Treatment	13195	Clarence Valley Council			
Clarence Valley Council	Yamba Sewage Treatment	1659	Clarence Valley Council			
Cobar Shire Council	Cobar Sewage Treatment	4324	Cobar Shire Council	Peter Vlatko	(02) 6836 5809	peter.vlatko@cobar.nsw.gov.au
Coffs Harbour City Council	Coff Harbour Sewage Treatment	573	Coffs Harbour City Council	Steve McGrath	02 6648 4102	coffs.council@chcc.nsw.gov.au
Coffs Harbour City Council	Corindi Sewage Treatment	573	Coffs Harbour City Council			
Coffs Harbour City Council	Moonee Sewage Treatment	573	Coffs Harbour City Council			
Coffs Harbour City Council	Woolgoolga Sewage Treatment	573	Coffs Harbour City Council			
Coonamble Shire Council	Gulgambone Sewage Treatment	350	Coonamble Shire Council	Hein Basson	02 6827 1900	council@coonambleshire.nsw.gov.au
Coonamble Shire Council	Coonamble Sewage Treatment	4085	Coonamble Shire Council			
Cootamundra-Gundagai Regional Council	Cootamundra Sewage Treatment	1603	Cootamundra-Gundagai Regional Council	Phil McMurray	1300 459 689	mail@cgrc.nsw.gov.au
Cootamundra-Gundagai Regional Council	Gundagai Sewage Treatment	1721	Cootamundra-Gundagai Regional Council			
Cowra Shire Council	Cowra Sewage Treatment	3648	Cowra Shire Council	Paul Devery	02 6340 2000	council@cowra.nsw.gov.au
Cowra Shire Council	Wyangala Sewage Treatment	20972	Cowra Shire Council			
Department of Planning Industry	Hill End Sewage Treatment	10074	Department of Planning Industry and Environment	Jim Betts	1300 305 695	ONLINE ENQUIRY
Department of Planning Industry	Kosciuszko Sewage Treatment	447	Department of Planning Industry and Environment			
Department of Planning Industry	Perisher Valley Sewage Treatment	1797	Department of Planning Industry and Environment			
Dubbo Regional Council	Dubbo Sewage Treatment	3850	Dubbo Regional Council	Dean Frost	(02) 6801 4000	council@dubbo.nsw.gov.au
Dubbo Regional Council	Wellington Sewage Treatment	3370	Dubbo Regional Council			
Edward River Council	Deniliquin Sewage Treatment	1694	Edward River Council	Phil Stone	03 5898 3000	council@edwardriver.nsw.gov.au
Broken Hill City Council	Wills Street Wastewater Treatment	3925	Essential Energy	John Cleland	13 23 91	communities@essentialenergy.com.au
Broken Hill City Council	South Wastewater Treatment	5067	Essential Energy			
Eurobodalla Shire Council	Batemans Bay Sewage Treatment	1397	Eurobodalla Shire Council	Catherine Dale	02 4474 1005	council@esc.nsw.gov.au
Eurobodalla Shire Council	Moruya Sewage Treatment	1614	Eurobodalla Shire Council			
Eurobodalla Shire Council	Narooma Sewage Treatment	1398	Eurobodalla Shire Council			
Eurobodalla Shire Council	Tomakin Sewage Treatment	2851	Eurobodalla Shire Council			
Eurobodalla Shire Council	Touross Sewage Treatment	3108	Eurobodalla Shire Council			

Appendix 1 (con.)

Federation Council	Corowa Sewage Treatment	835	Federation Council	Adrian Butler	(02) 6033 8999	council@federationcouncil.nsw.gov.au
Federation Council	Howlong Sewage Treatment	21287	Federation Council			
Federation Council	Mulwala Sewage Treatment	814	Federation Council			
Forbes Shire Council	Forbes Sewage Treatment	4809	Forbes Shire Council	Rodger Bailey	(02) 6850	Forbes@forbes.nsw.gov.au
Gilgandra Shire Council	Gilgandra Sewage Treatment	4640	Gilgandra Shire Council	David Neeves	(02) 6817 8800	council@gilgandra.nsw.gov.au
Glen Innes Severn Council	Glenn Innes Sewage Treatment	576	Glen Innes Severn Council	Craig Bennett	(02) 6730 2300	council@gisc.nsw.gov.au
Goulburn Mulwaree Council	Goulburn Sewage Treatment	1742	Goulburn Mulwaree Council	Warwick Bennett	02 4823 4444	council@goulburn.nsw.gov.au
Greater Hume Shire Council	Calcairn Sewage Treatment	3727	Greater Hume Shire Council	Steven Pinnuck	02 6036 0100	mail@greaterhume.nsw.gov.au
Greater Hume Shire Council	Henty Sewage Treatment	3726	Greater Hume Shire Council			
Greater Hume Shire Council	Holbrook Sewage Treatment	1804	Greater Hume Shire Council			
Greater Hume Shire Council	Walla Walla Sewage Treatment	2563	Greater Hume Shire Council			
Griffith City Council	Griffith Sewage System	1604	Griffith City Council	Brett Stonestreet	1300 176 077	admin@griffith.nsw.gov.au
Griffith City Council	Yenda Sewerage System	1402	Griffith City Council			
Gunnedah Shire Council	Gunnedah Sewage Treatment	831	Gunnedah Shire Council	Eric Groth	02 6740 2115	ericgroth@infogunnedah.com.au
Gwydir Shire Council	Bingara Sewerage Treatment	586	Gwydir Shire Council	Max Eastcott	02 6724 2000	mail@gwydir.nsw.gov.au
Gwydir Shire Council	Warialda Sewerage Treatment	584	Gwydir Shire Council			
Hawkesbury City Council	McGraths Hill Sewage Treatment	1684	Hawkesbury City Council	Elizabeth Richard	(02) 4560 4444	council@hawkesbury.nsw.gov.au
Hawkesbury City Council	South Windsor	3306	Hawkesbury City Council			
Hay Shire Council	Hay Sewage Treatment Plant	3520	Hay Shire Council	David Webb	(02) 6990 1100	mail@hay.nsw.gov.au
Hilltops Council	Murrumburrah Sewage Treatment	2866	Hilltops Council	Anthony O'Reilly	0428 600 436	anthony.o'reilly@hilltop.nsw.gov.au
Hilltops Council	Boorowa Sewage Treatment	1678	Hilltops Council			
Hilltops Council	Young Sewage Treatment	1624	Hilltops Council			
City of Lake Macquarie	Belmont Wastewater Treatment	1771	Hunter Water	Darren Cleary	1300 657 657	enquires@hunterwater.com.au
Port Stevens Council	Boulder Bay Wastewater Treatment	358	Hunter Water			
City of Cessnock	Branxton Wastewater Treatment	1680	Hunter Water			
City of Newcastle	Burwood Beach Wastewater Treatment	1683	Hunter Water			
City of Cessnock	Cessnock Wastewater Treatment	227	Hunter Water			
Dungog Shire Council	Clarence Town Wastewater Treatment	13250	Hunter Water			
City of Lake Macquarie	Dora Creek Wastewater Treatment	1771	Hunter Water			
Dungog Shire Council	Dungong Wastewater Treatment	4197	Hunter Water			
City of Lake Macquarie	Edgeworth Wastewater Treatment	1771	Hunter Water			
Port Stevens Council	Farley Wastewater Treatment	733	Hunter Water			
City of Maitland	Karuah Wastewater Treatment	10230	Hunter Water			
City of Cessnock	Kearsley Wastewater Treatment	3232	Hunter Water			
Cessnock City Council	Kurri Kurri Wastewater Treatment	1767	Hunter Water			
City of Maitland	Morpeth Wastewater Treatment	10693	Hunter Water			
Cessnock City Council	Paxton Wastewater Treatment	3755	Hunter Water			
Port Stevens Council	Raymond Terrace Wastewater Treatment	217	Hunter Water			
City of Newcastle	Shortland Wastewater Treatment	1683	Hunter Water			
Port Stevens Council	Taniba Bay Wastewater Treatment	4435	Hunter Water			
City of Lake Macquarie	Toronto Wastewater Treatment	1771	Hunter Water			
Inverell Shire Council	Ashford Sewage Treatment	580	Inverell Shire Council	Paul Henry	(02) 6728 8288	council@inverell.nsw.gov.au
Inverell Shire Council	Delungra Sewage Treatment	4114	Inverell Shire Council			
Inverell Shire Council	Inverell Sewage Treatment	718	Inverell Shire Council			
Jenolan Caves Reserve Trust	Jenolan Caves Sewage Treatment	1962	Jenolan Caves Reserve Trust	Peter Austen	1300 76 3311	reception@jenolancave.org.au
Junee Shire Council	Junee Wastewater Treatment	752	Junee Shire Council	James Davis	02 6924 8180	customerserviceteam@junee.nsw.gov.au
Kempsey Shire Council	Crescent Head Sewage Treatment	577	Kempsey Shire Council	Craig Milburn	02 6566 3200	Ksc@kempsey.gov.nsw.au
Kempsey Shire Council	Frederickton Sewage Treatment	363	Kempsey Shire Council			
Kempsey Shire Council	Gladstone Sewage Treatment	1781	Kempsey Shire Council			
Kempsey Shire Council	Hat Head Sewage Treatment	11874	Kempsey Shire Council			
Kempsey Shire Council	South Kempsey Sewage Treatment	720	Kempsey Shire Council			
Kempsey Shire Council	South West Rocks Sewage Treatment	2497	Kempsey Shire Council			
Kempsey Shire Council	West Kempsey Sewage Treatment	763	Kempsey Shire Council			
Kosciuszko Thredbo PTY. LTD.	Thredbo Sewage Treatment	1599	Kosciuszko Thredbo PTY. LTD.		02-6459-4294	info@thredbo.com.au
Kyogle Council	Bonalbo Sewerage System	833	Kyogle Council	Graham Kennett	(02) 6632 1611	council@kyogle.nsw.gov.au
Kyogle Council	Kyogle Sewage Treatment	832	Kyogle Council			
Kyogle Council	Kyogle Sewerage System	832	Kyogle Council			
Kyogle Council	Woodenbong Sewerage System	834	Kyogle Council			
Lachlan Shire Council	Condoblin Sewage Treatment	4480	Lachlan Shire Council	Greg Tory	02 6895 1900	greg.tory@lachlan.nsw.gov.au
Leeton Shire Council	Leeton Sewerage System	1602	Leeton Shire Council	Jackie Kruger	02 6955 6384	council@leeton.nsw.gov.au
Leeton Shire Council	Yanco Sewerage Treatment	399	Leeton Shire Council			
Lismore City Council	East Lismore Sewage Treatment	725	Lismore City Council	Peter Jeuken	(02) 6625 0500	lismore@lismore.nsw.gov.au
Lismore City Council	Nimbin Sewage Treatment	4468	Lismore City Council			
Lismore City Council	South Lismore Sewage Treatment	844	Lismore City Council			
Liverpool City Council	Liverpool Sewage Treatment	372	Liverpool City Council	Eddie Jackson	1300 36 2170	lcc@liverpool.nsw.gov.au
Liverpool Plains Shire Council	Quirindi Sewage Treatment	806	Liverpool Plains Shire Council	Joanne Sangster	02 6746 1755	lpcc@lpcc.nsw.gov.au
Liverpool Plains Shire Council	Werris Creek Sewer Treatment	575	Liverpool Plains Shire Council			
Lockhart Shire Council	Lockhart Sewage Treatment	1705	Lockhart Shire Council	Peter Ceneris	02 6920 5305	mail@lockhart.nsw.gov.au
Lockhart Shire Council	The Rock Sewage Treatment	1639	Lockhart Shire Council			

Appendix 1 (con.)

MidCoast County Council	Blahdelah Sewage Treat	5305	MidCoast County Council	Adrian Panuccio	02 7955 7777	council@midcoast.nsw.gov.au
MidCoast County Council	Cooperook Sewage Tre	12583	MidCoast County Council			
MidCoast County Council	Dawson Sewage Treatme	2531	MidCoast County Council			
MidCoast County Council	Forster Sewage Treatme	2562	MidCoast County Council			
MidCoast County Council	Gloucester Sewage Treat	721	MidCoast County Council			
MidCoast County Council	Hallidays Point Sewage T	3175	MidCoast County Council			
MidCoast County Council	Harrington Sewage Treat	2505	MidCoast County Council			
MidCoast County Council	Hawks Nest Sewage Trea	5909	MidCoast County Council			
MidCoast County Council	Lasdowne Sewage Treatr	12586	MidCoast County Council			
MidCoast County Council	Old Bar Sewage Treatme	2391	MidCoast County Council			
MidCoast County Council	Stroud Sewage Treatment	13042	MidCoast County Council			
MidCoast County Council	Wingham Sewage Treatm	1581	MidCoast County Council			
Mid-Western Regional Council	Gulgong Sewage Treatme	5808	Mid-Western Regional C	Brad Cam	1300 765 002	council@midwestern.nsw.gov.au
Mid-Western Regional Council	Kandos Sewage Treatment	1737	Mid-Western Regional Council			
Mid-Western Regional Council	Mudgee Sewage Treatment	5230	Mid-Western Regional Council			
Mid-Western Regional Council	Rylstone Sewage Treatment	1958	Mid-Western Regional Council			
Moree Plains Shire Council	Moree Sewage Treatment	723	Moree Plains Shire Cou	Lester Rodgers	02 6753 2389	councilmpsc.nsw.gov.au
Murray River Council	Moama Sewer Treatment	11505	Murray River Council	Terry Dodds	1300 087 004	admin@murrayriver.nsw.gov.au
Murrumbidgee Council	Darling Point Sewage Tre	6260	Murrumbidgee Council	John Scarce	1300 676 243	mail@murrumbidgee.nsw.gov.au
Murrumbidgee Council	Jerilderie Sewage treatm	1692	Murrumbidgee Council			
Muswellbrook Shire Council	Demans Sewage Treatment	5059	Muswellbrook Shire Cou	Fiona Plesman	02 6549 3700	council@muswellbrook.nsw.gov.au
Muswellbrook Shire Council	Muswellbrook Sewage Tr	1593	Muswellbrook Shire Council			
Nambucca Valley Council	Bowraville Sewage Treatr	587	Nambucca Valley Council	Michael Coulter	02 6568 2555	council@nambucca.nsw.gov.au
Nambucca Valley Council	Macksville Sewage Treatr	579	Nambucca Valley Council			
Nambucca Valley Council	Nambucca Sewage Treatr	803	Nambucca Valley Council			
Nambucca Valley Council	Scotts Head Sewage Trea	2564	Nambucca Valley Council			
Narrabri Shire Council	Narrabri Sewage Treatment	200	Narrabri Shire Council	Stewart Todd	0 6799 6866	council@narrabri.nsw.gov.au
Narrandera Shire Council	Narrandera Sewage Trea	836	Narrandera Shire Cou	George Cowan	02 6959 2700	council@narrandera.nsw.gov.au
Narrromine Shire Council	Narrromine Sewage Treat	11715	Narrromine Shire Cou	Jane Redden	02 6889 9999	mail@narrromine.nsw.gov.au
NSW Crown Holiday Parks Trust	Wyangala Dam Sewage T	4471	NSW Crown Holiday Par	Mark Martin	(02) 4237 8589	ONLINE ENQUIRY
Oberon Council	Oberon Sewage Treatment	1644	Oberon Council	Gary Wallace	02 6329 8100	council@oberon.nsw.gov.au
Orange City Council	Orange Sewage Treatment	1646	Orange City Council	David Waddell	02 6393 8000	council@orange.nsw.gov.au
Orange City Council	Spring Hill Sewage Treatr	3686	Orange City Council			
Parkes Shire Council	Parkes Sewage Treatment	5655	Parkes Shire Council	Kent Boyd	02 68612333	council@parkes.nsw.gov.au
Perisher Blue PTY Limited	Perisher Blue Sewage Tre	2274	Perisher Blue PTY Limited			ONLINE ENQUIRY
Port Macquarie Hastings Council	Lake Cathie/Bonny Hills S	594	Port Macquarie Hastings	Clare Allen	02 6581 8111	council@pmgc.nsw.gov.au
Port Macquarie Hastings Council	Port Macquarie Sewage Tr	589	Port Macquarie Hastings Council			
Port Macquarie Hastings Council	Dunbogan Sewage Treatr	805	Port Macquarie Hastings Council			
Port Macquarie Hastings Council	Wauchope Sewage Treat	804	Port Macquarie Hastings Council			
Port Macquarie Hastings Council	Kew Sewaget Treatment	10339	Port Macquarie Hastings Council			
Queanbeyan-Palerang Regional	Captain Flats Sewage Tre	1929	Queanbeyan-Palerang R	Peter Tegart	1300 735 025	council@qprc.nsw.gov.au
Queanbeyan-Palerang Regional	Queanbeyan Sewage Tre	201	Queanbeyan-Palerang Regional Council			
Queanbeyan-Palerang Regional	Braidwood Sewage Treat	1733	Queanbeyan-Palerang Regional Council			
Queanbeyan-Palerang Regional	Googong Sewage Treatm	20188	Queanbeyan-Palerang Regional Council			
Richmond Valley Council	Coraki Sewage Treatment	351	Richmond Valley Council	Vaughan MacDor	02 6660 0300	council@richmondvalley.nsw.gov.au
Richmond Valley Council	Casino Wastewater Treat	585	Richmond Valley Council			
Shoalhaven City Council	Sussex Inlet Sewage Trea	3936	Shoalhaven City Council	Robert Horner,	02 4429 3111	council@shoalhaven.nsw.gov.au
Shoalhaven City Council	Shoalhaven Heads Sewag	4128	Shoalhaven City Council			
Shoalhaven City Council	Culburra Beach Sewage T	2419	Shoalhaven City Council			
Shoalhaven City Council	Ulladulla Sewage Treatm	446	Shoalhaven City Council			
Shoalhaven City Council	Nowra Sewage Treatment	1734	Shoalhaven City Council			
Shoalhaven City Council	Bomaderry Sewage Treat	1735	Shoalhaven City Council			
Shoalhaven City Council	Berry Sewage Treatment	1736	Shoalhaven City Council			
Shoalhaven City Council	Bendalong Sewage Treat	12357	Shoalhaven City Council			
Singleton Council	Glenriding Sewage Trea	3088	Singleton Council	Jason Linnane	02 6578 7290	council@singleton.nsw.gov.au
Snowy Monaro Regional Council	Adaminaby Sewerage Tre	450	Snowy Monaro Regiona	Peter Bascomb	1300 345 345	council@snowymonaro.nsw.gov.au
Snowy Monaro Regional Council	Berridale Sewerage Treat	456	Snowy Monaro Regional Council			
Snowy Monaro Regional Council	Bombala Sewage Treatm	1752	Snowy Monaro Regional Council			
Snowy Monaro Regional Council	Cooma-The Glen Wastew	6368	Snowy Monaro Regional Council			
Snowy Monaro Regional Council	Jindabyne Sewage Treatr	773	Snowy Monaro Regional Council			
Snowy Monaro Regional Council	Nimmitabel Wastewater	1392	Snowy Monaro Regional Council			
Snowy Valleys Council	Adelong Sewage Treatment	1773	Snowy Valleys Council	Matthew Hyde	1300 275 782	info@svc.nsw.gov.au
Snowy Valleys Council	Batlow Sewage Treatment	1774	Snowy Valleys Council			
Snowy Valleys Council	Brungle Sewage Treatment	12351	Snowy Valleys Council			
Snowy Valleys Council	Talbingo Sewage Treatment	5119	Snowy Valleys Council			
Snowy Valleys Council	Tumbarumba Sewage Tre	448	Snowy Valleys Council			
Snowy Valleys Council	Tumut Sewage Treatment	210	Snowy Valleys Council			

Appendix 1 (con.)

City of Wollongong	Bellambi	1775	Sydney Water	Roch Cheroux	13 20 92	ONLINE ENQUIRY
The Council of the Municipality of	Bombo Sewage Treatment	2269	Sydney Water			
Waverly Council	Bondi Sewage Treatment	1688	Sydney Water	Roch Cheroux		
Hornsby Shire Council	Brooklyn	12438	Sydney Water	Roch Cheroux		
Hills Shire Council	Castle Hill	1725	Sydney Water			
Sutherland Shire Council	Cronulla	1728	Sydney Water	Roch Cheroux		
Fairfield City Council	Fairfield Sewage Treatment	372	Sydney Water	Roch Cheroux		
Hornsby Shire Council	Hornsby Heights	750	Sydney Water	Roch Cheroux		
City of Randwick	Malabar	372	Sydney Water	Roch Cheroux		
Northern Beaches Council	North Head	378	Sydney Water	Roch Cheroux		
Hawkesbury City Council	North Richmond	190	Sydney Water	Roch Cheroux		
City of Penrith	Penrith Sewage Treatment	1409	Sydney Water			
Wollondilly Shire Council	Picton	10555	Sydney Water			
City of Wollongong	Port Kembla	218	Sydney Water	Roch Cheroux		
City of Blacktown	Quakers Hill	1724	Sydney Water			
City of Blacktown	Riverstone	1796	Sydney Water	Roch Cheroux		
Hills Shire Council	Rousehill	4965	Sydney Water	Roch Cheroux		
City of Shellharbour	Shellharbour	211	Sydney Water	Roch Cheroux		
City of Penrith	St Mary's Advanced Water	1729	Sydney Water	Roch Cheroux		
City of Penrith; Liverpool City Council	Wallacia	12235	Sydney Water	Roch Cheroux		
Northern Beaches Council	Warriewood	1784	Sydney Water	Roch Cheroux		
Campbelltown Council	West Camden	1675	Sydney Water	Roch Cheroux		
Hornsby Shire Council	West Hornsby	1695	Sydney Water	Roch Cheroux		
Blue Mountains City Council	Winnalee	1963	Sydney Water	Roch Cheroux		
Tamworth Regional Council	Barraba Sewage Treatment	604	Tamworth Regional Council	Paul Bennett	(02) 6767 5555	trc@tamworth.nsw.gov.au
Tamworth Regional Council	Manilla Sewage Treatment	829	Tamworth Regional Council			
Tamworth Regional Council	Tamworth Sewage Treatment	1600	Tamworth Regional Council			
Tamworth Regional Council	Tamworth Sewage Treatment	1600	Tamworth Regional Council			
Temora Shire Council	Temora Sewage Treatment	2523	Temora Shire Council	Gary Levelle	428216057	glavelle@temora.nsw.gov.au
Tenterfield Shire Council	Urbenville Sewage Treatment	4306	Tenterfield Shire Council	Kylie Smith	02 6736 6000	council@tenterfield.nsw.gov.au
Tenterfield Shire Council	Tenterfield Sewage Treatment	4305	Tenterfield Shire Council			
Tweed Shire Council	Banora Point Wastewater Treatment		Tweed Shire Council	Troy Green	02 6670 2400	tsc@tweed.nsw.gov.au
Tweed Shire Council	Hastings Point Wastewater	3618	Tweed Shire Council			
Tweed Shire Council	Kingscliff Wastewater Treatment Plant		Tweed Shire Council			
Tweed Shire Council	Mooball Wastewater Treatment	20172	Tweed Shire Council			
Tweed Shire Council			Tweed Shire Council			
Tweed Shire Council			Tweed Shire Council			
Tweed Shire Council			Tweed Shire Council			
Tweed Shire Council	Murwillumbah Wastewater	582	Tweed Shire Council			
Upper Hunter Shire Council	Aberdeen Sewage Treatment	827	Upper Hunter Shire Council	Greg McDonald	02 6540 1100	council@upperhunter.nsw.edu.au
Upper Hunter Shire Council	Merrima Sewage Treatment	4661	Upper Hunter Shire Council	Greg McDonald	02 6540 1100	
Upper Hunter Shire Council	Scone Sewage Treatment	2654	Upper Hunter Shire Council	Greg McDonald	02 6540 1100	
Upper Lachlan Shire Council	Crookwell Sewage Treatment	1938	Upper Lachlan Shire Council		(02) 4830 1000	council@upperlachlan.nsw.gov.au
Upper Lachlan Shire Council	Gunning Sewage Treatment	3110	Upper Lachlan Shire Council		(02) 4830 1000	
Uralla Shire Council	Uralla Sewage Treatment	1626	Uralla Shire Council	Kate Jessup	(02) 6778 6300	council@uralla.nsw.gov.edu.au
Veolia Water Australia PTY LTD	Gerroa STP	11317	Veolia Water Australia PTY LTD			
Veolia Water Solutions and Tech	Wilton STP	20335	Veolia Water Solutions and Tech	Vincent Caillaud		ONLINE ENQUIRY
Wagga Wagga City Council	Bomen Industrial Pre-treatment	393	Wagga Wagga City Council	Peter Thompson	(02) 6926 9121	council@wagga.nsw.gov.au
Wagga Wagga City Council	Forest Hill Sewage Treatment Plant		Wagga Wagga City Council			
Wagga Wagga City Council	Narrung Street Sewage Treatment	392	Wagga Wagga City Council			
Walcha Council	Walcha Sewage Treatment	2613	Walcha Council	Chris Weber	02 6774 2500	council@walcha.nsw.gov.au
Walgett Shire Council	Walgett Sewage Treatment	13056	Walgett Shire Council	Michael Urquhart	02 6828 6100	admin@walgett.nsw.gov.au
Warren Shire Council	Warren Sewage Treatment	2384	Warren Shire Council	Gary Woodman	02 6847 6600	council@warren.nsw.gov.au
Warrumbungle Shire Council	Baradine Sewer	5950	Warrumbungle Shire Council	Steve Loan	(02) 6378 5000	info@warrumbungle.nsw.gov.au
Warrumbungle Shire Council	Coolah Sewage Treatment	4445	Warrumbungle Shire Council			
Warrumbungle Shire Council	Coonabarrabran Sewer	1744	Warrumbungle Shire Council			
Warrumbungle Shire Council	Dunedoo Sewer	1747	Warrumbungle Shire Council			
Weddin Shire Council	Grenfell Sewage Treatment	1732	Weddin Shire Council	Glen Carroll	02 6343 1212	mail@weddin.nsw.gov.au
Wentworth Shire Council	Gol Gol Sewage Treatment	10639	Wentworth Shire Council			
Wentworth Shire Council	Cadell Street Sewage Treatment	5566	Wentworth Shire Council			council@wentworth.nsw.gov.au
Wentworth Shire Council	Wentworth Sewage Treatment	3342	Wentworth Shire Council			
Wingecarribee Shire Council	Berrima Sewage Treatment	3575	Wingecarribee Shire Council	Lisa Miscamble	(02) 4868 0888	mail@wsc.nsw.gov.au
Wingecarribee Shire Council	Bowral Sewage Treatment	1749	Wingecarribee Shire Council			
Wingecarribee Shire Council	Bundanoon Sewage Treatment	2436	Wingecarribee Shire Council			
Wingecarribee Shire Council	Mittagong Sewage Treatment	10362	Wingecarribee Shire Council			
Wingecarribee Shire Council	Moss Vale Sewage Treatment	1731	Wingecarribee Shire Council			
Wingecarribee Shire Council	Robertson Sewage Treatment	20205	Wingecarribee Shire Council			
Yanco Agricultural High School	Yanco Sewerage Treatment	4162	Yanco Agricultural High School	Daryl Finch (Principal)	02 69511 500	yancoag-h.school@det.nsw.edu.au
Yass Valley Council	Murrumbateman Sewerage	20844	Yass Valley Council	Chris Berry	02 6226 1477	council@yass.nsw.gov.au
Yass Valley Council	Yass Sewerage System	1730	Yass Valley Council			
Zoological Parks Board of NSW	Mosman Sewage Treatment	1677	Zoological Parks Board of NSW		(02) 9969 2777	tz@zoo.nsw.gov.au

Appendix 2

The results showed that total nutrient load from individual outfalls sites around Australia ranged from 12 to 6,934,136 kg, with a mean of 164,551 kg (Table 1). The ranked loads throughout Australia were mapped by quartiles. The top quartile (lowest nutrient load) of outfalls seems to be more prevalent in regional areas and discharge less nitrogen and phosphorus loads into the coastal and marine environment. The bottom quartile, on the other hand, with higher nutrient loads principally occur around the major cities. The phosphorous concentrations contribute less to the overall outfall nutrient load and vary less between outfall sites. Nitrogen, on the other hand has a higher median contribution and high variability across the sites.

Table 1. Top (green) and bottom (red) quartiles of outfall ranking for 2019/2020 financial year data.

Outfall	Nutrients Load (kg)	State	Rank
Christies Beach - Southern	12	South Australia	1
Iluka	15	New South Wales	2
Beaconsfield	32	Tasmania	3
Swansea	42	Tasmania	4
Crescent Head	51	New South Wales	5
Bicheno	151	Tasmania	6
Bundaberg North	164	Queensland	7
Cambridge	185	Tasmania	8
Port Welshpool	287	Victoria	9
Rokeby	291	Tasmania	10
Cocos (Keeling) Island	391	Western Australia	11
Sisters Beach	403	Tasmania	12
Triabunna	419	Tasmania	13
Toora	436	Victoria	14
Christmas Island	508	Western Australia	15
Wickham	522	Western Australia	16
Boat Harbour	543	Tasmania	17
Busselton (North)	561	Western Australia	18
St Helens	626	Tasmania	19
Port Arthur	631	Tasmania	20
Bermagui	1,010	New South Wales	21
Karana Downs	1,016	Queensland	22
Dover	1,080	Tasmania	23
Beauty Point	1,121	Tasmania	24
Merimbula	1,210	New South Wales	25
Port Douglas	1,620	Queensland	26
Bowen	1,824	Queensland	27
Risdon	1,936	Tasmania	28
Stanley	2,423	Tasmania	29
Orford	2,513	Tasmania	30
Long Nose (Tomakin)	2,588	New South Wales	31
Landsborough	2,657	Queensland	32
Cygnet	2,740	Tasmania	33

Outfall	Nutrients Load (kg)	State	Rank
Currie	2,907	Tasmania	34
Cannonvale	2,929	Queensland	35
Rockhampton North	38,354	Queensland	106
Christies Beach - Northern	46,220	South Australia	107
Lorne	46,717	Victoria	108
Altona	51,912	Victoria	109
Merrimac	52,066	Queensland	110
Bunbury	52,316	Western Australia	111
Gibson Island	52,354	Queensland	112
Cameron Bay	54,120	Tasmania	113
Apollo Bay	57,729	Victoria	114
Elanora	63,023	Queensland	115
Newnham	65,998	Tasmania	116
Bolivar High Salinity	67,840	South Australia	117
Smithton	68,174	Tasmania	118
Loganholme	68,620	Queensland	119
Anglesea	101,003	Victoria	120
Coombabah	101,969	Queensland	121
Boags Rock (Boneo, Mt Martha, Somers)	102,068	Victoria	122
Prince of Wales	152,605	Tasmania	123
Oxley	156,658	Queensland	124
Macquarie Point	160,696	Tasmania	125
Ti-tree Bend	207,249	Tasmania	126
Warrnambool	210,031	Victoria	127
Pardoe	239,581	Tasmania	128
Glenelg	243,404	South Australia	129
Kawana	260,974	Queensland	130
Winnie Bay (Kincumber)	285,982	New South Wales	131
Bolivar WWTP	366,621	South Australia	132
Subiaco	421,021	Western Australia	133
Luggage Point	448,070	Queensland	134
Point Peron	517,419	Western Australia	135
Beenyup	681,269	Western Australia	136
Woodman Point	1,011,506	Western Australia	137
Boags Rock (Eastern Treatment Plant)	3,479,639	Victoria	138
Werribee (Western Treatment Plant)	5,103,568	Victoria	139
Black Rock	6,934,136	Victoria	140

Appendix 3

Table 1 Parameters

Outfall Details (As per outfall.info)								
	Organisation Details							
	Mixing zone							
	Location							
	Population /Connections							
	Licensed capacity of Outfall							
Parameters (As per what we collect now)						Yearly Totals	Monthly Averages	Daily Flow
	Priority (Definition?) A,B,C							
	A	Outfall Flow volume	ML					
	B	Influent Flow Volume	ML					
	C	pH	pH					
	B	Total dissolved solids	mg/L					
	B	Total suspended solids	mg/L					
	A	Total phosphorus	mg/L					
	A	Total nitrogen	mg/L					
	A	Oil and grease	mg/L					
	C	Surfactants (MBAS)	mg/L					
	C	E. coli	org/100mL					
	B	Enterococci	org/100mL					
	B	Faecal coliforms	org/100mL					
	C	Turbidity	NTU					
	C	Colour	Pt. Co. Units					
	C		Frequency					
	C		Frequency					
Incidents		Description	Further Information (Links etc.)					
	Out of license events							
	Community interactions							
	Algal blooms							
	Blue green algal bloom							
Future Changes and Key Dates Governance								
	Capital Works affecting process							
	Proposed Variation to License							
	License History (Variations etc.)							
	Community Notification Policy							
Emerging Contaminants								
	Results (if measured)							
	Participating in Research							
	Links to Papers							
Recycling								
	Details and Methodology							

Table 2 Report Card

Feature to Display	Information Listed	Pictorial Representation
Outfall location		Coordinate point
Treatment level/process	Primary, Secondary, Tertiary, Advanced Tertiary	
Water quality compared to class A+ recyclable		4 Shaded drops
Outfall type	Deep ocean	Symbol
	Coastal/estuary	Symbol
	River	Symbol
Treatment plant capacity	% Influent capacity (influent volume/capacity)	Visual % representation.
Influent received	Actual flow received per day	Olympic swimming pools or other relatable volume
Population serviced		People
Effluent discharged		Olympic swimming pools or other relatable volume
Nutrient load		Containers of Food/Protein
Key pollutants/issues related to specific to outfall	e.g., Warriewood heavy rain events, Warrnambool: cotton buds phosphorus etc.	List eg e-coli, phosphorus, pH.
Emerging contaminant load	Are these being addressed or monitored? If so how and link to data.	Question Mark
Water Recycling	Percentage of Water Recycled	Recycled symbol
Size of mixing zone (Compromised Beneficial Use)	Description	Shaded area of mixing zone on map
Future changes or proposals that may affect discharge e.g., Capital works, License changes or anything else that might change pollutant load	Key dates and description of change and regulatory requirements	A suitable symbol for change