

Environmental Protection (Water and Wetland Biodiversity) Policy 2019

Great Barrier Reef River Basins

End-of-Basin Load Water Quality Objectives

Great Barrier Reef Basins 101–138 (excluding basins 115, 123, 131 and 139)

Prepared by: Environmental Policy and Programs Division, Department of Environment and Science

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Contents

	List of tables	iii
1	Dictionary	1
2	Preamble.....	3
3	Introduction.....	3
	3.1 Purpose	4
	3.2 Waters to which this document applies.....	4
	3.3 Information about mapped areas and boundaries	4
4	Environmental Values and management intent.....	5
	4.1 Environmental values	5
	4.2 Management intent for waters.....	5
5	Water Quality Objectives (WQOs) to protect environmental values.....	5
	5.1 End-of-basin load Reef WQOs.....	5
	5.2 Source of the Reef WQOs	5
	5.3 End-of-basin anthropogenic load Reef WQOs.....	6

List of tables

Table 1: Annual end-of-basin load WQOs for anthropogenic dissolved inorganic nitrogen and fine sediments in the Great Barrier Reef catchment to be achieved by 2025.	6
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1 Dictionary

Anthropogenic loads are pollutant loads derived from human-based activities (e.g. sewage treatment, fertiliser application).

Aquatic ecosystems is defined in the EPP Water and means a community of organisms living within or adjacent to water, including riparian or foreshore areas.

Basin, followed by a number, is defined in the EPP Water and means the river basin of that number described in 'Australia's River Basins 1997', 3rd edition, published by Geoscience Australia, Commonwealth of Australia, in 2004.

End-of-basin loads in this document are the average annual anthropogenic loads of key pollutants (nutrient and sediment) for the river basins that drain into the Reef.

Biological integrity, of water, is defined in the EPP Water and means the ability of the water to support and maintain a balanced, integrative, adaptive community of organisms having a species composition, diversity and functional organisation comparable to that of the natural habitat of the locality in which the water is situated.

Ecological health (defined in the Australian Water Quality Guidelines) means the 'health' or 'condition' of an ecosystem. It is the ability of an ecosystem to support and maintain key ecological processes and organisms so that their species compositions, diversity and functional organisations are as comparable as possible to those occurring in natural habitats within a region (also termed ecological integrity).

Environmental value (EV) is defined in the *Environmental Protection Act 1994* to mean:

- a) a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or
- b) another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

EPP Water means the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*.

Fine sediment, measured as total suspended solids, is any sediment fraction in water that measures less than 16 µm. Fine sediment is one of the parameters for which Reef water quality targets are set in the Reef 2050 Water Quality Improvement Plan. Given its small size, fine sediment is transported the furthest in the marine environment, leading to increased turbidity and reduced light availability. When compared to other sediment fractions, fine sediments pose the greatest risk to the Reef.

Great Barrier Reef (the Reef) in this document means the Great Barrier Reef World Heritage Area.

Management goals are outlined in the EPP Water and are the measures or statements that are used to assess whether the EVs are being maintained (e.g. to maintain an area, composition and condition of seagrass beds).

Management intent for a water means the management intent defined in section 4.2 of this document.

Mean high water spring (defined by Maritime Safety Queensland) means the long-term mean of the heights of two successive high waters during those periods of 24 hours (approximately once a fortnight) when the range of tide is greatest, during full and new moon.

Nutrients are the natural chemical elements and compounds that plants and animals need to grow. Carbon, hydrogen and oxygen are abundant nutrients in nature, but nitrogen and phosphorus are not always so freely available. They promote plant growth, making increased levels (e.g. from excess fertilisers) an issue for water quality.

NWQMS means the National Water Quality Management Strategy.

Reef see Great Barrier Reef.

Reef catchment has the same meaning as *Great Barrier Reef catchment* in section 75 of the *Environmental Protection Act 1994*. (Note: the catchment includes the 35 mainland river basins draining into the Reef and is defined by reference to a map which is published on the Department of Environment and Science website).

Reef 2050 Water Quality Improvement Plan (Reef 2050 WQIP) is the Plan that aligns with the Reef 2050 Long-Term Sustainability Plan. It includes actions to address all land-based sources of water pollution, including from agricultural, urban, industry and public lands. This Plan sets targets for improving water quality for the 35 river basins in the Reef catchment (i.e. Reef water quality targets).

Reef water quality targets has the same meaning as the definition in the Reef 2050 Water Quality Improvement Plan.

Reef WQOs are the end-of-basin load WQOs shown in Table 1 of this document. Note: the Reef WQOs were developed to protect aquatic ecosystem EVs.

Total suspended solids (TSS) means sediments that can be derived from both natural and modified landscapes through erosion and can be present in various forms of water. Total suspended solids is an indicator of particulate matter in water.

Water quality refers to the chemical, physical, biological and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and/or to any human need or purpose.

Water Quality Objectives (WQOs) are defined in the EPP Water and are the objectives identified under section 11 for protecting the EVs for the water. In essence, they are long-term goals for water quality management that protect the EVs. They may define what the water quality should be to protect the EVs and can be defined for a range of physical, chemical and biological characteristics of the water (e.g. nitrogen, total suspended solids, dissolved oxygen, turbidity and macroinvertebrates).

Waters is defined in the EPP Water and includes the bed and banks of waters, surface water and groundwater. The EPP Water definition does not limit the *Acts Interpretation Act 1954* of **Queensland Waters**, which are all waters that are –

- a) within the limits of the state; or
- b) coastal waters of the state.

2 Preamble

The Reef catchment is made up of 35 major river basins that stretch from Cape York in the north to the Burnett Mary in the south, draining an area larger than the size of Japan directly into the Reef lagoon.

Since European settlement, the Reef catchment has been transformed because of land modification associated with population growth, urban development and agricultural expansion. Land modification is one of the leading causes of declining Reef water quality, contributing excess nutrients, pesticides and sediment into the reef ecosystem, impeding its ability to withstand and recover from climate change.

Successive reports since the late 1990's show declining trends in the health of the Reef. The Reef 2050 WQIP sets river basin water quality targets (e.g. 30% reduction of anthropogenic fine sediment in the Herbert River basin) aimed at reducing the current sediment, nutrient and pesticide pollution loads. This enables better prioritisation of actions to ensure that impacts on aquatic ecosystems are prevented or minimised.

The Reef WQOs are derived from the Reef 2050 WQIP's targets, however, they are represented as annual anthropogenic pollutant load limits (e.g. no more than 232,000 tonnes of anthropogenic fine sediment leaving the Herbert River basin in a year). The Reef WQOs will help guide licence conditions for environmentally relevant activities that release nutrients or sediment to land or water within the Reef catchment. This will help ensure that new activities in the Reef catchment do not jeopardise the progress made to date towards meeting the water quality targets in the Reef 2050 WQIP. The Reef water quality targets, and consequently the WQOs, will be reviewed every five years to maintain adequacy and currency.

3 Introduction

This document is made under the EPP Water. The EPP Water is the principal legislative instrument in Queensland for water quality management. The EPP Water is subordinate legislation created under the *Environmental Protection Act 1994* and aims to protect waters whilst supporting ecologically sustainable development.

The EPP Water provides a framework for:

- (a) identifying the EVs for waters and wetlands to be enhanced or protected; and
- (b) identifying management goals for waters; and
- (c) stating water quality guidelines and WQOs for enhancing or protecting the EVs of waters; and
- (d) providing a framework for making consistent, equitable and informed decisions about waters; and
- (e) monitoring and reporting on the conditions of waters.

For further information on EVs and WQOs under the EPP Water, please refer to the Department of Environment and Science website.

3.1 Purpose

The purpose of this document is to establish locally relevant anthropogenic load-based Reef WQOs for each mainland river basin located within the Reef catchment. Achievement of the Reef WQOs will contribute to the protection of the Reef aquatic ecosystem EV, including coral reef, mangrove and seagrass. The Reef WQOs are expressed as end-of-basin anthropogenic loads for dissolved inorganic nitrogen and fine sediment¹ to be achieved by 2025. The loads reflect a reduction from current anthropogenic loads.

The WQOs are used to help set conditions for activities regulated under the *Environmental Protection Act 1994* and may influence local government planning schemes. This document forms part of a suite of documents that establish locally relevant WQOs. The WQOs are refined from national² and state water quality guidelines. This document is made under s 11(4) of the EPP Water. Other documents can be found in schedule 1 of the EPP Water and are available on the Department of Environment and Science website.

3.2 Waters to which this document applies

This document applies to all waters in the Reef catchment³.

This means that it will apply to all fresh and estuarine surface waters draining to the Reef (basins 101–138⁴). This document does not apply to island river basins 115, 123, 131 and 139.

3.3 Information about mapped areas and boundaries

The Reef catchment map is prescribed in the *Environmental Protection Regulation 2019* and published on the Department of Environment and Science website.

The Department of Environment and Science website also has a search tool where a lot on plan search can be done to check if the property is within the Reef catchment and, if so, which river basin.

In addition, the GIS dataset for the boundaries of the Reef catchment map may be downloaded free of charge from the Queensland Spatial Catalogue (QSpatial).

For further information, please email the department at evinfo@des.qld.gov.au

¹ In this document, fine sediments are measured as total suspended solids.

² ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines

³ Note: the Reef catchment is defined by reference to a map which is published on the Department of Environment and Science website

⁴ Australia's River Basins 1997—Product User Guide. Published by Geoscience Australia. Canberra, ACT (3rd edition, 2004).

4 Environmental Values and management intent

4.1 Environmental values

This document does not prescribe EVs for the Reef river basins. The EVs for the Reef river basins, as per section 6 of the EPP Water, are the EVs prescribed in the EPP Water or the EVs stated in section 6(2).

The dictionary located within this document provides further explanation on EVs (refer to section 1).

4.2 Management intent for waters

The management intent for waters is outlined in section 15 of the EPP Water.

In the context of the Reef catchments, this is to ensure that the quality of the water leaving the Reef catchment has no detrimental impact on the health or resilience of the Reef. This aim is supported by setting end-of-basin anthropogenic load Reef WQOs for dissolved inorganic nitrogen and fine sediment. The Reef WQOs in this document will ensure that the dissolved inorganic nitrogen and fine sediment targets in the Reef 2050 WQIP are reflected in legislation and contribute to the protection of Reef aquatic ecosystems.

5 Water Quality Objectives (WQOs) to protect environmental values

5.1 End-of-basin load Reef WQOs

This section provides end-of-basin (anthropogenic) load Reef WQOs to support and protect the Reef aquatic ecosystems. Anthropogenic loads are those pollutants derived from human-based activities (e.g. sewage treatment, fertiliser application). The Reef WQOs specified in Table 1 aim to result in reduced anthropogenic nutrient and sediment loads over time with the aim of achieving the Reef WQOs by 2025. Where anthropogenic nutrient and sediment loads in a river basin are already at low levels, Table 1 aims to maintain these current low levels to ensure there is no increase in pollutant loads. End-of-basin load Reef WQOs have been established for dissolved inorganic nitrogen (DIN) and fine sediment (FS), shown in tonnes per year, as these two pollutants have been found to have the greatest overall impact on the health and resilience of the Reef.

5.2 Source of the Reef WQOs

The Reef WQOs in this document have been sourced from the following reference reports:

- Brodie, J., Baird, M., Waterhouse, J., Mongin, M., Skerratt, J., Robillot, C., Smith, R., Mann, R., Warne, M., 2017. *Development of basin-specific ecologically relevant water quality targets for the Great Barrier Reef*. TropWATER Report No. 17/38, James Cook University, published by the State of Queensland, Brisbane, Australia. 68 pp
- The State of Queensland 2018. *Reef 2050 Water Quality Improvement Plan 2017-2022*, published by the State of Queensland, Brisbane, Australia.

- Great Barrier Reef Marine Park Authority (2010) *Water quality guidelines for the Great Barrier Reef Marine Park 2010*, Great Barrier Reef Marine Park Authority, Townsville, available on the Great Barrier Reef Marine Park Authority website.

All documents are available online. For further information about the three sources of information, email the department at evinfo@des.qld.gov.au.

5.3 End-of-basin anthropogenic load Reef WQOs

Table 1 provides end-of-basin anthropogenic load Reef WQOs to support the Reef aquatic ecosystem EV. Sources used in deriving locally relevant WQOs are provided in section 5.2 of this document.

Table 1: End-of-basin anthropogenic load WQOs for dissolved inorganic nitrogen and fine sediments in the Great Barrier Reef catchment to be achieved by 2025.

NRM Region	River basin name	Anthropogenic Dissolved inorganic nitrogen (DIN) shown as tonnes per year	Anthropogenic Fine sediments (FS) shown as tonnes per year
Cape York	Jacky Jacky	0	43,000
	Olive Pascoe	1	54,000
	Lockhart	0	53,000
	Stewart	0	39,000
	Normanby	9	136,000
	Jeannie	0	29,000
	Endeavour	1	24,000
Wet Tropics	Daintree	135	28,000
	Mossman	52	6,000
	Barron	35	32,000
	Mulgrave-Russell	123	140,000
	Johnstone	149	160,000
	Tully	194	66,000
	Murray	112	31,000
Herbert	266	232,000	
Burdekin	Black	21	34,000
	Ross	49	49,000
	Haughton	274	157,000
	Burdekin	71	1,946,000
	Don	68	128,000
Mackay Whitsunday	Proserpine	47	75,000
	O'Connell	56	145,000
	Pioneer	53	138,000
	Plane	106	99,000
Fitzroy	Styx	10	94,000
	Shoalwater	5	59,000
	Water Park	4	57,000

NRM Region	River basin name	Anthropogenic Dissolved inorganic nitrogen (DIN) shown as tonnes per year	Anthropogenic Fine sediments (FS) shown as tonnes per year
	Fitzroy	159	902,000
	Calliope	6	35,000
	Boyne	3	10,000
Burnett Mary	Baffle	16	42,000
	Kolan	34	24,000
	Burnett	57	341,000
	Burrum	93	14,000
	Mary	181	536,000

Notes:

- Table identifies annual end-of-basin anthropogenic load WQOs to be achieved by 2025, listed by main reef regions (listed north-south). For information on the current anthropogenic loads, refer to the Reef WQIP.
Example:
 - Herbert River: annual end-of-basin anthropogenic load Reef WQO for DIN in 2025 is 266 tonnes/year.
 - Fitzroy River: annual end-of-basin anthropogenic load Reef WQO for FS in 2025 is 902,000 tonnes/year.
- In this document, fine sediment is measured as total suspended solids.
- Where the annual anthropogenic load Reef WQOs are 0 tonnes per year, this reflects low existing rates of anthropogenic impact. The intent in these areas is to maintain current low rates of impact.
- End-of-basin is identified as mean high water springs.