

# Waterbody Management Guideline Overview

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**waterbydesign**



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## Acknowledgements

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## GLOSSARY OF TERMS

**brackish** Slightly salty water (approx 2400-8000  $\mu$ S) typical of estuarine systems.

**cyanobacteria** Primitive, photosynthetic bacteria occurring as a single cell or in filaments, some types can fix nitrogen and some types can produce harmful toxins.

**detritus** Organic waste material from decomposing dead plants or animals.

**estuarine wetlands** Wetlands with oceanic water sometimes diluted with freshwater runoff from the land.

**eutrophication** A process where an environment such as a waterbody receives excessive nutrients which leads to excessive plant growth.

**fetch length** The length of water over which a given wind has blown, typically the prevailing wind.

**internal loading** Accumulation of a pollutant in the waterbody sediment from an external source (e.g. untreated stormwater, wastewater, bird faeces).

**lacustrine wetlands** Wetlands that are dominated by open water and can have deep, standing or slow-moving waters.

**macrophyte** An aquatic plant that grows in or near water and is either emergent, submergent, or floating.

**marine wetlands** Include the area of ocean from the coastline or estuary, extending to the jurisdictional limits of Queensland waters (3 nautical mile limit).

**palustrine wetlands** Wetlands which are primarily vegetated non-channel environments of less than eight hectares. They include billabongs, swamps, bogs, springs, soaks etc., and have more than 30% emergent vegetation.

**peri-urban** The space that lies immediately outside the existing urban area extending in the non-urban, rural areas.

**residence time** The average time taken for the entire waterbody column to be displaced via waterbody inflows and outflows. Commonly referred to as Hydraulic Retention Time (HRT), waterbody detention time or waterbody retention time.

**riverine wetlands** All wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water.

**secchi disk** A disk, divided into black and white quarters, used to gauge water clarity by measuring the depth at which it is no longer visible from the surface.

**stratification** The separation of different layers of water due to different densities.

**waterbody batter** Sloped ground leading into or away from the waterbody, both above and below the water surface.

**wetlands** Areas of permanent or periodic/intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres. To be a wetland the area must have one or more of the following attributes:

- at least periodically the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle
- the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers
- the substratum is not soil and is saturated with water, or covered by water at some time.

(Wetland definition, WetlandInfo, Department of Environment and Heritage Protection, Queensland, viewed 9 May 2013, <http://wetlandinfo.ehp.qld.gov.au/wetlands/what-are-wetlands/definitions-classification/wetland-definition.html>).

## 0.1 INTRODUCTION

Waterbodies are an important part of our landscape and a subset of our broader wetland assets. They are present in our urban, peri-urban and rural landscapes. Just like our broader wetland assets, waterbodies have environmental, economic and social value. However, they have specific management needs as they hold open, standing water. External pressures such as those from existing landuse (e.g. pollutant loads from stormwater and agricultural runoff) and those from changes to landuse (e.g. development or land clearing) can cause the quality of a waterbody to decline and no longer function effectively. Waterbodies need to be managed with the overall catchment in mind, as many of the impacts on and from the waterbody are tied to the broader landscape. This guideline provides guidance on all aspects of waterbody management from development assessment through maintenance to on-ground works, monitoring and communicating. This guideline provides a structured approach to how waterbodies can be managed in an integrated way as part of a broader landscape and seeks to achieve good outcomes for waterbodies, especially those with high values.

## 0.2 GUIDELINE SCOPE

This guideline has been designed primarily to assist in the management of artificial and highly modified fresh and brackish waterbodies but the concepts could also be applied to other waterbody and wetland types.

Based on their general characteristics, wetlands can be divided into the following broad systems; estuarine,

lacustrine, palustrine, riverine, marine (see glossary for definitions). This system classification can be useful when considering the management of waterbodies, which are often diverse with different functional needs.

Another important factor for waterbody management is to consider the waterbody formation. It is important to understand whether the waterbody:

- is natural with no modifications to its water flow
- may have been naturally present but has since had its water flows modified
- is totally artificial and was never previously present in the landscape.

These categories of waterbody formation and wetland system are consistent with Queensland state classification of wetlands (EPA, 2005). Figure 0.1 outlines the waterbodies to which this guideline applies and the relationship with wetlands in the landscape. Table 0.1 provides examples of typical waterbodies to which this guideline applies. This guideline does not apply to riverine and marine wetlands and excludes waterbodies that have natural water flows, function as treatment systems (stormwater treatment systems, contaminant removal, sewage treatment ponds etc.), are regional drinking water storages or are used for aquaculture or industrial purposes. While this guideline supports the management of the broader landscape and wetland, its primary focus is on the waterbody due to the specific management needs associated with standing water. Where possible the guideline will direct managers to other relevant sources of information for managing issues that are not dealt with in this document.

Figure 0.1 Scope of The Waterbody Management Guideline

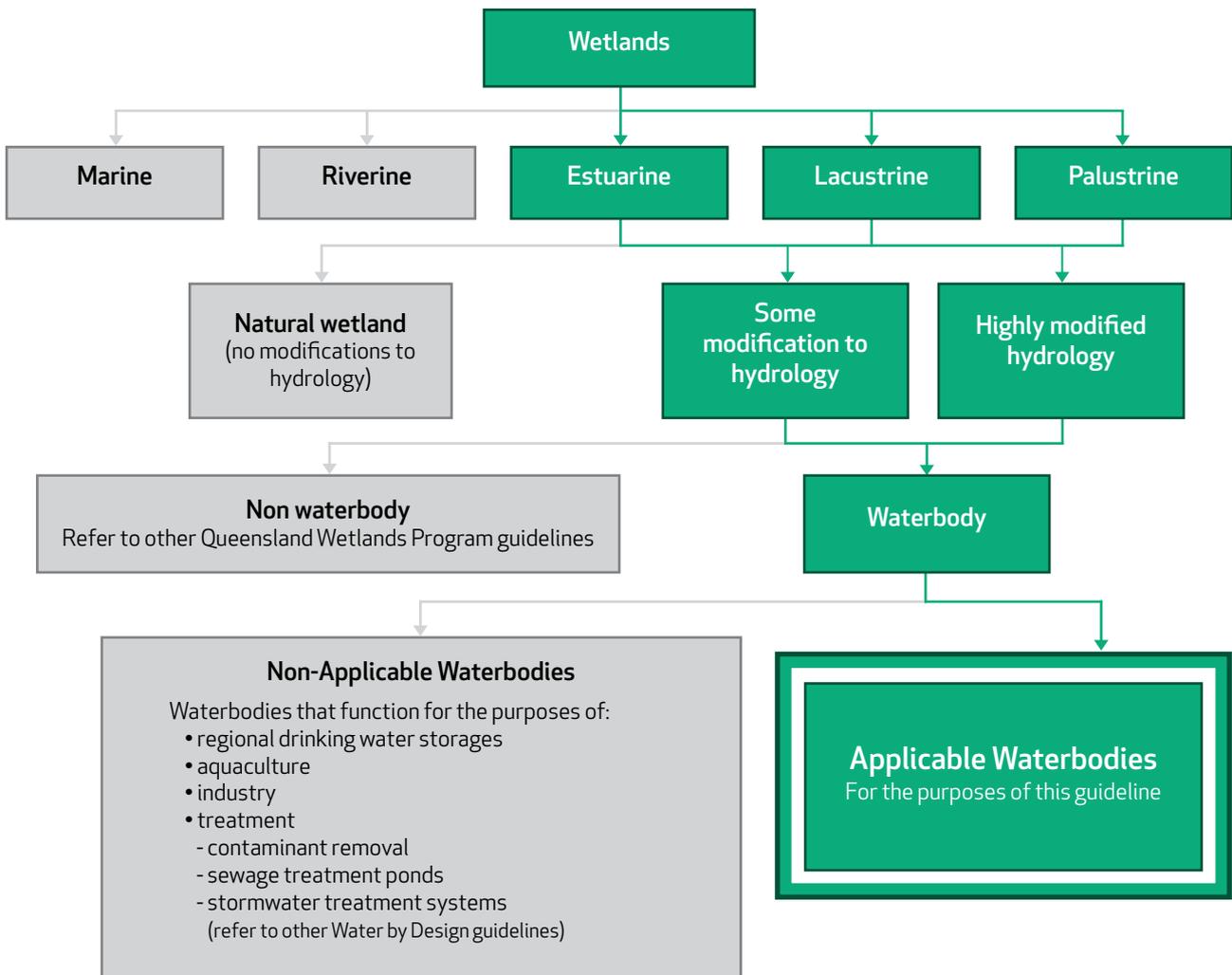


Table 0.1 Applicable waterbodies found in different landscapes

Landscapes	Applicable waterbodies	Non-applicable waterbodies	Reason why not applicable to this guideline
<b>Urban</b>	Artificial waterbodies Constructed urban lakes Modified existing waterbodies	Swimming pool Decorative water features Functioning stormwater treatment device	Not a wetland For information on stormwater treatment devices refer to <a href="#">Water by Design guidelines and resources</a>
<b>Peri-urban</b>	Relic farm dams Fishing ponds Landscape features on 'lifestyle plots'	Treatment devices Aquaculture ponds Waterbodies for industry use	Outside scope of this guideline as these waterbodies usually have specific legislative requirements
<b>Rural</b>	Farm dams Irrigation ponds	Natural waterbodies	Outside scope of this guideline, refer to <a href="#">Queensland Wetlands Program tools and guidelines</a>

For the purposes of brevity an applicable waterbody will be referred to as a waterbody throughout the rest of this guideline. A waterbody system refers to multiple waterbodies located in close proximity with connected functioning.

This guideline is provided as a best practice guideline, however, it cannot override other requirements contained in legislation. Where legislation or approvals state minimum standards must be achieved, this guideline can be used to support achieving these standards to the degree it can be incorporated.

### 0.3 GUIDELINE TARGET AUDIENCE

The Waterbody Management Guideline provides a management framework for managers dealing with waterbodies in all areas including development assessment, asset management, maintenance and operations as well as extension and engagement.

### 0.4 GOALS AND KEY PRINCIPLES OF MANAGING WATERBODIES

This guideline is directed by a set of goals and key principles.

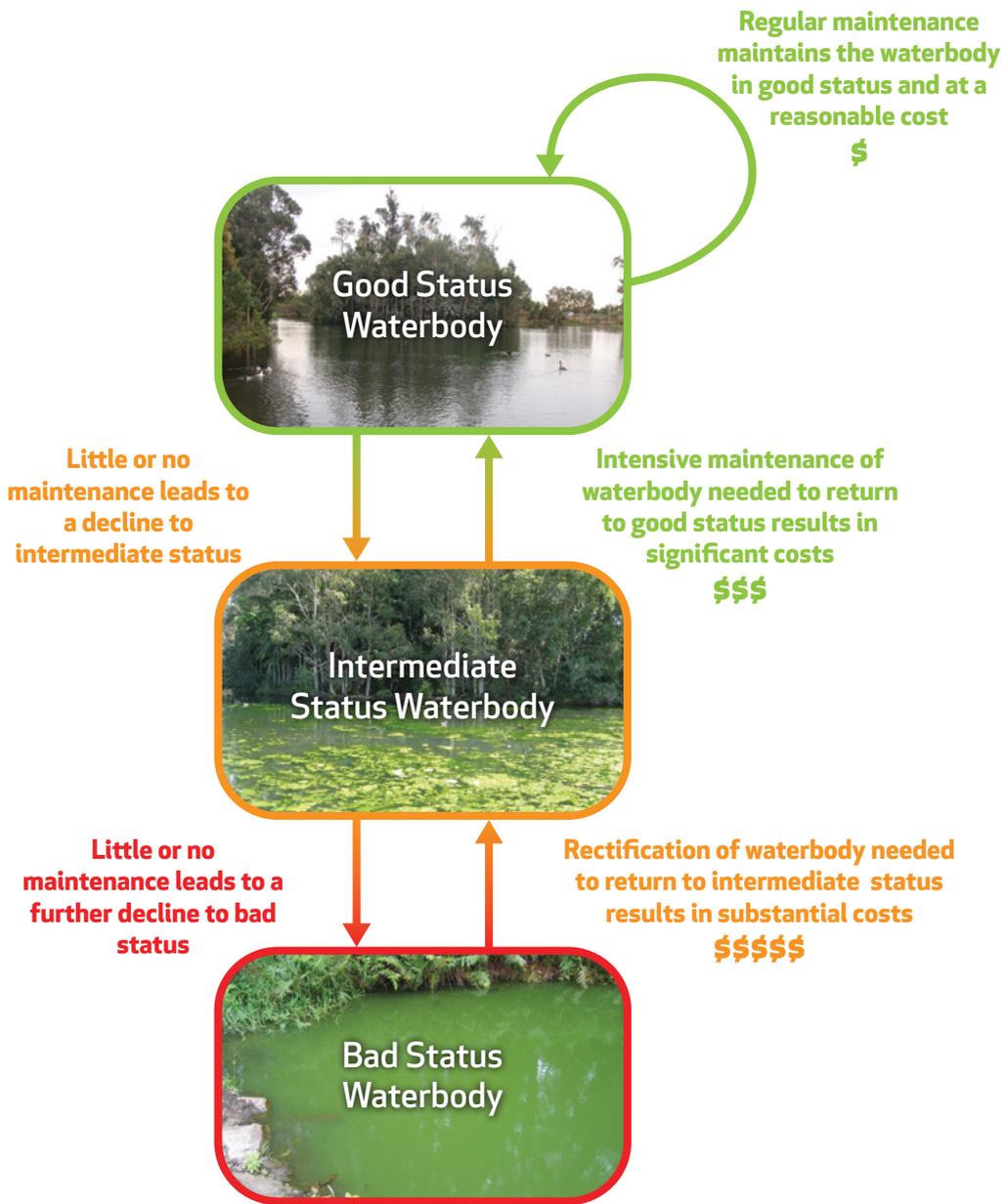
The **goals of managing waterbodies** are to:

- protect and maximise values and services provided by waterbodies
- avoid adverse downstream impacts
- build resilience into waterbodies
- reduce risk and maintenance requirements.

The **key principles of managing waterbodies** to achieve the above goals are to:

1. Avoid constructing new waterbodies and decommission waterbodies that are no longer used for the purpose for which they were designed, unless they continue to provide values.
2. Avoid using waterbodies as water treatment devices as such devices need to be properly designed.
3. Consider the connection of the waterbody to wetlands and to the broader catchment and landscape and manage them as an interconnected system in the landscape.
4. Understand how the waterbody was formed and how the presence of the waterbody impacts the natural hydrology of the catchment, use this understanding to guide appropriate management choices.
5. Prioritise waterbodies based on values and manage accordingly.
6. Ensure that actions taken to manage waterbodies are consistent with broader organisational, planning and catchment principles and activities.
7. Take a long term approach to managing waterbodies. Monitor outcomes over time, learn from successes and failures and tailor future management actions accordingly.
8. Undertake regular, proactive maintenance to prevent the status of waterbodies from declining in preference to waiting for the decline to occur before applying management actions (Figure 0.2).
9. Communicate the goals and principles to all relevant stakeholders to maximise uptake and implementation of appropriate waterbody management.

Figure 0.2 Proactive waterbody maintenance compared with reactive waterbody maintenance



Photos: Julian Wakefield, Sunshine Coast Council

## 0.5 GUIDELINE STRUCTURE

This guideline is comprised of five modules. Figure 0.3 outlines the structure and target audience for each module. A multidisciplinary approach should be adopted when managing waterbodies. Communication channels between the managers of waterbodies from different areas should be established and continually strengthened.

Figure 0.3 Structure of The Waterbody Management Guideline

Waterbody Management Guideline			
Guideline Overview - All			
Introduction	0.1	Goals and Key Principles of Managing Waterbodies	0.3
Guideline Scope	0.1	Guideline Structure	0.5
Guideline Target Audience	0.3	References	0.6
Module 1: Waterbodies in Our Landscape - All			
Introduction	1.1	How a Waterbody Works	1.5
Context of Waterbodies	1.2	References	1.18
Value of Waterbodies	1.4		
Module 2: Development Assessment	Module 3: Asset Management	Module 4: Maintenance & Operations	Module 5: Extension & Engagement
Development assessment officers	Asset management professionals	Maintenance officers and asset managers	Extention officers
Introduction	2.1	Introduction	3.1
Background to Waterbodies and Development Assessment	2.2	Getting Started	3.2
The Development Assessment Process for Waterbodies	2.3	Identify Roles, Responsibilities and Resources	3.3
Producing a Development Code for Waterbodies	2.16	Identify and Assess Waterbodies	3.11
Worked Example	2.19	Manage Finances	3.17
References	2.28	Prioritise Waterbodies	3.19
		Review and Revise	3.24
		Worked Example	3.25
		References	3.34
		Introduction	4.1
		Scheduling Inspections and Maintenance	4.2
		Identifying Issues and Selecting Actions	4.3
		Management Actions	4.39
		Worked Example	4.51
		References	4.55
		Introduction	5.1
		Local Government Extension Programs	5.2
		Secure Participation	5.5
		Site Assessment	5.8
		Identify the Issues and Actions	5.9
		Set Priority Issues and Actions	5.27
		Implement Waterbody Plan	5.28
		Worked Example	5.29
		References	5.32

## 0.6 REFERENCES

Environmental Protection Agency (2005) *Wetland Mapping and Classification Methodology – Overall Framework – A Method to Provide Baseline Mapping and Classification for Wetlands in Queensland*, Version 1.2, Queensland Government, Brisbane.

Queensland Wetlands Program (2003-2013) suite of integrated tools across the wetland management spectrum <http://wetlandinfo.ehp.qld.gov.au>

Water by Design (2006-2013) *Guidelines for managing vegetated stormwater assets*. <http://www.waterbydesign.com.au/guidelines>