# FRASER COAST
# WATERBODY MANAGEMENT STRATEGY

**DesignFlow**

Prepared for Fraser Coast Regional Council

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## Document Control Sheet

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## Disclaimer

## Table of Contents

# 1 INTRODUCTION

Fraser Coast Regional Council (FCRC) is responsible for the management of a significant number of urban waterbodies. These waterbodies provide a range of social, environmental and economic values and functions. However, many waterbodies are in a degraded condition or are at risk of deteriorating due to declining water quality, infestations of noxious weeds, fish kills, algal blooms and failure of hydraulic structures.

**Goal** - Council's long term goal for Fraser Coast waterbodies is to protect and enhance their values and functions, reduce risks associated with open water and water quality (within the waterbody and downstream), and to optimise maintenance efforts. .

The Strategy is underpinned by significant technical analysis, community engagement and lessons learnt from other local governments. The *Fraser Coast Waterbody Management Strategy - Waterbody Management Framework Technical Report* (DesignFlow, 2021) contains additional background investigations that have informed development of this Strategy including the work completed to identify, characterise and prioritise Council's waterbody assets and the use of this information to develop a waterbody asset management framework. This Strategy provides a concise overview of the strategic direction, key findings and prioritisation policy and directions of the Framework to assist Council in managing urban waterbody assets.

## 1.1 THE NEED FOR A WATERBODY MANAGEMENT STRATEGY

The Strategy focusses on constructed waterbodies (i.e. predominantly open water systems), located wholly or partially on land owned and managed by Council. Assets that are currently not the responsibility of Council are not considered in this framework, nor are natural waterways, or natural or constructed wetlands.

Within the Fraser Coast region, there are currently 50 urban waterbodies for which Council has management responsibility. A total of 54 waterbodies, including 4 which are not currently managed by Council, were included in the assessment and development of the framework and strategy. These 54 waterbodies have a total area of 120ha and approximately 46 kilometres edges. These waterbodies provide significant value for the community, which include:

- **Premium on property values** - people are willing to pay more live close to waterways and waterbodies;
- **Flood management** – many waterbodies play an important role in reducing flood flows;
- **Aesthetics, amenity and liveability** – waterbodies can enhance the amenity or urban areas;
- **Ecological values** – healthy waterbodies provide diverse habitats within urban areas both now and for the future; and

- **Education and awareness** – the presence of waterbodies can make residents more aware of the water cycle and water quality.

Despite these benefits, waterbodies which are poorly designed or difficult to maintain can exhibit significant issues and incur considerable cost to Council. Common issues observed in waterbodies include:

- Risk of injury or drowning;
- Health risks (pollution or pathogens);
- Drainage and Flooding;
- Sediment and organic matter build up;
- Odours;
- Algal or blue green algae blooms;
- High turbidity (i.e. murky water);
- Aquatic weeds;
- Exotic fish species;
- Terrestrial weeds;
- Erosion of bank edges;
- Water bird populations; and
- Fish kills.

### 1.1.1 Waterbody condition or status

Waterbody condition or status refers to the overall ecological health of the waterbody as well as how well the values are being achieved.

A 'healthy' waterbody has good water clarity and supports a range of aquatic habitats including open water, emergent and submerged native water plants. Generally healthy systems occur where the following conditions occur:

- Typically <2m deep. This allows native plants to establish which play an important role in removing nutrients and providing habitat for native fauna. Shallow systems tend to be more resilient and stable compared with deep systems, which reduces the risk of fish kills.
- Has a relatively large catchment (with ideally limited urban runoff). This ensures that the water within the system does not become stagnant and allow nutrients to build up. It also helps ensure water levels stay 'topped-up' with relatively clean water.

An unhealthy waterbody typically has poor water quality resulting from high nutrient levels. Common symptoms of an unhealthy waterbody include:

- Lack of native water plants (emergent and submerged).
- May have floating scums or appear pea-soup green from blue-green (cyanobacterial) blooms or filamentous algae.

- The surface of the waterbody can become overgrown with aquatic weeds (such as floating plants like Salvinia). These plants can grow rapidly utilising excess nutrients within the water.
- Fish kills are more prevalent in unhealthy systems due to low oxygen levels. This can occur when the waterbody 'turns-over' releasing low-oxygen water trapped in the deeper areas.

Examples of healthy and unhealthy waterbodies are shown in Figure 1 and Figure 2 respectively.

**Figure 1: Unhealthy waterbody with toxic blue-green algae.**

**Figure 2: Healthy waterbody with fringing emergent plants.**

### 1.1.2 Reactive versus Proactive management

The relationship between the status or health of a waterbody and maintenance is shown in Figure 3. It demonstrates how a maintenance regime which is only 'reactive' to addressing issues as they arise results in a gradual decline in waterbody health over time.

The ultimate rectification costs for restoring a poor waterbody is often significantly more than delivery of regular maintenance to a waterbody in good or intermediate condition.

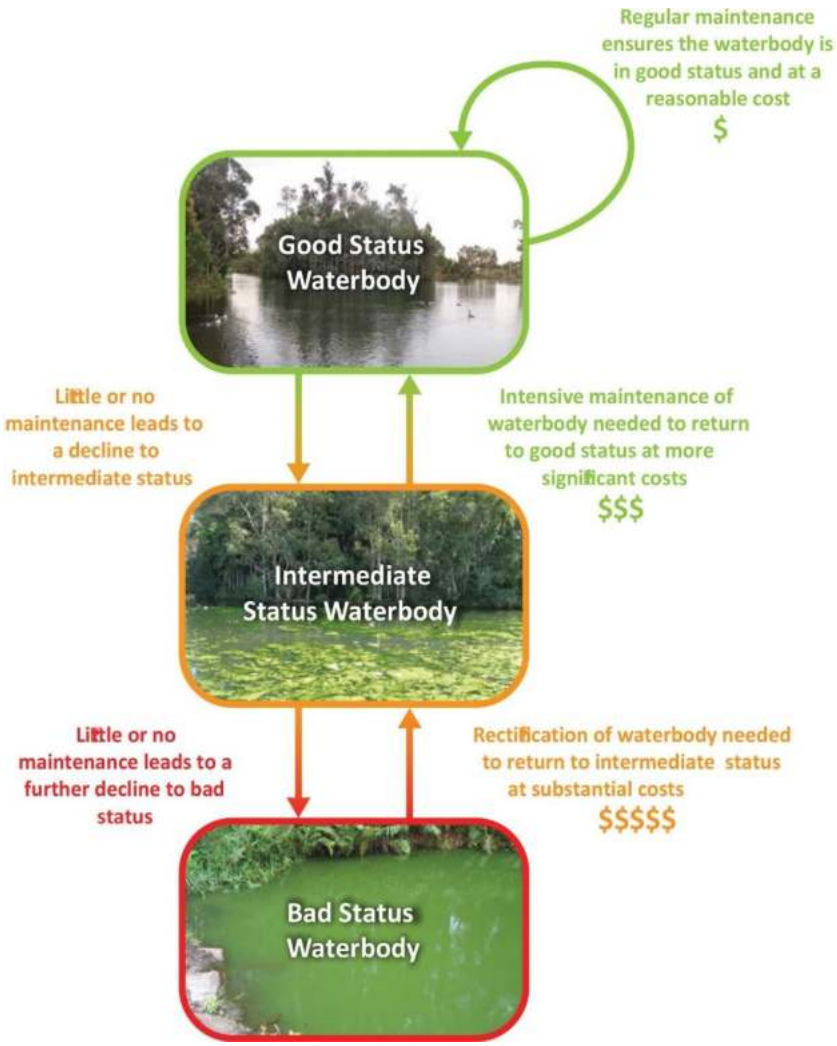


**Figure 3: Proactive waterbody maintenance compared with reactive waterbody maintenance (Source: Waterbody Management Guideline, Water By Design, 2013)**

High or Very High management priority waterbodies generally need proactive maintenance and/or rectification in order to strategically manage the waterbodies in a cost effective and sustainable manner.

As a general rule, urban waterbodies tend to decline in condition over time, meaning the number of waterbodies needing rectification will increase and so will the associated management costs (e.g. increased reactionary management). Furthermore, there is a risk that new waterbodies will be handed over to Council from new development in the future further increasing the management burden.

Historically, waterbody management has been largely reactionary based on addressing issues as they arise. It is inevitable if the current reactionary approach to waterbody management is continued then the number of waterbodies requiring reactionary rectification and the overall cost to Council will increase.

The Strategy is intended to assist Council implement a proactive maintenance regime for waterbodies, which focuses resources where they will yield the greatest benefits and/or values for the community.

## 1.2 STRATEGIC ALIGNMENT

Council's *Corporate Plan 2018-2031* is a key strategic document that provides a framework and guides Council in decision making and setting policy to prioritise and deliver services, programs and facilities to the community. Table 1 identifies the key Corporate Plan themes and strategies which this document supports.

The development of the Strategy has considered a number of existing FCRC policies and documents such as:

- *Living Lakeside on the Fraser Coast* (Factsheet)
- *Aquatic Plant Management Policy*
- *Management of Urban Lakeside Vegetation Policy*
- *Fraser Coast Planning Scheme 2014*

There are also a number of FCRC Strategies and Policies under development which will require consideration of integration and alignment.

**Table 1: Corporate Plan Alignment.**

| Corporate Plan Themes | Corporate Plan Strategies | Waterbody Management Strategy Contribution |
|---|---|---|
| **Governance** | • Implement effective strategic management and governance frameworks<br>• Improve focus on forward planning and project management practices<br>• Focus on long term financial sustainability | • The strategy provides a strategic framework for investment in waterbody management |
| **Lifestyle** | • Improve accessibility to key locations including the beach, foreshore, cultural and historical infrastructure and events | • The strategy provides a framework for developing Waterbody Management Plans which will facilitate passive recreation |
| **Prosperity** | • Work in collaboration with tourism industry bodies, local businesses and all levels of government to build successful visitor experiences | • The strategy will enhance waterbody health which in turn will enhance the experiences of both residents and visitors |
| **Natural Environment** | • Improve access and recreational facilities across a range of natural assets<br>• Pursue options to enhance vibrant open spaces suitable for community living<br>• Implement and maintain environmental management plans across the region | • The strategy seeks to improve ecological health of waterbodies through improved management frameworks which will deliver improved urban experiences |
| **Built Environment** | • Establish and implement asset management planning to ensure asset longevity | • A key aim of the strategy is to shift to proactive waterbody maintenance to ensure longevity of the assets |

# 2 WATERBODY PRIORITISATION

Due to the large number of waterbodies managed by the Council (50) and limited resources, it is important to understand which waterbodies are the highest priority on which to focus. Priority was determined by considering both the values of each waterbody (termed the waterbody 'classification') and the current condition of the waterbody as described in the *Fraser Coast Waterbody Management Strategy - Waterbody Management Framework Technical Report* (DesignFlow, 2021).

Waterbodies that have high values, but are in poor condition, are considered to not be meeting expectations so would be amongst the highest priority for management. While waterbodies with low values and are in good condition would be the lowest priority.

## 2.1 WATERBODY CLASSIFICATION

The values and functions of each waterbody were assessed to resolve an overall classification (or hierarchy) for the waterbodies. This was determined by assigning a score for each value or function and then ranking each waterbody according to the total score.

The values and functions considered in the scoring are described by Figure 4, and their descriptions and what this means in terms of values and typical maintenance are provided in Table 2.

Council has a significant portion of waterbodies that have multiple values, which is illustrated by the number of waterbodies within each classification. The results of the classification assessment are presented in the *Fraser Coast Waterbody Management Strategy - Waterbody Management Framework Technical Report* (DesignFlow, 2021).

**SNAPSHOT: 46% of waterbodies are classified as having either 'Very High' or 'High' values.**

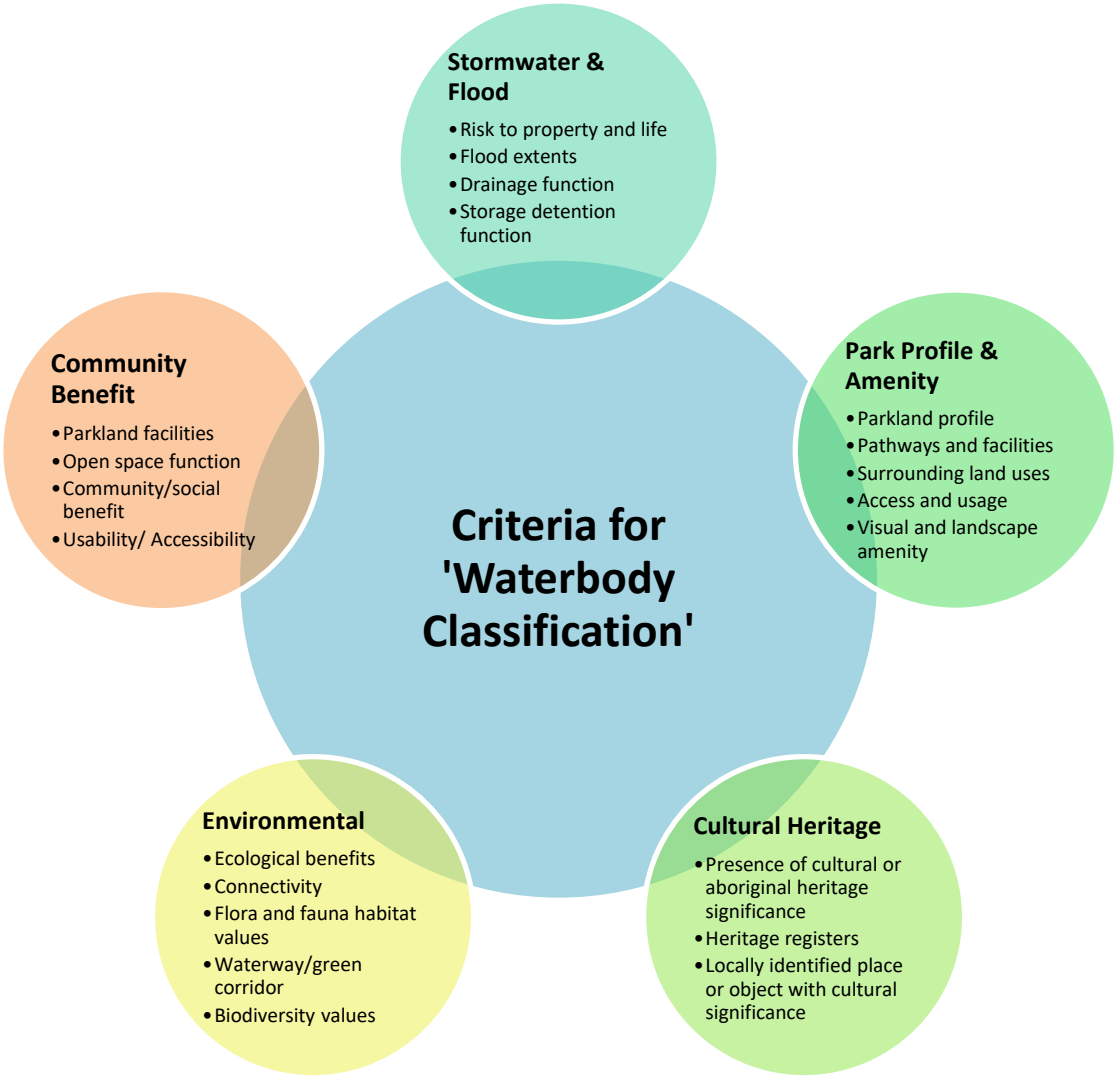


**Figure 4: Criteria used for Classification Assessment.**

**Table 2: Waterbody classification and typical maintenance.**

| Waterbody Classification | Typical values and functions | Indicative management response |
|---|---|---|
| **Very High** | • Located in a very high profile area (e.g. regional park).<br>• Provides a number of cultural/social/environmental values to the whole community.<br>• Forms a key visual feature within the surrounding landscape<br>• Very high community expectation for maintenance upkeep. | • Requires higher levels of maintenance to manage waterbody health, aesthetics and public health and safety risks.<br>• Frequent inspection and maintenance (e.g. 12 visits per year). |
| **High** | • Highly visible, typically located in a medium-high profile area (e.g. district park).<br>• Provides a number of cultural/social/environmental values to the whole community.<br>• High community expectation for maintenance upkeep. | • May require a high level of maintenance to manage environmental risks and public health and safety hazards.<br>• Regular inspection and maintenance (e.g. 6 visits per year). |
| **Medium** | • Waterbody within low profile parkland (e.g. local park or drainage reserve) with informal pathways +/- park amenities.<br>• Limited use due to surrounding land use<br>• Provides function/values to local community | • Occasional inspection and maintenance (e.g. 4 visits per year). |
| **Low** | • Waterbody within low profile parkland (e.g. drainage reserve).<br>• Limited public access or visibility (e.g. screened by dense vegetation.<br>• May provide limited values to the community (e.g. flood function only)<br>• Provides function/values to local residents only | • Infrequent inspection and maintenance (e.g. 2 visits per year). |
| **Very Low** | • No identified waterbody values or functions | • Consider decommissioning or reclassifying |

## 2.2 WATERBODY CONDITION

The condition of each waterbody was assessed against a series of criteria. The criteria were developed to reflect indicators of waterbody health as well as ease of maintenance and safety considerations. The range of criteria considered in the condition assessment are shown in Figure 5: Criteria used for Condition Assessment.

**SNAPSHOT: 41% of waterbodies are in either 'poor' or 'very poor' condition**

The results of the condition assessment are presented in the *Fraser Coast Waterbody Management Strategy - Waterbody Management Framework Technical Report* (DesignFlow, 2021).

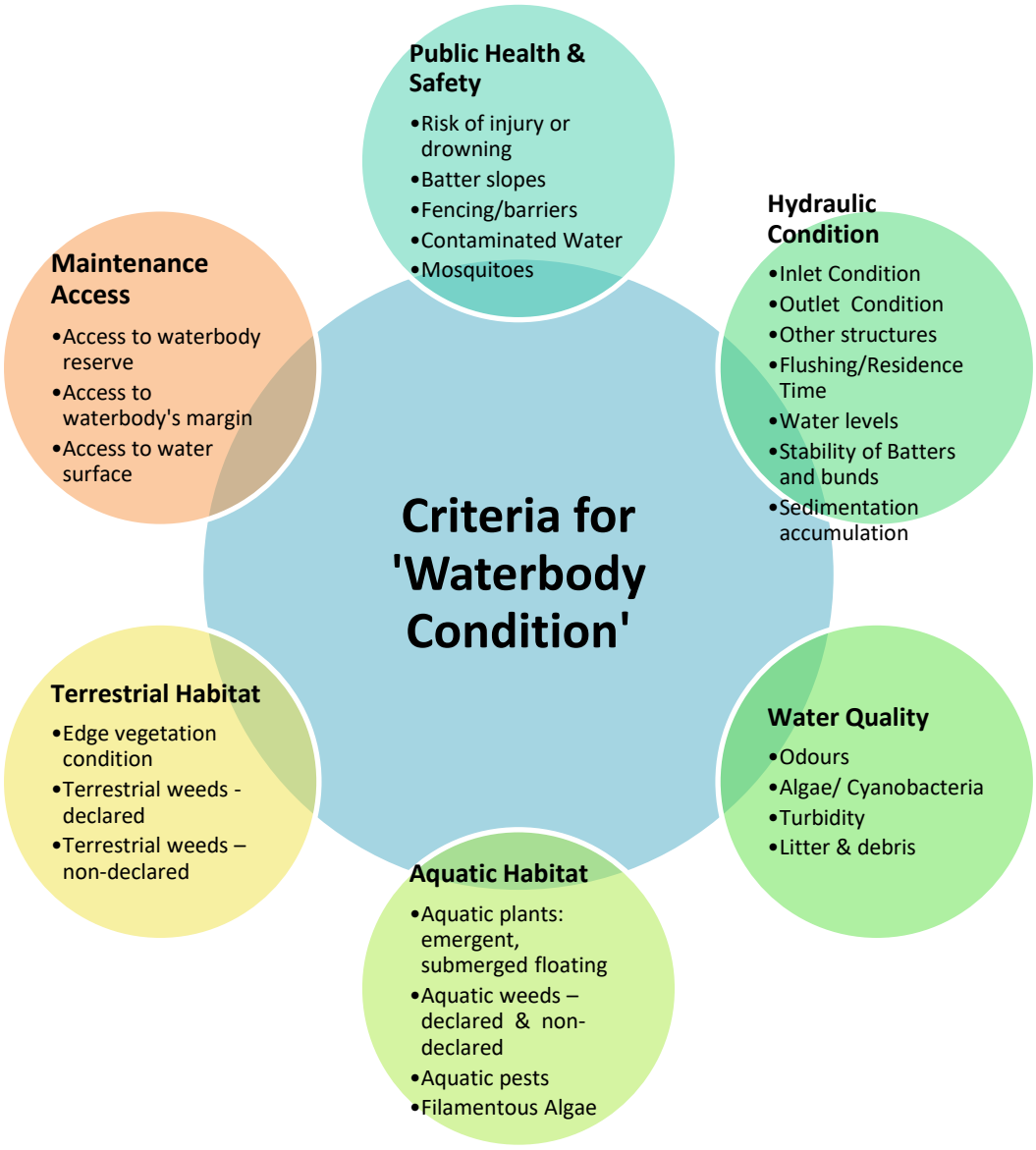


**Figure 5: Criteria used for Condition Assessment.**

## 2.3 MANAGEMENT PRIORITY

The results of both the waterbody classification and the condition assessment were combined in order to determine the priority of each waterbody for management actions. The way in which this prioritisation was determined is shown in Table 3. Waterbodies which have high values (i.e. high expectations by the community) but are currently in poor condition are ranked as having a high priority for management.

**SNAPSHOT: 39% of waterbodies are either 'high' or 'very high' priority for management**

The detailed results of the prioritisation are presented in the *Fraser Coast Waterbody Management Strategy - Waterbody Management Framework Technical Report* (DesignFlow, 2021).

**Table 3: Waterbody Prioritisation Criteria.**

| WATERBODY CLASS | CONDITION WEIGHTING | | | | |
|---|---|---|---|---|---|
| | **Very Poor** | **Poor** | **Adequate** | **Good** | **Very Good** |
| **Very High** | Very High | Very High | Very High | High | High |
| **High** | Very High | High | High | Medium | Medium |
| **Medium** | High | Medium | Medium | Low | Low |
| **Low** | Medium | Medium | Low | Very Low | Very Low |
| **Very Low** | Low | Low | Very Low | Very Low | Very Low |

# 3 WATERBODY MANAGEMENT PLAN FRAMEWORK

Individual Waterbody Management Plans are proposed to be developed for the highest priority waterbodies. Full details of the framework are provided in the *Fraser Coast Waterbody Management Strategy – Waterbody Management Framework Technical Report* (DesignFlow, 2021). Application of the framework will deliver a concise Waterbody Management Plan tailored for a specific waterbody made up of a plan of the waterbody and a schedule of work.

## 3.1 WATERBODY MANAGEMENT PLANS

As part of the development of specific individual Waterbody Management Plans, a range of maintenance and rectification options will be detailed to address the identified waterbody issues. The management responses depend on the specific issues at each waterbody, but can include a large range of actions as outlined in the Waterbody Management Guidelines (Water by Design, 2013) and reflected in this Strategy's preferred management practices.

Where Waterbody Management Plans are developed, the framework shown in Figure 6 will be followed. Priority for the development of Waterbody Management Plans will be given to those with a Very High management priority.

This will provide the following waterbody specific information:

- Waterbody issues
- Rectification and management actions
- Indicative Costs

## 3.2 PRIORITIES FOR WATERBODY MANAGEMENT PLANS

Waterbody Management Plans for the Lowlands Lagoons (Anembo Lakes) system and the Ululah Lagoons system have been prepared to assist with development and application of the framework as part of the *Fraser Coast Waterbody Management Strategy – Waterbody Management Framework Technical Report* (DesignFlow, 2021).

Waterbody Management Plans will continue to be developed for waterbodies in order of priority ranking, with an initial focus on waterbodies ranked as 'very high' priority. Once developed, the Waterbody Management Plans will provide a works schedule necessary for proactive maintenance and indicative costings to inform future budgets in subsequent years.

General principles and actions that are common to all waterbodies will be applied to the waterbodies which are generally lower priority, meaning Waterbody Management Plans will not be required for all waterbodies.

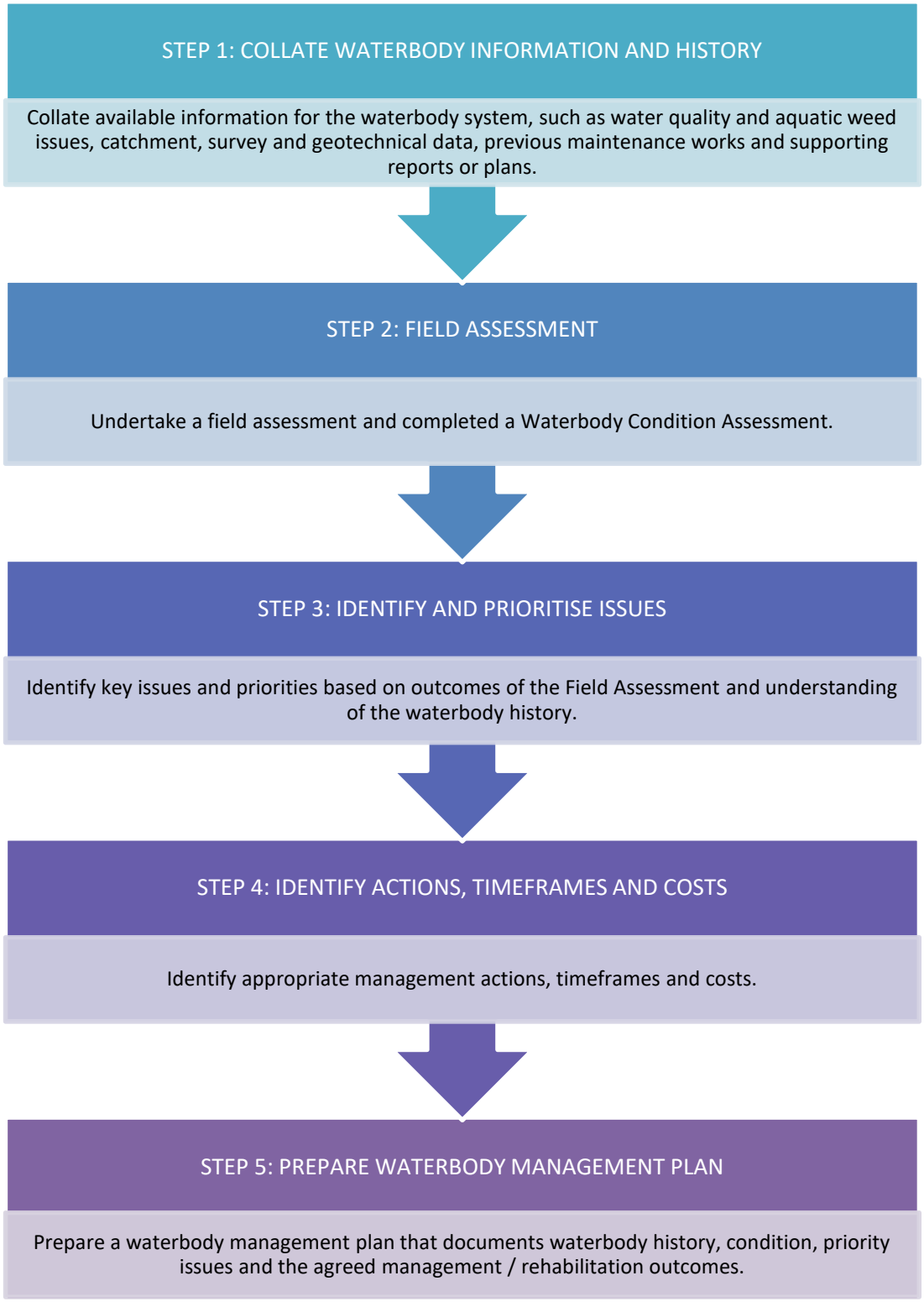


**Figure 6: Overview of the Waterbody Management Plan Framework.**

# 4 WATERBODY MANAGEMENT PRACTICES

The management responses depend on the specific issues at each waterbody, but can include a large range of actions as outlined in the Waterbody Management Guidelines (Water by Design, 2013). Although individual Waterbody Management Plans will not be required for all waterbodies, general principles and actions that are common to all waterbodies will be applied to waterbodies that are generally lower priority.

## 4.1 PREFERRED MANAGEMENT PRACTICES

For the Fraser Coast urban waterbodies, preferred management practices include:

1. Establishing and maintaining vegetated waterway buffers (unmown) with a minimum of 1.5m and to a wider width where appropriate;
2. Establishing and maintaining submerged and emergent water plants within waterbodies and along edges;
3. Ensuring waterbody edges are safe and where necessary improve safety through appropriate design responses such as physical barriers (e.g. vegetation, fencing or profiling bank edges) or modification to edge profiles (e.g. re-profiling);
4. Stabilising bank erosion including re-profiling and/or repairing areas and revegetating with native species;
5. Managing nuisance waterbird populations to reduce nutrient inputs into waterbodies, including discouraging waterbird feeding and reducing habitat for these bird species (e.g. weed trees overhanging water);
6. Maintaining drainage structures for drainage function and flood management (inlets/outlets/weirs);
7. Implement catchment-based stormwater management initiatives to treating and remove pollutants from stormwater before it enters a waterbody;
8. Managing dispersive soils within waterbodies and upstream areas through appropriate soil management practices;
9. Progressively developing individual Waterbody Management Plans for priority waterbodies;
10. Undertaking actions as identified through a Waterbody Management Plan, including but not limited to:
    a. Creating wetlands (converting shallow waterbody areas to wetlands);
    b. Filling in isolated pockets/stagnant areas; and,
    c. Reducing waterbody depths to support creating wetlands, increase flushing time or improve safety (e.g. modifying outlet water level controls).
11. Avoiding the following activities:
    a. Large scale dredging due to very high cost, disturbance to sediments impacts (i.e. no guarantee organic sediments will be entirely removed) and difficulty establishing wetland plants (required for a healthy waterbody) following dredging.

b. Increasing waterbody depth due to high cost, potential environmental impacts (acid sulfate soils and groundwater), increased residence times (reduced flushing) and the challenge of establishment of wetland plants (required for a healthy waterbody) in deeper water.

12. Guiding principles that are to inform management actions of Fraser Coast urban waterbodies include:
    a. Aquatic weed harvesting – Caution should be applied to harvesting practices and should only be carried out where management of declared aquatic weeds is required by the FCRC Biosecurity Plan. Harvesting of non-declared weeds and native aquatic vegetation (e.g. such as waterlilies) can cause significant disturbance and can result in decline in waterbody condition (such as increased turbidity and algal blooms).
    b. Aquatic recreation – Due to fluctuating water quality aquatic recreation is not recommended in urban waterbodies. There is a risk of adverse health effects from exposure so care should be taken to limit any water exposure.
    c. Water extraction – Extraction of water from urban waterbodies is not allowed unless an extraction license is obtained. Fluctuating water quality poses a risk to human contact and for irrigation purposes; there is a risk to waterbody health from over-extraction which is difficult for council to manage.
    d. Aerators /water mixers – Devices that artificially mix or aerate the water column are generally not recommended for urban waterbodies due to the cost to operate and maintain them. While they can provide some benefit at a local scale to improve circulation and oxygen levels, it becomes very expensive to artificially circulate or aerate an entire waterbody system; more sustainable approach is to encourage submerged and emergent water plants to improve oxygenation and ensure waterbody sizing and depths encourage better flushing rates.

# 5 RECOMMENDATIONS

Further to the Strategy's preferred management practices outlined in Section 4.1 above, the following actions are recommended for FCRC to pro-actively and sustainably manage its waterbody assets:

1. Adopt the Waterbody Management Prioritisation Framework, Waterbody Management Plan Framework and Waterbody Management Practices for the strategic management of FCRC's urban waterbodies.
2. Amend the Fraser Coast Planning Scheme to prescriptively manage the assessment and approval of waterbodies in the future including:
    a. Developing a policy for artificially constructed or modified waterbodies that recognises the high-risk these assets pose, considering maintenance, resourcing and sustainable management.
    b. Establishing development controls for artificially constructed or modified waterbodies that do not readily accept new waterbodies or existing farm dams, but rather establishes appropriate development controls to ensure waterbody systems are designed and constructed to adhere to best practice and handed over correctly and that developers provide a long-term financial contribution to Council for management.
    c. Developing processes and procedures for proposed new waterbodies inclusive of development assessment, development compliance and asset handover to provide a streamlined and an effective framework for the design, construction, maintenance and ultimately hand over of new waterbody assets to Council.
3. Promote communication, education and awareness of urban waterbody management principles and practices.
4. Complete Waterbody Management Plans for Very High Priority water bodies.
5. Use Council's Risk Management framework to identify prioritised actions for waterbody management within and between waterbodies.
6. Establish resources and funding for the management of waterbodies.
7. Support strategic catchment planning to minimise sediment and pollutant inputs into waterbodies.
8. Create an internal Catchment Coordination Working Group to coordinate environment, catchment and infrastructure management with a focus on:
    a. Review and amend Council's strategies, policies and procedures to align with this Strategy;
    b. Develop and implement a Communications Plan for waterbody management that includes internal communication, as well as a comprehensive catchment education, awareness raising and community behaviour change program; and
    c. Identify sources of funding, such as stormwater quality or biodiversity initiatives, to deliver better value outcomes (i.e. with dual purpose).
9. Investigate and establish appropriate mechanisms to monitor and evaluate the performance of this Strategy.

# 6 REFERENCES

DesignFlow (2021) *Fraser Coast Waterbody Management Strategy – Waterbody Management Framework Technical Report*

FCRC (2017) *Living Lakeside on the Fraser Coast* (Factsheet)

FCRC (2017) *Aquatic Plant Management Policy*

FCRC (2017) *Management of Urban Lakeside Vegetation Policy*

South East Queensland Healthy Waterways Partnership (SEQHWP, 2007), *Constructed Waterbodies in Urban Areas of South East Queensland: Maintenance issues and Costs to Local Government.*

Water by Design (2013) *Waterbody Management Framework*