

# A guide for developing an aquatic facility water quality risk management plan



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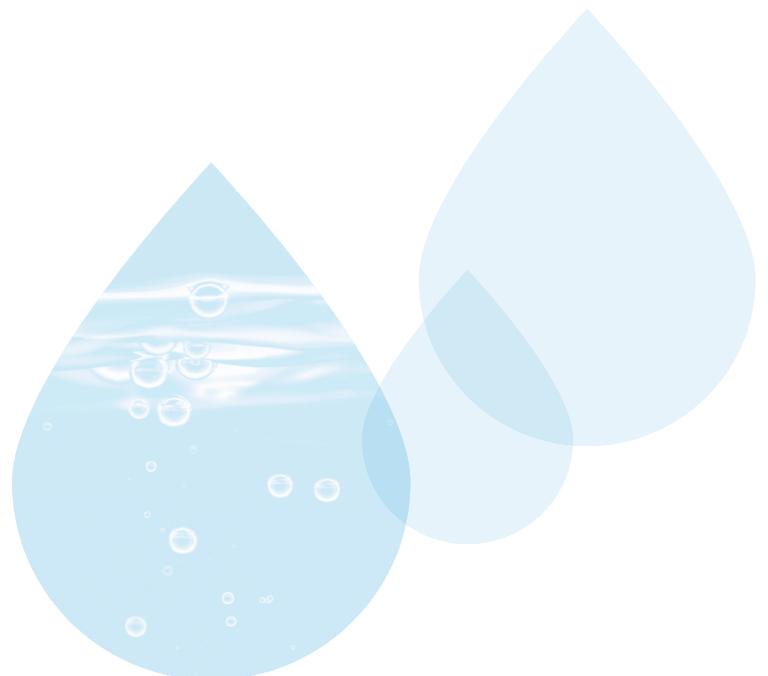
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# Acknowledgements

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# Introduction

While public aquatic facilities are vital for maintaining and promoting active lifestyles for improved health and wellbeing, these facilities have been associated with outbreaks of illness. Aquatic facility users, especially children, elderly or immunocompromised people, can be affected by disease-causing microorganisms that are passed through contaminated pool water, contaminated surfaces or through person-to-person contact.

The Public Health and Wellbeing Regulations 2019 (the regulations) outline the minimum water quality requirements for category 1 and category 2 aquatic facilities and the duties of aquatic facility operators. All category 1 aquatic facilities must be registered with local council from 14 December 2020. Applications to register a category 1 aquatic facility must include a statement as to whether a current water quality risk management plan exists for each aquatic facility located at the premises.

The regulations are supported by the [Water quality guidelines for public aquatic facilities – managing public health risks](#)

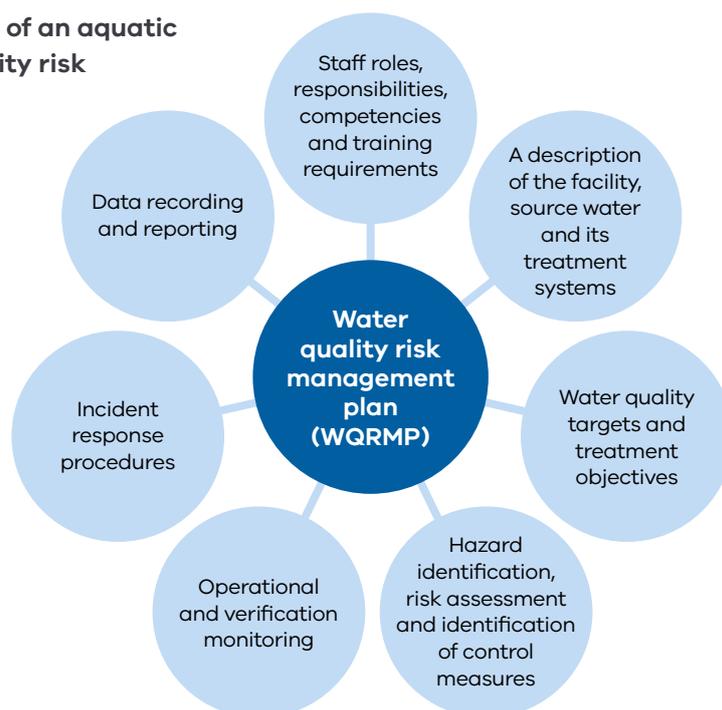
(the guidelines) <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines>>, which state that all aquatic facilities must have a water quality risk management plan in place.

Section 1.3 of the guidelines outlines the components that must be included in a plan:

- staff roles, responsibilities, competencies and training requirements
- a description of the facility, source water and its treatment systems
- water quality targets and treatment objectives
- hazard identification, risk assessment and identification of control measures
- operational and verification monitoring
- incident response procedures
- data recording and reporting.

This guide is intended to assist aquatic facility operators in the development of their water quality risk management plan. The guide outlines the minimum requirements for an aquatic facility water quality risk management plan and how the plan can be

**Figure 1: Summary of an aquatic facility water quality risk management plan**



tailored to suit each specific aquatic facility. The guide should be used alongside the [Water quality risk management plan template](#) (the template) and is also supported by the guidelines which detail how to manage water quality within an aquatic facility.

## Purpose of this guide

This guide and accompanying water quality risk management plan template are intended to assist aquatic facilities to develop a site-specific water quality risk management plan. The guide provides a broad overview of water quality risk management. It is each facility's responsibility to develop and manage its own risk management processes.

The objective of the water quality risk management plan guide and associated template is to assist aquatic facilities to achieve:

- proactive rather than reactive water quality risk management
- compliance with legislation
- improved stakeholder confidence and trust.

The guide and accompanying template are designed to be used together to help support aquatic facilities in developing a risk management process and documenting how they manage water quality risks within their facility. For aquatic facilities that have an existing risk management plan in place the guide and template can be used to complement an existing risk framework. Alternatively, aquatic facilities may have their own tailored water quality risk management templates, which at a minimum include the components outlined in section 1.3 of the guidelines.

## Scope of this guide

The information and advice in this guide applies to all category 1 and category 2 aquatic facilities. As defined in Part 1 (4) of the Public Health and Wellbeing Regulations:

**Category 1 aquatic facility** means a swimming pool, spa pool or interactive water feature that—

- is used by members of the public, whether free of charge or on payment of a fee; or
- is used in association with a class or program that is offered free of charge or on payment of a fee; or
- is located at the premises of an early childhood service, school or other educational institution; or
- is located at premises at which residential aged care services are provided; or
- is located at any of the following premises—
  - (i) a public hospital;
  - (ii) a multipurpose service;
  - (iii) a denominational hospital;
  - (iv) a private hospital;
  - (v) a privately-operated hospital within the meaning of section 3(1) of the *Health Services Act 1988*.

**Category 2 aquatic facility** means a swimming pool or spa pool that is used by members of the public and located at the premises of the following—

- (a) a residential apartment complex;
- (b) a hotel, motel or hostel.

# Purpose and scope of a water quality risk management plan

A water quality risk management plan steps out the essential components required for an aquatic facility to manage water quality and to manage potential public health risks. A water quality risk management plan:

- is a requirement for both category 1 and category 2 aquatic facilities
- is a requirement for registering category 1 aquatic facilities
- clarifies roles and responsibilities in managing aquatic facility water quality
- provides a systematic documented process for identifying and managing risks
- ensures that the quality and reliability of systems are maintained.

To ensure water quality is maintained and no illness is associated with the aquatic facility, all staff should be familiar with the water quality risk management plan and understand their roles.

## Document history

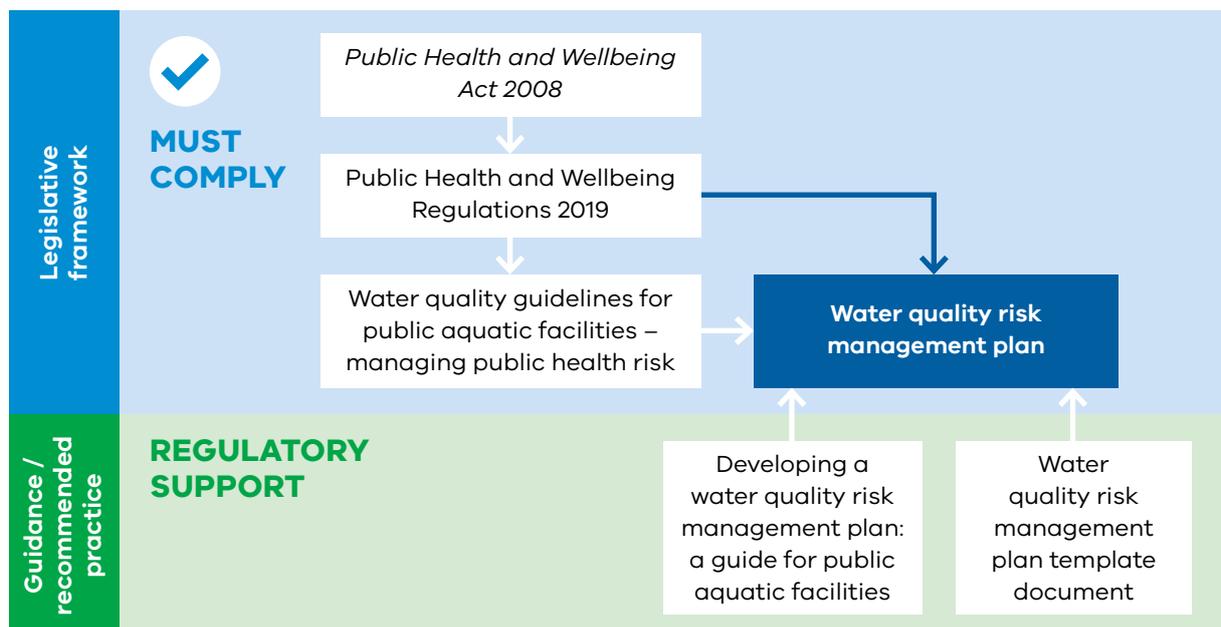
Include a summary of the document history (who the plan was prepared by, who reviewed the plan).

### Example:

The document history was not maintained while the plan was in the initial draft phase. The history below details staff members, consultants and contractors who have directly worked on the document and provided comment and change.

Date of issue	Version	Prepared by	Approved by	Description of changes
01/03/2020	1.0	John Doe	Mary Smith	Initial draft, sent for review and comment
05/03/2020	1.1	Jane Doe	Mary Smith	Review and update to section 4
07/03/2020	1.2	Peter Doe	Mary Smith	Final review – minor content editions

## Aquatic facilities legislative framework and associated regulatory support tools



# Developing a water quality risk management plan

Each component of the water quality risk management plan is described below. To assist in the development of a site specific water quality risk management plan, use this guide alongside the [template](https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/developing-water-quality-risk-mgmt-plan) <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/developing-water-quality-risk-mgmt-plan>>.

## 1. Staff roles, responsibilities, competencies and training requirements

This is the first component of the water quality risk management plan. This component should clearly identify all staff who have responsibilities for managing and maintaining water quality within the aquatic facility. It is important to have each person's responsibilities clearly identified in the plan. One person should be accountable for the whole plan, but this person does not necessarily need to be solely responsible for its implementation.

Training is a fundamental process to ensure staff have necessary skills to fulfil their duties. Many incidents can be attributed to lack of training or poor communication between staff. It is crucial to ensure staff are adequately supported, and this includes continuous/ refresher training to support staff to retain their skills and be updated on new methods.

Requisite training is mapped out by the Australian Skills Qualification Authority, the Safer Pools – Code of Practice, the *Guidelines for safe pool operations* and the *Water quality guidelines for public aquatic facilities*. The competencies are:

- Test pool water quality.
- Develop and implement pool water maintenance procedures.
- Maintain aquatic facility plant and equipment.
- Develop and implement aquatic facility maintenance procedures.
- Identify risk and apply risk management processes.

Additional areas of competence may include:

- supervising clients in aquatic locations
- manual handling training
- chemical handling training.

It is management's responsibility to assess the competency of each staff member. This can be achieved in a variety of ways such as on-site assessment and observance. All positions with a responsibility in the water quality risk management plan must have the relevant training for their position/duties. For lower risk duties, in-house training programs/ procedures may be adequate. However, refer to appropriate industry guidelines, codes of practice and applicable legislation before determining what level of training is required – see Supporting documentation for further information.

### REFER TO:

- 1 [Staff roles, responsibilities, competencies and training requirements in the water quality risk management plan template](#)

### REFER TO APPENDIX FOR ADDITIONAL OPTIONAL SUPPORTING DOCUMENTS (IF APPLICABLE):

- Risk management team (Appendix A)
- Duties register (Appendix B)
- List of key stakeholders (Appendix C)
- Training record form (Appendix I).

### NOTE:

**Appendix of template – provides additional optional supporting documentation and forms that can be used to support and demonstrate implementation of the water quality risk management plan.**

## 2. A description of the facility, its source water and its treatment systems

This component provides a general overview of the aquatic facility and helps inform the risk assessment aspects of the water quality risk management plan.

In describing the overall facility and pool treatment systems list:

- information about the premises and aquatic facility (for example, build date, maximum bather capacity)
- water circulation information (how the pool water flows through the water treatment plant)
- all components related to the treatment system such as:
  - the filtration system
  - pH regulation system
  - primary disinfection system (for example, chlorination)
  - secondary disinfection system (for example, ozone or UV disinfection)
  - monitoring points throughout the process.

This can either be detailed in table form or in text. If possible, provide a basic schematic or flow diagram of the process. Include any water body or interactive features where bathers come into contact with the water and identify where bathers may encounter spray mist from any interactive water features.

### i. Source water

Understanding the source water quality will inform maintenance, treatment and operational monitoring plans.

In your plan, include:

- where the water is sourced from (for example, a municipal supply or rainwater – include the supplier, rainwater tank – provide method of collection)
- the contact details of the supplier
- treatment process prior to entry to facility such as the type of disinfectant used, pH, alkalinity, hardness, temperature and turbidity – (if not known, contact water supplier to obtain this information).

### ii. Treatment process

Describe the treatment system to provide all staff with an overview and understanding of the design and layout of the aquatic facilities water treatment plant.

In describing the treatment system, note for each aquatic facility:

- the filtration method (types of filters, size, media)
- circulation turnover rate
- primary disinfection method and chemicals used
- secondary disinfection method (if applicable)
- regulation methods and adjustment chemicals used.

#### REFER TO:

*2 Facility, source water and treatment systems in the water quality risk management plan template*

### 3. Water quality targets and treatment objectives

The Public Health and Wellbeing Regulations outline the water quality parameters facilities must operate to. Aquatic facilities must be managed to ensure water quality complies with the regulations and the health of bathers is protected. In instances where water quality does not meet the requirements outlined in the regulations the affected aquatic facility must close until water quality is again compliant with the regulations. Water quality targets and treatment objectives are required to determine if water quality is meeting the minimum water quality requirements outlined in the regulations, or when follow-up action is required. To reduce aquatic facility closure periods or 'downtime' water quality targets and treatment objectives should be set to prevent water quality falling outside of the regulations. Setting operational water quality targets prior to non-compliance limits provides a 'buffer' and helps prevent downtime and unnecessary pool closure. This approach also provides staff with an opportunity to respond to any changes in water quality. Document water quality targets and treatment objectives so all staff can be trained in the facility's operation. This can be documented in a water quality operational control plan.

#### Definitions

**Target range:** preventative measure that indicates water quality is within the acceptable range.

**Action range:** preventative measure that indicates water quality may be deteriorating and action is required.

**Critical action range:** water quality is approaching non-compliance, immediate corrective action required.

#### Advantages of implementing operational targets, action range and critical action ranges

- Act as a control in managing the quality of the water and water quality incidents
- Provides early indicator water quality is deteriorating
- Allows staff to proactively manage water quality and minimise the amount of time an aquatic facility is closed
- Reduces the number of poor water quality events
- Allows for simple and effective management of water quality
- Simplifies document management because operating parameters and operational and incident response procedures are consolidated into one location

#### REFER TO:

3 [Water quality targets and treatment objectives in the water quality risk management plan template](#)

## TIP

Water quality operational control plans can be printed and located at the point of operation. This will ensure that they are visible to all operators.

## SIMPLE SCENARIO EXAMPLE: Looking at a water quality operational target in practice – free chlorine

Please note the following scenario is for demonstration purposes only and does not reflect optimum operating ranges.

### Consider two similar facilities

Facility A and Facility B have bather capacities of 200 people. Both sites are indoor facilities operating at 29 °C. The main pool is also connected to a smaller toddler pool. Prior to opening, staff test the water quality. Pools are tested at four-hour intervals.

Facility information	Facility A	Facility B
Has operational warning and alarm points	Yes	No
Pre-swim shower policy in place	Yes	Yes
The toddler pool has separate chemical dosing	Yes	Yes
Swim nappy policy in place	Yes	Yes

### Water quality operational targets

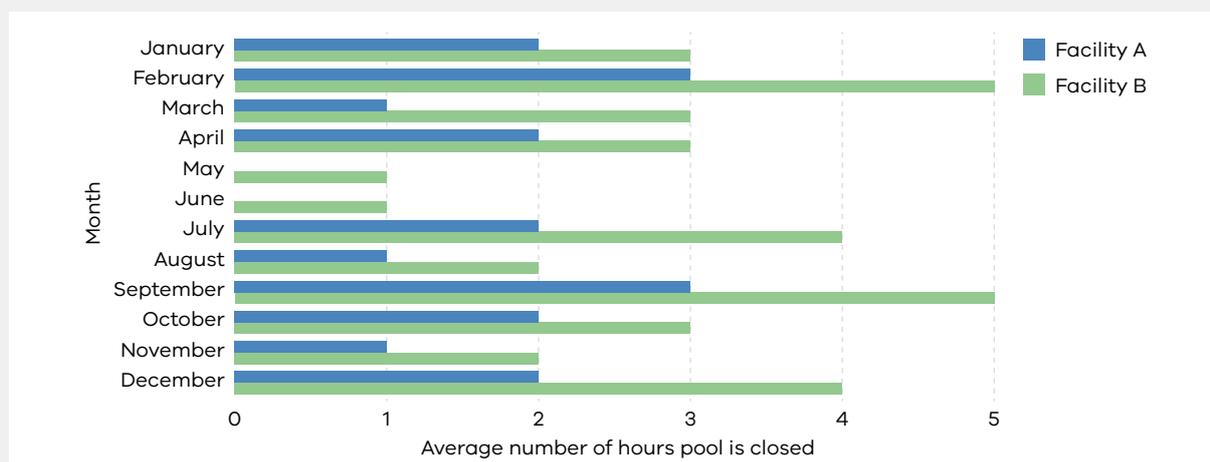
Please note for this simple scenario, free chlorine is only used as a parameter to demonstrate application of operational monitoring as a tool to preventing poor water quality.

DOSE RATE	Facility A: 1.1 mg/L Facility B: 1.1 mg/L	Set point		Action limit		Critical limit	
		Facility A	Facility B	Facility A	Facility B	Facility A	Facility B
Free chlorine (mg/L)		2.5	2.5	2.0	Not specified	1.5	Not specified

### Scenario: There has been an influx of children due to school holidays

Facility A	Facility B
<ul style="list-style-type: none"> <li>Performs routine pool test.</li> <li>Free chlorine has decreased since opening check. It is now within the action range documented in the facility's water quality operational control plan.</li> <li>The operator implements procedural steps to increase the free chlorine levels to the target range.</li> <li>Free chlorine is monitored throughout the day. Slight decreases are identified and responded to.</li> </ul> <p><b>Result</b></p> <ul style="list-style-type: none"> <li>Free chlorine complies with regulations throughout all periods of operations.</li> <li>No pool closures required.</li> </ul>	<ul style="list-style-type: none"> <li>Performs routine pool test.</li> <li>Free chlorine has decreased since opening pool test.</li> <li>The facility has not adopted any criteria for determining when action needs to be taken.</li> <li>The operator checks again after another two hours.</li> <li>The water quality is now outside of regulated parameters.</li> </ul> <p><b>Result</b></p> <ul style="list-style-type: none"> <li>The aquatic facility is not compliant with the free chlorine requirement in the regulations and is required to close.</li> <li>Pool remains closed for 60 minutes until the free chlorine level is corrected to comply with the regulations.</li> <li>Service impacts including frustration for customers.</li> </ul>

### Facility A vs Facility B – time pool is closed per month



## 4. Hazard identification, risk assessment and control measures

### Purpose

To identify and document all potential hazards, hazardous events and sources so the associated risks can be understood and effective risk management strategies (controls) developed.

Having a detailed understanding of the aquatic facility is essential to prepare for a hazard identification and risk assessment. To prepare this component of the water quality risk management plan, where possible include a team, who are familiar with different aspects of the aquatic facility. The hazard and risk assessment process should include each component of the aquatic facility and the water quality risks that may affect it. Include all potential hazards (such as pathogens), hazardous events (such as failure of the disinfection system) and sources (such as a faecal contamination event).

The method for assessing aquatic facilities and conducting hazard identification and risk assessment can be summarised into six steps:

1. Identify hazards/hazardous events and sources
2. Determine the consequence of each hazard/hazardous event
3. Identify and evaluate the existing controls and preventative measures for each hazard/event
4. Assess the likelihood and assign the level of risk for each identified hazard/event
5. Document, report and manage identified risks
6. Monitor and review.

### Step 1: Identify hazards/hazardous events and sources

In general, there are three types of hazards that can affect water quality within an aquatic facility: **microbiological**, **chemical** and **environmental**. Consider the hazardous events (for example, disinfection failure or a faecal contamination event) that would result in a hazardous event.

#### Definitions

**Hazard:** A source of potential harm or a situation with a potential to cause illness.

**Hazardous event:** An incident or occurrence that can lead to the presence of a hazard.

**Consequence:** The outcome of an event or situation expressed qualitatively or quantitatively, being a loss of water quality, impact on public health, disadvantage or gain.

**Likelihood:** A qualitative description of the frequency of an event occurring.

**Risk:** The chance of an event happening that will have an impact upon objectives. It is measured in terms of consequence and likelihood.

**Control:** Any measure or action that modifies or regulates risk. Can include any policy, procedure, practice, process, technology, technique, method or device that modifies or regulates risk.

### Questions to ask in identifying hazards and hazardous events

- What is the source of the hazard?
- What might happen?
- What would the effect be?
- When, where, why and how are these events likely to occur?
- Who might be involved or affected?
- Are there controls in place to treat this?
- How effective are the controls and what level of control is currently being achieved?
- What could cause the control to fail in managing this event?

## Step 2: Determine the consequence of each hazard/hazardous event

### Determine the consequence

Determining the consequence of a hazard requires experienced judgement and agreed assumptions. This process should involve decision-makers, managers, the risk assessment team and operational staff. Use the best available information sources to inform this process such as: records; relevant experience; industry practice and experience; expert judgements; and case studies. Apply your own knowledge and assumptions to determine the severity of each hazardous event.

Table 1 sets out qualitative measures for consequence or impact.

**Table 1: Qualitative measures of consequence or impact**

Severity level	Public health consequence
Insignificant	Isolated aesthetic issue <b>For water quality</b> – a water quality incident/event that has no public health impact
Minor	Minor health-related issue such as skin/eye irritation or isolated water quality issue <b>For water quality</b> – localised illness (diarrhoea) that does not require medical attention
Moderate	Acute health impact such as a faecal incident or water quality repeatedly non-compliant with the Public Health and Wellbeing Regulations <b>For water quality</b> – localised illness (diarrhoea) requiring medical attention
Major	Probable health impact such as a diarrhoeal incident or pathogens detected, or facility impacted <b>For water quality</b> – Confirmed outbreak of disease causing widespread illness (more than three confirmed cases) requiring hospitalisation
Extreme	A fatality, or long-term or permanent disabling effects on human health <b>For water quality</b> – Confirmed outbreak of disease causing serious widespread illness (for example, a confirmed outbreak of cryptosporidiosis), disease secondary to water-borne illness, fatality

# TIP

In general, when assessing the risk of a microbiological hazard in water, the assumption is made that the pathogen is present in the water.

Supporting requirements for assumption

- pathogens are introduced to water by contaminants people carry on their bodies
- bathers are sharing one body of water

Therefore, the risk is the **hazardous event** which may cause the breakthrough of pathogens.

The consequence of the presence of a pathogen in the water is that a visitor or staff member may get sick. The degree of illness will vary with each individual circumstance, which in turn alters the severity of the consequence. It is best to use the worst-case scenario to determine the **consequence** or impact and if in doubt, assign a higher rather than lower severity level.

To determine the **likelihood** of the pathogen, the controls that protect patrons/staff from exposure to the pathogen need to be identified – (for example, disinfection identified as a **control measure**).

The reliability and effectiveness of this control is key to decreasing the likelihood of occurrence/exposure. Some controls may be identified and assessed by reviewing operational records, pool monitoring logs etc or validation tests on the disinfection system.

Therefore, for microbiological risks, the facility will only have the ability to reduce/eliminate the likelihood of occurrence through application of controls or changes in practices. The facility cannot change the consequence as if a vulnerable patron is exposed to a pathogen from the water, they are more susceptible and are more likely to get sick.

Table 2 provides examples of different types of aquatic water quality incidents and the associated public health consequences.

**Table 2: Industry examples of aquatic water quality incidents**

Incident details	Microbiological hazard	Chemical hazard	Environmental hazard
<b>Location</b>	Water park	Aquatic facility	Outdoor pool
<b>Hazard information</b>	<i>Pseudomonas aeruginosa</i>	Dry chlorine and sodium bisulfate mixed in pool's water	Environmental dust storm
<b>Hazardous event</b>	Inadequate disinfection	Chemical incorrectly mixed in pool's water	Dust storm
<b>Cause</b>	Inefficient operation of treatment system and human error	Unsafe mix and human error	Natural environmental dust storm
<b>Consequences</b>	<p><b>Public health</b> – partial blindness in one eye for a child – <b>EXTREME</b></p> <p><b>Reputation</b> – nationwide – <b>MAJOR</b></p> <p><b>Service delivery</b> – closures &gt; days–weeks – <b>EXTREME</b></p>	<p><b>Public health</b> – 14 people treated for health issues caused by spill: 1 critical, 2 stable, 6 hospitalised – <b>MAJOR to EXTREME</b></p> <p><b>Reputation</b> – national news – <b>MAJOR</b></p> <p><b>Service delivery</b> – short-term disruption – <b>MODERATE</b></p>	<p><b>Public health</b> – nil – pool closed</p> <p><b>Service delivery</b> – pool closed – 24 hours – <b>EXTREME</b></p>

### Step 3: Identify and evaluate the existing controls and preventative measures for each hazard/event

Identify the preventive measures (controls) for each hazard/hazardous event. A preventative measure is any action, activity or process that is used to prevent hazards from occurring or reducing them to acceptable levels. Assess the overall effectiveness of the control in preventing or reducing the hazard or hazardous event and plan improvements where required. Review past records to verify that the controls present are working. If the preventative measures are not fully effective, then improvement is required.

### Step 4: Assess the likelihood and assign the level of risk for each identified hazard/event

#### Assess the likelihood

After determining the consequence and identifying the controls for each hazard or hazardous event, assess the likelihood of occurrence (see Table 3). Apply your knowledge and experience as well as reviewing past records, relevant experience, industry practice/experience and specialist/expert judgements.

#### What is risk and how is it measured?

Risk is the chance of something happening (for example inadequate disinfection) that will have an impact on objectives (for example, ensuring pathogens are not present in pool water). It is measured in terms of consequence and likelihood:

$$\text{Risk} = \text{consequence} \times \text{likelihood}$$

where:

consequence is the impact if the event occurs and likelihood is the probability of the event occurring.

Table 3: Semi-qualitative description of likelihood

Descriptor	Description
<b>Almost certain</b>	Is expected to occur daily to weekly (52–365 times per year)
<b>Likely</b>	May occur weekly (13–52 times per year)
<b>Possible</b>	May occur monthly (2–12 times per year)
<b>Unlikely</b>	Expected to occur annually (once per year)
<b>Rare</b>	May occur less than annually



### Assign the risk

Use a risk matrix to assign the level of risk to each hazard/ hazardous event (see Table 4). The level of risk for each hazard or hazardous event can be estimated from evaluating the severity of the consequences of the hazard (for example, minor, major) and then identifying the likelihood of occurrence (for example, almost certain, possible, rare).

**Table 4: Qualitative risk analysis matrix – level of risk**

Likelihood	Insignificant	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	Extreme	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	Medium

#### Assessing risk within the scope of a risk management plan

For the purposes of the water quality risk management plan, you are only assessing the risks that relate to water quality. For example, for a faecal contamination event, you will be assessing the hazard and likelihood to determine if any pool users could get sick. Events such as someone slipping into the pool will not jeopardise the public health of other swimmers and is assessed as a health and safety risk, which is not in the scope of this plan.

#### Example

Pathogen risk in pool following faecal contamination:

The pool is operating with a free chlorine residual of 2 mg/L. The aquatic facility does not have a 'pre-swim shower policy' or 'faecal incident policy', and chlorine dosing is unreliable. In the past month, the chlorine residuals have been outside the regulations (less than 1 mg/L) five times. Aside from sand filtration, no additional treatment is in place. Based on this scenario, the hazard is pathogens and the hazardous event is disinfection failure. Because the hazard is pathogens, swimmers may become sick (**consequence = severe**). The likelihood can be defined as 'likely' (event has occurred at least once weekly which if not treated, over a year would be 52 times). Therefore, the risk of inadequate disinfection can be classified as '**extreme**'.

## Step 5: Document, report and manage identified risks

The final stage in the hazard identification and risk assessment process is to consolidate and document the risks, which will create a basic framework to manage, monitor, review and report on that risk. After creating and populating the initial hazard and risk identification table, document the identified risks into a risk register, which is a tool to manage risk. Once risks have been identified, document how these risks will be prevented and/or addressed.

A risk treatment schedule and supporting risk action plan are optional templates that can be used. The risk treatment schedule will document the plan for implementing preferred strategies for managing the identified risks. It provides the detail of who is doing what and when. The facility also needs the ability to document how it will action the improvements required to treat the identified risks. This can be documented in a risk action plan.

### Examples of risk treatment options

<b>Level 1: Highest effectiveness</b>	<b>Elimination</b>	Remove the hazard; for example, eliminate the requirement to carry out the task, use a piece of equipment or chemical.
<b>Level 2: Intermediate effectiveness</b>	<b>Substitution</b>	Substitute the hazard for something safer; for example, replace the work practice/operational control with a safer/more reliable one.
	<b>Isolation</b>	Isolate the hazard from people. This means physically separating the source of harm using barriers; for example, store chemicals in a fume cabinet.
	<b>Engineering</b>	Change the workplace, equipment or work process; for example, install secondary disinfection, implement continuous monitoring, change a fixed sample location.
<b>Level 3: Least effective</b>	<b>Administration</b>	Use administrative controls; for example, develop procedures on how to limit exposure to the hazard, manage the hazard, carry out preventative maintenance provide training to alert people to the hazard.
	<b>PPE</b>	Use personal protective equipment (PPE) such as swim nappies, swim caps and goggles.

## Step 6: Monitor and review

To effectively manage risk, establish a process to monitor (continual assessment of what has been implemented) and review (periodic assessment of the effectiveness of controls/measures in place) the water quality risk management plan. The detail may be captured in the risk register and/or in procedural documents relating to such processes as incident management and audit. This is a continuous process that will require the plan to be updated accordingly. Include in the plan how the risk is monitored and the process for reporting.

### Note

Step 6 relates only to the risk improvement activities and is different from operational and verification monitoring and audit and review.

## REFER TO:

4 *Hazard identification, risk assessment and control measures in the water quality risk management plan template*

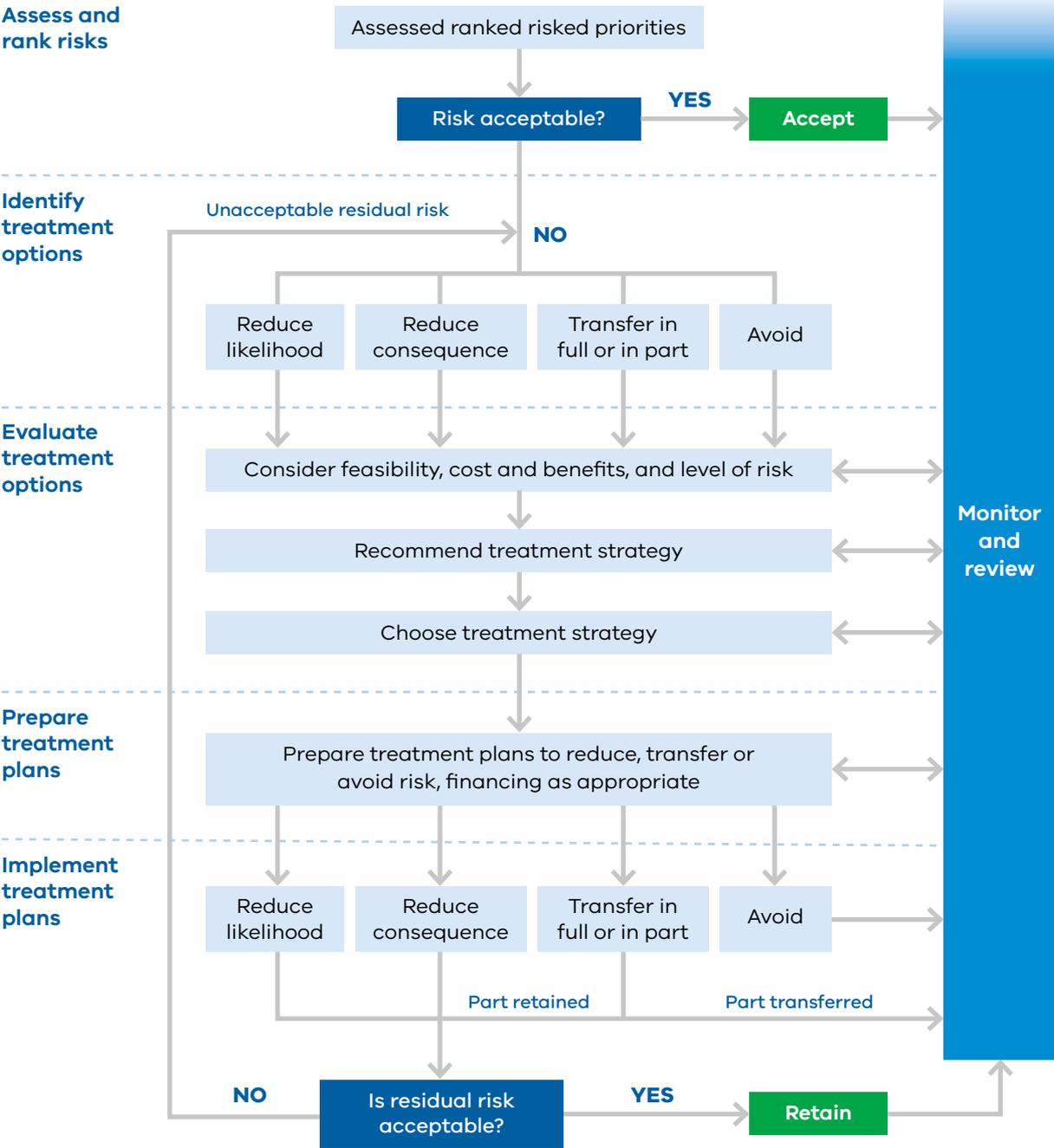
## REFER TO APPENDIX FOR ADDITIONAL OPTIONAL SUPPORTING DOCUMENTS:

- Qualitative measures of consequence (Appendix D)
- Qualitative descriptions – likelihood and risk (Appendix E)
- Risk action plan (Appendix F)
- Risk treatment schedule and plan (Appendix G).

## Considerations to make:

Monitor	Review
<ul style="list-style-type: none"><li>• Incidents – How many? Was the control in place effective? If not, why?</li><li>• Water quality performance – Is the aquatic facility compliant with the regulations? If not, why?</li><li>• Training – Have any incidents resulted from lack of training? If so, what improvements are needed?</li></ul>	<ul style="list-style-type: none"><li>• Effectiveness of controls</li><li>• Assignment of risk – Is the likelihood of occurrence changing?</li><li>• Procedures supporting this plan</li></ul>

Figure 2: Risk treatment process



## 5. Operational and verification monitoring

Operational procedures are central to ensure safe water quality. To effectively manage risk, a proactive approach rather than a reactive one works better to prevent water quality issues and/or public health incidents. Operational monitoring will allow aquatic facility operators to identify potential risks and react promptly.

Verification monitoring ensures the operational controls are working. This monitoring is reactive and, if results indicate water quality contamination, it can be difficult to protect human health because people have already been exposed to potential hazards in the water.

The *Water quality guidelines for public aquatic facilities* <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines>> provide detailed information on the frequency of monitoring required for each parameter and aquatic facility type.

### REFER TO:

5 *Operational and verification monitoring in the water quality risk management plan template*

### REFER TO APPENDIX FOR ADDITIONAL OPTIONAL SUPPORTING FORM:

- Aquatic facility water quality monitoring form (Appendix J).

## 6. Incident response procedures

It is imperative to have suitable incident response and management procedures and to ensure that all staff are trained. The department has provided procedures for some incidents in the *Water quality guidelines for public aquatic facilities* <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines>>. The facility may adopt these procedures and ensure all staff are trained in them. The water quality risk management plan should also contain references to internal processes or procedures that detail how the facility responds to potential hazardous events (for example, to results that do not comply with the regulations).

### REFER TO:

6 *Incident management and response in the water quality risk management plan template*

### REFER TO APPENDIX FOR ADDITIONAL OPTIONAL SUPPORTING FORM(S):

- Corrective action form (Appendix H)
- Incident response form (Appendix K).

Note: The facility should be able to demonstrate corrective actions and responses to incidents and/or events.

## 7. Data recording and reporting

Under the Public Health and Wellbeing Regulations, all public aquatic facilities must maintain all records pertaining to water quality for 12 months from the date of creation. Fill out monitoring logs when samples are analysed and retain records on site. Ensure all records are readily available.

Include a summary of how the facility maintains and manages its records in accordance with the regulations. The facility should also demonstrate how it records incidents, takes corrective actions, conducts operational/verification monitoring, and stores training records.

Refer to section 7.3 of the *Water quality guidelines for public aquatic facilities – managing public health risks* <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines>> for more information.

### Audit and review

At a minimum, the water quality risk management plan will need to be reviewed annually and following an incident. This is to ensure all hazards and hazardous events are identified, suitable controls are in place and the responses are effective in managing the overall risk.

An audit/review should determine the extent to which the plan:

- achieves its objectives
- conforms to requirements outlined in the water quality risk management plan such as water quality targets
- complies with requirements listed in the Public Health and Wellbeing Regulations.

Determine the frequency of audits. Facilities that have a corporate audit plan may include or reference the corporate audit plan in the risk management plan.

Table 5 provides an example summary of audit frequency.

**Table 5: Example summary of audit frequency**

Audit/ review type	Audit	Frequency
In house	Check	Quarterly
External	Compliance	Annual
Regulatory	Compliance	Annual

### REFER TO:

7 *Data recording and reporting in the water quality risk management plan template*

### REFER TO APPENDIX FOR ADDITIONAL OPTIONAL SUPPORTING FORM(S):

- Water quality risk management plan review checklist (Appendix L).

# Supporting documentation

This is an optional component; however, it demonstrates best practice document management.

## References

Include any legislation, standards and/or in-house policies/procedures that the plan adheres to or those that are required to enact the plan. For example, the water quality risk management plan will need to comply to the following:

## Legislation

- *Public Health and Wellbeing Act 2008* (Vic)
- *Public Health and Wellbeing Regulations 2019* (Vic)

## Guidelines

- *Water quality guidelines for public aquatic facilities – managing public health risks*

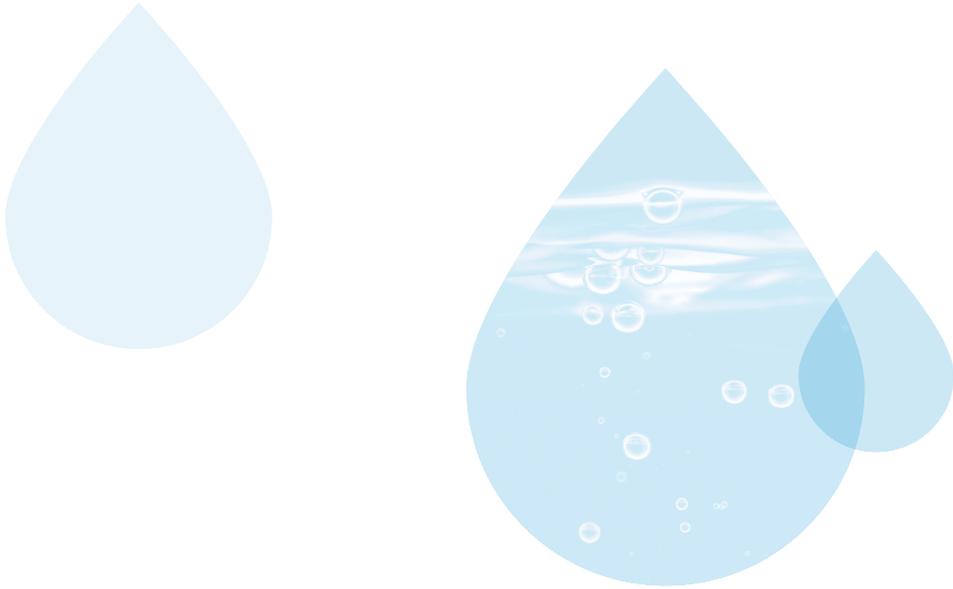
## Australian Standards

SAI Global has compiled a comprehensive list of Australian Standards that may be relevant to public aquatic facilities in its *Guide to Standards – pools and spas* <[https://infostore.saiglobal.com/uploadedFiles/Content/Standards/Guide\\_to\\_Standards-Pools\\_and\\_Spas.pdf](https://infostore.saiglobal.com/uploadedFiles/Content/Standards/Guide_to_Standards-Pools_and_Spas.pdf)>. A list of standards that are relevant for public aquatic facilities are also provided in the *Water quality guidelines for public aquatic facilities – managing public health risks* <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines>>

# Glossary and definitions

For best practice and to decrease the incidence of confusion due to the use of terminology, include a glossary in the plan (optional).

Term	Definition
<b>e.g. WQRMP</b>	e.g. Water quality risk management plan
<b>e.g. Source water</b>	e.g. Water used to fill the aquatic facility and used as make-up water. Usually town water but could also include rainwater (provided it is introduced into the balance tank first).



# References

Department of Health and Human Services 2019, *Water quality guidelines for public aquatic facilities – managing public health risks* <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines>>, State Government of Victoria, Melbourne.

National Health and Medical Research Council 2011, *Australian drinking water guidelines* <<https://www.nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines>> 6 National Water Quality Management Strategy.

*Victorian legislation and parliamentary documents 2020* <<http://www.legislation.vic.gov.au>>.

## **Australian Standards**

AS ISO 31000:2018 *Risk management – Guidelines*



# Glossary

For a comprehensive glossary, please see the [Water quality guidelines for public aquatic facilities – managing public health risks](https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines) <<https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines>>.

Term	Definition
<b>Action range</b>	Preventative measure that indicates water quality may be deteriorating and action is required.
<b>Aquatic facility</b>	A category 1 or category 2 aquatic facility that is not an exempt aquatic facility.
<b>Aquatic facility operator</b>	A person who owns, manages or controls an aquatic facility.
<b>CFU</b>	Colony forming units. A measure of microorganisms per unit volume of water.
<b>Chlorination</b>	Using chlorine as a means of disinfection.
<b>Chlorine demand</b>	The difference between the amount of chlorine added to water and the amount of residual chlorine remaining after a given contact time. Chlorine demand may change with dosage, time, temperature, pH and the nature and amount of impurities in the water.
<b>Consequence</b>	The outcome of an event or situation expressed qualitatively or quantitatively, being a loss of water quality, impact on public health, disadvantage or gain.
<b>Control</b>	Any measure or action that modifies or regulates risk. Can include any policy, procedure, practice, process, technology, technique, method or device that modifies or regulates risk.
<b>Corrective action</b>	Procedures to follow when monitoring results indicate a deviation occurs from acceptable criteria and/or improvements to eliminate undesirable effects
<b>Critical range</b>	Water quality is approaching noncompliance, immediate corrective action required.
<b>Disinfection</b>	The process designed to kill most micro-organisms in the water including essentially all pathogenic bacteria.
<b>Exempt aquatic facility</b>	Means any of the following: <ul style="list-style-type: none"> <li>• a spa pool that is, or is intended to be, emptied of water after each use</li> <li>• a flotation tank</li> <li>• a spring water pool that has a turnover rate of at least 25 per cent of the entire volume of the water in the pool to waste each hour</li> <li>• a waterway within the meaning of s. 3(1) of the <i>Water Act 1989</i></li> <li>• a private dam within the meaning of s. 3(1) of the <i>Water Act</i>.</li> </ul>

<b>Term</b>	<b>Definition</b>
<b>Exposure</b>	Contact of a chemical, physical or biological agent with the boundary of an organism (e.g. through inhalation, ingestion or dermal contact)
<b>Free chlorine</b>	A measure of the chlorine that is available as hypochlorous acid and chlorite ion.
<b>Frequency</b>	A measure of the likelihood expressed as the number of occurrences of an event in a given time.
<b>Hazard</b>	A source of potential harm or a situation with a potential to cause loss.
<b>Hazard control</b>	The application or implementation of preventative measures that can be used to control identified hazards.
<b>Hazard identification</b>	The process of recognising that a hazard exists and defining its characteristics (AS/NZS 3931:1998).
<b>Hazardous event</b>	An incident or occurrence that can lead to the presence of a hazard.
<b>Inadequate disinfection</b>	Disinfection that does not fully kill and/or inactivate pathogens.
<b>Incident</b>	An undesired event that disturbs normal operations and may adversely affect the facility.
<b>Likelihood</b>	A qualitative description of the frequency of an event occurring.
<b>Monitor</b>	To check, supervise, observe critically or record the progress of an activity, action or system on a regular basis to identify change.
<b>Outbreak</b>	Two or more human cases of a communicable (infectious) disease related to a common exposure.
<b>Pathogen</b>	A disease-causing micro-organism.
<b>Premises</b>	Building that is occupied by a business or considered in an official context.
<b>Preventative action</b>	Any planned action, activity or process that is used to prevent hazards from occurring or reduce them to acceptable levels.
<b>Residual risk</b>	The risk remaining after consideration of existing preventative measures.
<b>Risk</b>	The chance of an event happening that will have an impact on objectives. It is measured in terms of consequence and likelihood.
<b>Risk analysis</b>	A systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequences.

<b>Term</b>	<b>Definition</b>
<b>Risk assessment</b>	The process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria.
<b>Risk control</b>	That part of risk management that involves providing policies, standards and procedures to eliminate, avoid or minimise adverse risks facing the facility.
<b>Risk identification</b>	The process of determining what can happen, why and how.
<b>Risk management</b>	The systematic evaluation of the aquatic facility, the identification of hazards and hazardous events, the assessment of risks and the development and implementation of preventative strategies to manage the risks.
<b>Risk register</b>	A repository for all risks identified and includes additional information about each risk. It records all information about identified risks.
<b>Risk treatment</b>	Selection and implementation of appropriate options for dealing with risk.
<b>Source water</b>	Water used to fill the aquatic facility and used as make-up water. Usually town water but could also include rainwater (provided it is introduced into the balance tanks first).
<b>Stakeholder</b>	A person or organisation that can affect or be affected by a decision or activity.
<b>Target range</b>	Preventative measure that indicates water quality is within the acceptable range.
<b>Validation of processes</b>	The substantiation of effectiveness through investigative or experimental studies existing or of new processes, operational criteria to ensure capability to effectively control hazards.
<b>Water quality monitoring</b>	The wide-ranging assessment of the quality of water in the aquatic facility that includes the regular sampling and testing performed for assessing conformance with regulatory requirements.
<b>Water quality risk management plan</b>	A plan that describes how an aquatic facility intends to manage risk. It describes the management components, the approach and the resources that are used to manage risk.
<b>Water supplier</b>	An organisation, agency or company that has the responsibility and authority for treating and/or supplying water.

