Environment Protection Authority

Code of practice for vessel and facility management (marine and inland waters)

EPA South Australia

Code of practice for vessel and facility management (marine and inland waters)

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Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

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Foreword

South Australia's waterways, be they inland or marine, must be protected from continuing damage caused by pollution. This is a task for all.

This code of practice embraces the prevention of pollution which may arise from the construction, use and maintenance of vessels and related facilities. It provides guidance for ship and boat builders and repairers, shipping companies, maritime construction engineers, fishing organisations, yachts-people, and even the lone enthusiast who occasionally puts to sea in a 'tinny' with fishing rod and icebox on board. It is for both those who earn a living from the sea or other waterways, and for those who use our waters for holidays, recreation and sport.

The South Australian Environment Protection Authority first drafted this code in 2008 with the assistance of a community based advisory group whose members had wide-ranging interests in our waterways. Members of this advisory group volunteered to contribute to this code and acted in an honorary capacity. They recognised the need for protecting the environment for their wellbeing and those who come after them.

Since the inception of this code, the Boating Industry and the EPA have worked together towards gaining blackwater and greywater compliance for private and commercial vessels that use State waters. In recent years, issues arose with the market failure of a commercially available on-board greywater treatment system and maintenance requirements that applied to the other commercially available system; this prompted the need for this review of the code.

The EPA and the Houseboat Hirers Association, now a part of the Boating Industry Association of NSW & SA Ltd, have been able to work together and initiate an alternative, cost-effective and sustainable solution for greywater management to alleviate any outstanding compliance concerns from the Industry. The alternative approach has been included in 5.16 and 5.18 of this code.

This code highlights the importance and value of government and industry working in partnership to establish practices for the ongoing benefit of the whole community.

1 Introduction

South Australia's marine and inland waters have substantial environmental, social and economic value. The state government therefore has a responsibility to protect these habitats and their biodiversity, and to provide community leadership and direction in their sustainable use, improved management, and conservation. Aquatic users are dependent on these resources, whether for commercial harvesting of fish and crustaceans, or for enjoying recreational pursuits such as fishing and water sports.

The maritime industry has long been a part of South Australia's community. Several slipways and boat clubs have been operating at their current locations for over 100 years. Continued demand for the services offered and activities undertaken within the industry is expected to grow. South Australia currently has:

- over 55,000 registered (mechanically powered) and up to 50,000 unpowered, unregistered recreational vessels
- over 3,000 commercial vessels
- 249 public vessel launching facilities
- at least 34 marinas
- over 30 boat/yacht clubs
- a total of 40 vessel construction and maintenance facilities

There is a requirement that commercial/surveyed vessels, registered with the Australian Maritime Safety Authority (AMSA), be slipped twice every five years.

It is recognised that marinas, vessel service facilities and vessel operators can significantly affect the quality of our aquatic environment. Facility operators and users may be unaware of, or underestimate, the environmental damage that can result from their practices and the wastes they generate. In particular, toxic paint chips, paint residues and other solid and liquid wastes containing heavy metals, nutrients, acid, oil, hydrocarbons and invasive pest species can have seriously deleterious effects. The effect of a single boat or slipway might seem insignificant, but when multiplied by the thousands of vessels and many facilities in use today, the potential impact is significant.

The South Australian Environment Protection Authority (EPA), along with an external advisory group (Appendix 6) and, in partnership with the former Commonwealth Department of the Environment, Water and the Arts, developed this code of practice to encourage best environmental management practices for the benefit of both current and future generations.

Scope of this code of practice

This code of practice applies to people, organisations and agencies that own, operate and use vessels, vessel construction and maintenance facilities (including slipways and launch facilities), and vessel storage facilities (including dry dock boat yards, marinas, moorings, boat and yacht clubs) within or adjacent to the state waters of South Australia. State waters include the inland, estuarine and marine waters (coastal state and territorial waters) vested in the state (Appendix 1).

2 Environment protection regulatory framework

The EPA codes of practice do not contain offence provisions, but they fit within a framework of regulatory tools (see Figure 1) that can be used by the authority with the aim of protecting the South Australian environment from pollution and polluting activities. When a code of practice is linked to an environment protection policy (EPP), compliance with the requirements of a code (the things that you **must or must not** do) can be enforced by an environment protection order (EPO). Non-compliance with an EPP is an offence under the *Environment Protection Act 1993* (EP Act).

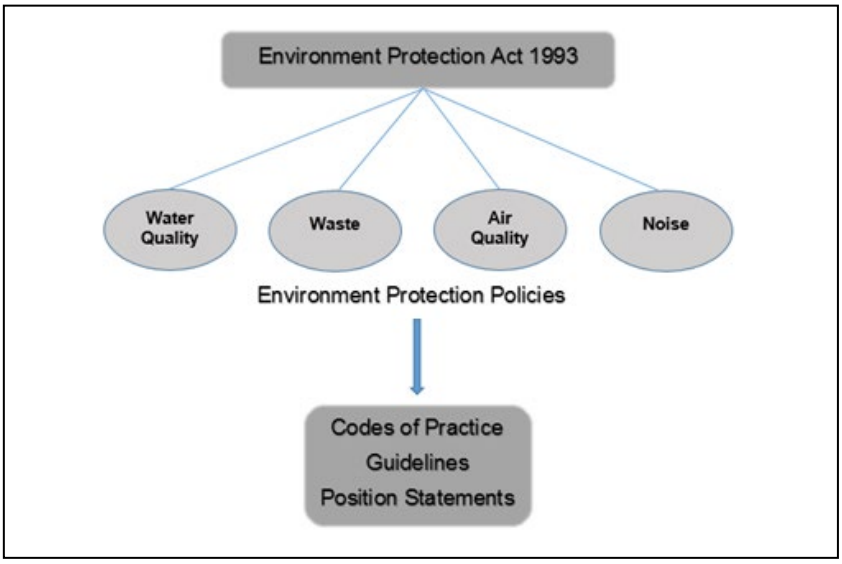


Figure 1 Relationships between the Environment Protection Act, environment protection policies, codes of practice and guidelines

2.1 Environment Protection Act 1993

At the top of the hierarchy, the EP Act provides for the protection of the environment and defines the authority's functions and powers. The Act promotes ecologically sustainable development and the use of the precautionary principle to minimise environmental harm. It requires polluters to bear an appropriate share of the costs and responsibilities of protecting the environment from their activities. The Act makes people or organisations responsible for minimising harm to the environment resulting from their actions.

2.2 Environment protection policies

EPPs are the second level of environment protection legislation. They can be developed for any area to secure the aims of the EP Act. The *Environment Protection (Water Quality) Policy 2015* is an example.

The principal aim of the Water Quality Policy is to achieve the sustainable management of waters by protecting or enhancing water quality while allowing economic and social development. In particular, the policy seeks to:

- ensure that pollution from both diffuse and point sources does not reduce water quality
- promote best practice environmental management.

EPPs may contain mandatory provisions that are enforceable under the EP Act, either as offences or by the issuing of an EPO. EPPs may also refer to, or require compliance with codes of practice.

2.3 Codes of practice

A code of practice is designed to assist in the compliance with the general environmental duty and to fulfil obligations under the EP Act and associated environment protection policies. It does this by closely examining an industry or activity, its various aspects and impacts and, through a process of negotiation, formulate reasonable and practical outcomes and recommended practices to achieve good environmental outcomes. These are outlined as 'musts' and 'shoulds', which are defined as the following:

MUST ⇒ indicates a requirement[1] which if ignored, is likely to lead to a breach of the EP Act or relevant EPPs, or may expose the environment to a risk of harm.

SHOULD ⇒ represents a recommended practice that operators need to have regard to in order to meet their general environmental duty.

Before a code of practice can become enforceable, the EPA must consult with communities, organisations, and industries likely to be affected by it. The EPA must consider the views expressed by those consulted and pass them on to the responsible minister. For the original version of this code of practice, the principle consultation process involved just the members of the external advisory group. This revision has been prepared in consultation with the peak bodies associated with the houseboat industry.

This code of practice is linked to the Water Quality Policy. The requirements outlined in this code are enforceable by the issuing of an EPO under section 93 of the EP Act. Failure to comply with an order is a breach of the Act and constitutes a criminal offence.

2.4 Guidelines

EPA guidelines are advisory rather than regulatory documents in that they inform general environmental duty while providing guidance to an industry or activity. In some cases they may explain the legislation, but guidelines are not enforceable in their own right. They are 'how to' documents that include technical information and may further explore the recommended methods of undertaking an activity as outlined in a code of practice.

2.5 Authorisations

The EP Act states that an environmental authorisation is required before certain activities of environmental significance can be undertaken. These activities are outlined in Schedule 1 of the Act, a number of which involve the maritime industry (refer to Appendix 2).

If the EPA grants an authorisation, it may impose conditions necessary or expedient for the purposes of the Act. Where a code of practice exists for an activity of environmental significance, the optimum requirements of the code contained within 'musts' will, if appropriate, form conditions of licence. However, due to the higher environmental risks associated with these activities, additional conditions of licence may also be applied, for example to those relating to infrastructure, reporting or monitoring requirements.

2.6 Importance of other government legislation and codes of practice

The environmental legislation administered by the EPA is only a part of the legislation that regulates the vessel industry. Vessel and facility operators and developers should also be aware of their obligations under public health; occupational health, safety and welfare; dangerous substances; primary industries; and transport legislation.

Many provisions contained in other legislation and codes promote practices that have environmental benefits. Organisations are required to comply with the mandatory provisions. It is important to note that the EPA cannot enforce legislation outside its authority – this is the responsibility of the relevant government body.

A number of maritime industries have developed their own code of ethics and/or environmental accreditation schemes and handbooks. The EPA encourages the development of such tools and this code of practice would assist with their development and/or review.

[1] Mandatory practice in accordance with requirements of the EP Act and associated environment protection policies. Other legislation, such as administered by Department of Primary Industries and Regions SA (PIRSA) and Department for Environment and Water (DEW), also contain mandatory practices that will not be specified in this document.

3 Underlying principles of this code of conduct

3.1 Pollution avoidance

The potential to cause environmental harm can be significantly reduced if the waste management hierarchy is applied as shown in Figure 2.

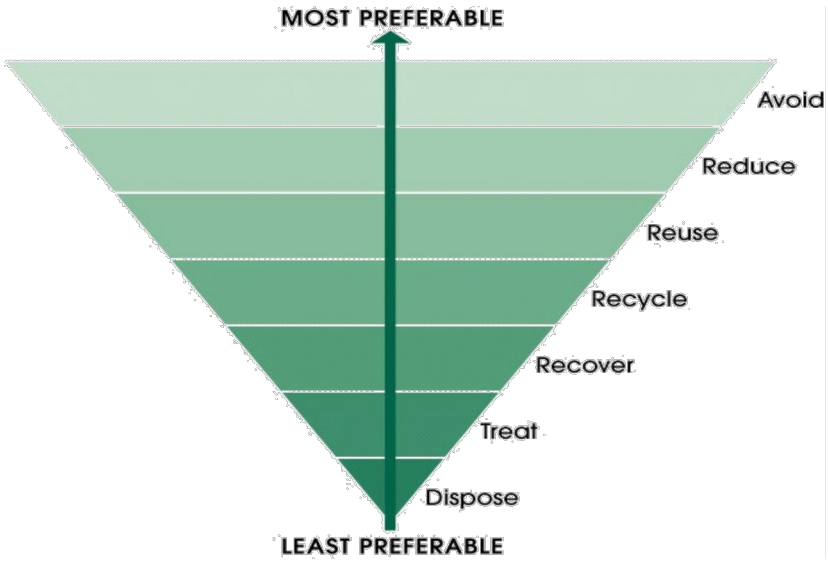


Figure 2 Waste management hierarchy

It is better to avoid the production of pollutants or waste products as it is more likely to be ecologically and economically sustainable to do so than to dispose.

AVOIDANCE do not produce the waste in the first place

REDUCTION reduce the amount of pollution or waste by changing the way the activity is carried out

REUSE some products and materials can be reused with minimal processing, for example use durable alternatives to disposables, or use waste materials from one process as the raw material for another

RECYCLING break down products into their constituent materials and reprocess this into new articles

TREATMENT remove pollutants from waste streams using chemical or physical methods, decreasing the environmental impacts

DISPOSAL transfer waste to another location under controlled conditions for long-term storage (no further use).

To assist with the application of the waste management hierarchy, it is important to consider the closely related tools of environmental planning and environmental management systems. Environmental planning is concerned with the future, while an environmental management system is concerned with what is happening now and how to implement plans.

3.1.1 Environmental planning

One of the most important functions of environmental planning is ‘finding the best use for each location and the best location’ for each use. Many, if not all, environmental management practices in a code of practice should be considered during the environmental planning stages of development proposals, as well as during assessment and construction (eg wastewater collection facilities, bunded and roofed refuelling facilities and stormwater reuse). In doing so, compliance with the code of practice can be achieved, so avoiding the cost of future modification or retrofitting.

Government planning authorities include councils, the EPA, Department of Planning, Transport and Infrastructure (DPTI), Department for Environment and Water (DEW), Coast Protection Board and Department of Primary Industries and Resources SA for vessel registration. These authorities have planning policies and guidelines that relate either directly to

the industry, or indirectly (for example, coast protection measures). It is likely that this code of practice will be a key guiding document for the establishment of policy for assessing development by many of these authorities. Before seeking approvals for new development, organisations are advised to consult with these agencies on their policies and prepare any application accordingly.

3.1.2 Environmental management systems

In most cases, organisations will already be in operation and so the opportunity for environmental planning has passed. In this case, the application of a code of practice is more complex, but often a necessity to avoid further environmental harm. A useful and commonly applied tool for incorporating environmental best management practices (like those outlined in a code of practice) into existing operational structures is an environmental management system (EMS).

An EMS is a systematic approach that can be used by a business or organisation to identify and manage significant impacts on and risks to the environment that can occur as a result of its activities. It provides a structured way to identify environmental impacts and legal responsibilities, set clear objectives and targets, and then implement and review changes for continual improvement. The most generally accepted process for an EMS is outlined in Figure 3.

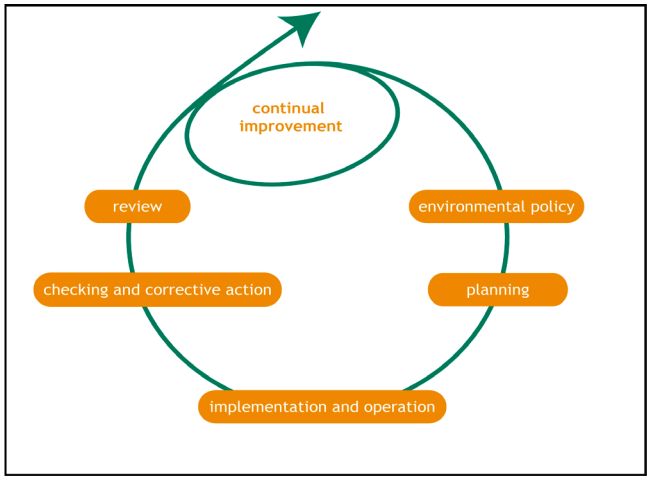


Figure 3 Environmental management system process (Source: Small business environmental management solutions, Business SA 2002)

3.1.3 Risk management

Risk management is a key business process within both the private and public sectors around the world. Sound and effective implementation of risk-management policies and procedures are part of best business practice, as well as a means of improving operational activities. It is the connective element between managing the environmental health, safety, and economic aspects of a business.

This code of practice is designed to facilitate the risk-management approach, as a recognised method by which individual site characteristics, operations and resources can be taken into account before devising the most reasonable and practical techniques for management to be implemented. This is further explored in Section 4 – How to use this code of practice.

A joint *Australian/New Zealand Standard AS/NZS 4360 Risk Management* has been developed for guiding businesses through the process. A handbook to accompany this standard has also been produced to demonstrate how to establish the context, and then to identify, analyse, evaluate, treat, communicate and monitor any risks.

4 How to use the code of practice

This code of practice outlines preferred environmental management practices for the operation of vessels and vessel facilities, by firstly considering the application of environmental management systems and environmental incident reporting (sections 5.1 and 5.2). The code then addresses the new development and general management of vessel facilities (sections 5.3 and 5.4), before outlining the various activities or issues relating to the operation of vessels and their facilities that can cause environmental harm, if not managed appropriately (sections 5.5−5.21).

It is therefore the intention that all readers of the code examine sections 5.1 and 5.2, and then consider which further sections are relevant to them depending on:

- what types (and scale) of activities are performed
- what types of wastes are produced.

Each section provides:

- a summary of the activity or issue and any environmental concerns
- an outline of who this section should apply to (these are guides only and it must be remembered that all persons have a general environmental duty not to pollute the environment)
- ‘musts’ or required outcomes
- ‘shoulds’ or recommended practices
- key notes and references to assist or further clarify the management of that activity or issue.

The ‘must’ requirements throughout the code are generally designed to establish an optimum outcome(s), with alternatives ‘or’ that provides for an assessment of risk of the activity being performed; and subsequent flexibility in determining the method of control to be used.

Methods for reducing risk are outlined as ‘shoulds’ and are only recommended practices. These recommendations may be methods not suitable for application in all instances and the EPA encourages operators to devise their own methods to achieve the desired outcome for their particular circumstance.

The EPA is primarily concerned with prescribing environmental outcomes and not methods of achieving such outcomes. Operators are encouraged to use their experience, knowledge and ingenuity within their own industry to develop tools to avoid pollution, provided that environment protection standards are retained. The use of this code of practice as a reference tool in establishing leases, contracts, environmental management systems and standard operating procedures is encouraged.

5 Environmental management practices

5.1 Environmental management systems

All vessel and facility operations have some impact on the environment. All operators have a responsibility to ensure that whatever the level of impact, it is managed appropriately and pollution is avoided where possible. An environmental management system (EMS) provides a structured way of planning and implementing environment protection measures. Most importantly, it can be used for formulating an understanding between parties as to how this will occur.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators should:

1 Develop, implement and review (annually) an EMS to achieve high environmental performance standards for all operations undertaken.

> **KEY NOTE**
>
> Vessel facilities differ from location to location. They can be unconfined moorings used for commercial fishing vessels or enclosed marinas with a range of services offered which may include refuelling stations and wastewater pump out. The types of operations that occur within these facilities also vary from location to location. As such, it is important when developing an EMS, aspects and impacts of individual facilities are considered and an environmental action plan designed to suit. For example, a facility primarily used for commercial fishing vessels would require an EMS with an emphasis on actions to prevent pollution from activities such as stock feed or bait handling.

2 Establish facility and vessel-specific environmental management practices (where multiple facilities/vessels are owned) under an overall EMS to ensure practices are relevant to the individual circumstances.

3 Incorporate relevant best environmental management practices from this code of practice and/or from EMS into contractual (or non-contractual) conditions of using the facility or vessel.

4 Develop emergency management procedures, including those for stormwater management during extreme events.

5 Have users, customers, contractors, employees and members provide written acknowledgment that they understand and will abide by EMS obligations before undertaking any work or activity on your vessel or facility.

6 Keep copies of all government permits and conditions of approval related to the construction and operation of the facility. This may include land-use planning permits, Crown Land lease or EPA licence conditions.

7 Maintain a list of all materials (liquid and dry) kept on the premises together with up-to-date copies of all safety data sheets (SDSs).

8 Record and retain waste tracking forms and invoices, or maintain a vessel log for all waste and wastewater disposals mechanisms.

9 Maintain a slipping register containing the details of all vessels slipped and the work done on each vessel. For example, record the name of the vessel, registration details or distinctive markings, length, gross tonnage, paint history (types of hull coating applied and application dates) and recent voyage history (ie whether from intrastate, interstate or overseas).

10 Retain environmental monitoring data collected for aquatic or land-based discharges.

11 Establish a daily, weekly or monthly checklist (depending on the nature of the facility) to ensure that key work areas are kept clean and appropriate storage, work and management procedures are being adhered to. Assign different inspection responsibilities to specific facility staff or club members.

12 Educate employees, customers, users and members on environmental management practices through initiatives such as signage, newsletters and training programs.

13 Supply suitable safety equipment and clean up kits for each facility in the event of a spill.

14 Exchange knowledge of environmental management practices within the industry to establish and encourage a uniform approach.

KEY REFERENCES

Australia and New Zealand Standard, *AS/NZS 4360:2004 Risk Management*, www.saiglobal.com

Small business environmental management solutions, https://www.epa.sa.gov.au/files/47726_sbes.pdf

Bunding and Spill Management, https://www.epa.sa.gov.au/files/47717_guide_bunding.pdf

International Environmental Management Standard ISO 14001, www.iso14001.com.au/iso-14001-standard.html

Clean Marina Program, https://www.marinas.net.au/

5.2 Environmental incident reporting

Environmental harm can be minimised if environmental incidents are reported immediately so that action can be taken at the earliest opportunity to mitigate any adverse effects. In some circumstances, reporting incidents to the EPA is also a legislative requirement.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators must:

Comply with section 83(1) of the EP Act which states:

> Where an incident occurs so that serious or material environmental harm from pollution is caused or threatened in the course of an activity undertaken by a person, the person must, as soon as reasonably practicable after becoming aware of an incident, notify the Environment Protection Authority of the incident, its nature, the circumstances in which it occurred and the action taken to deal with it.

KEY NOTE

In most cases, concerns about pollution should be referred to the source or person causing the problem in the first instance. The EPA incident reporting (non-emergency) and complaints telephone number is 8204 2004 (non-metro callers 1800 623 445).

Emails to the EPA are acceptable epainfo@sa.gov.au but must include:

- name, address and daytime telephone number of person reporting the incident
- incident details (please indicate if the incident is still occurring at the time this notification is lodged)
- date and time of incident
- details of source of pollution – business name, address, etc
- location of incident (not always the same as address).

Note: The EPA may not be able to act on complaints lodged more than **two business days** (Monday to Friday) after the incident occurs.

Caller's details are confidential to the EPA, but details may be given to the local council if the incident is within its jurisdiction.

The Department for Transport, Energy and Infrastructure (DPTI) is responsible for the management of the Marine Oil Spill Response program in South Australian waters. The 24-hour emergency contact number is 8248 3505.

Operators should:

1 Prepare environmental incident records when there has been a release of solid, liquid or gas (or a combination thereof) during operations that is not ordinarily expected to occur despite the existence of a proper maintenance program and procedures due to the following:

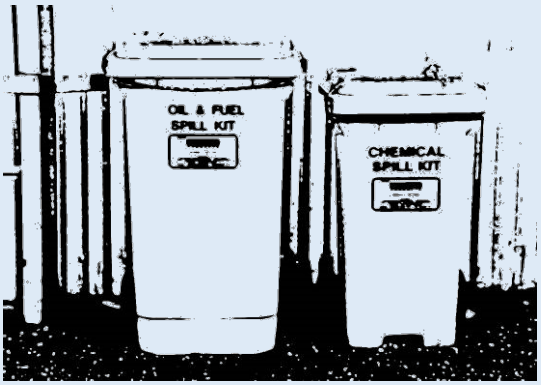
- plant or equipment breakdown or malfunction
- power generation failure
- pipe or pipeline breakage
- storage container or vessel fracture
- vandalism or sabotage
- bund fracture, leakage or overflow
- a physical or chemical reaction
- transportation vehicle breakdown, malfunction or accident using plant or equipment for a purpose for which it was not designed
- operating or maintaining plant, vehicles or equipment in an improper manner
- failure to process, handle, move or store goods and or materials in a proper manner.

2 Retain environmental incident records for a period of two years from their creation.

3 Review processes and/or equipment and undertake appropriate actions to avoid future incidents from the same or similar cause.

4 Include in an environmental incident record:

- location of the incident
- time and date of the incident
- description of the release (substance, estimated volume)
- source of the release (if known)
- management strategies undertaken
- name and contact details of the recorder.



KEY NOTE

Although often neglected, record keeping is an increasingly essential tool for operations management in any industry. It can serve a number of purposes such as providing a better understanding of operations, a method of communicating between operators, evidence that legislative requirements have been met and information for evaluating efficiencies and/or deficiencies. All such outcomes have benefits for environment protection.

KEY REFERENCES

ANZECC, Best practice guidelines for waste reception facilities at ports, marines and boat harbours in Australia and New Zealand

Australia's Clean Marina Program, https://www.marinas.net.au

South Australia recycled water guidelines, www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/resources/policies/south+australian+recycled+water+guidelines

EPA website: https://www.epa.sa.gov.au

Bunding and spill management, www.epa.sa.gov.au/files/47717_guide_bunding.pdf

Guide to Development Assessment, https://www.sa.gov.au/topics/planning-and-property/land-and-property-development/building-and-property-development-applications/development-application-guides-forms-and-fees

Melbourne Water, *Water Sensitive Urban Design Engineering Procedures: Stormwater*, www.publish.csiro.au/book/4974/

Rainwater tanks, https://www.health.gov.au/internet/main/publishing.nsf/Content/0D71DB86E9DA7CF1CA257BF0001CBF2F/$File/enhealth-raintank.pdf

5.3 Vessel facility development (and redevelopment)

Any over or underwater development carries with it an inherent risk of environmental harm, both in its construction and ongoing operation. Vessel facilities are generally constructed or manufactured to operate in low energy, sheltered environments to benefit the types of operations performed (ie vessel storage/maintenance). These environments, such as rivers, bays and estuaries are ecologically significant and known to be more sensitive to the influx of pollutants than higher energy, more exposed environments. As such, the development of new and existing vessel facilities requires careful consideration to avoid environmental harm.

This applies to:

- vessel facility developers (including development of and within ports, marinas, slipways, moorings, boat yards and ramps).

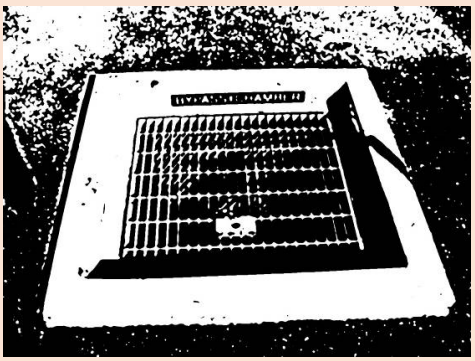
Vessel facility developers must:

1 Ensure that the necessary development application process is followed.

2 For activities of major environmental significance or development that is within both the River Murray Water Protection Area and a River Murray Protection Area, ensure the vessel facility is fit for the purpose (refer to following Key Note) of permitted vessel operations, and avoid, as far as is reasonable and practicable, the release of pollutants to the environment:

BY

Providing in-built structural pollution controls in areas designated for activities that are proposed through the operation of and use of the facility (this includes refuelling, cleaning, fibreglassing, abrasive blasting and painting)



AND

Providing waste and wastewater collection facilities and/or waste transfer (reception) stations and/or by facilitating waste transporters commensurate to the type of vessels and activities likely to be performed through the operation of and use of the facility (this includes wastes from vessels such as blackwater, greywater and bilge water, garbage and those from vessel service and repair activities)

AND

During the course of development, ensure spill, erosion and sediment control equipment are available for all pollutants likely to be generated through construction.

KEY NOTE

In South Australia, all **development*** requires approval under planning law. Development includes a change in the use of land and building work to construct a vessel facility.

Organisations should contact their local government/council authority for further information on development regulations and planning policies for developments in or on water.

Planning authorities are required to refer certain types of development applications to other agencies, known as 'prescribed bodies', for specialist advice. The EPA is one of these prescribed bodies. Certain vessel facilities and other related activities are required to be referred to the EPA who may direct the planning authority to include conditions on any approval, and in some instances direct the planning authority to refuse an application where there are significant residual water quality risks. The planning authority must comply with any EPA direction to refuse an application or to impose conditions.

Any conditions applied to a development approval are important as they are legally binding, that is, they provide statutory force to the prescribed environmental protection measures.

* 'Development' is defined in the Development Act 1993 and the Planning, Development and Infrastructure Act 2016, with the latter to replace the former by July 2020).

GLOSSARY

Fit-for-the-purpose vessel facility: one that can demonstrate it has the structural and operational capabilities to minimise the environmental impacts of its uses.

Wastewater collection facility: a facility designed and constructed to receive the contents of a holding device for vessel wastewaters. Facility operators should provide for those vessels with fixed or portable holding devices.

Waste transfer (reception) stations: structures designed to temporarily store vessel wastes in an environmentally responsible manner (such as waste oil, bilge water, fish waste, oil absorbent materials and garbage).

Waste transporter: a mobile service provider contracted to remove wastes.

KEY REFERENCES

ANZECC, *Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand*, http://dinrac.nowpap.org:8080/documents/MALITA_10_Waste_Reception_Facilities_1997_by_AU&NZ.pdf

Australia's Clean Marina Program, https://www.marinas.net.au

South Australian Recycled Water Guidelines, https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/protecting+public+health/water+quality/recycled+water

EPA website: https://www.epa.sa.gov.au

Bunding and spill management, https://www.epa.sa.gov.au/files/47717_guide_bunding.pdf

SA Planning Portal, https://www.saplanningportal.sa.gov.au

Melbourne Water, *Water Sensitive Urban Design Engineering Procedures: Stormwater*, www.publish.csiro.au/pid/4974.htm

Rainwater tanks, https://www.health.gov.au/internet/main/publishing.nsf/Content/0D71DB86E9DA7CF1CA257BF0001CBF2F/$File/enhealth-raintank.pdf

Vessel facility developer should:

1 Explore opportunities to increase the use of dry dock storage for vessels (including air berths and racking) rather than storage on waters.

2 Use water sensitive vessel facility design techniques.

> **KEY NOTE**
>
> Water sensitive design (WSD) is a technique to manage components of urban water, including potable water supply, wastewater, stormwater and groundwater. WSD has multiple environmental benefits including improving urban landscape, reducing pollutant export, retarding storm flows and reducing irrigation requirements.
>
> Stormwater and wastewater pollution issues are apparent on many vessel facilities around the state. Significant environment protection gains could be had with improved operational and supporting structural mechanisms in place.

3 For in-water development, use a hydrodynamic model to determine the relationship between water circulation, water exchange and potential pollutant concentrations in the water column, sediments and aquatic organisms in order to choose the most environmentally sustainable vessel facility design.

4 Avoid having entrance channels that are deeper than adjacent navigable channels.

5 Have entrance channels to the vessel facility that follow the natural alignment of the waterway with only gradual bends, and parallel to the direction of the prevailing winds.

6 Have a wide entrance to a vessel facility if there is a small tidal range.

7 Have a small entrance to a vessel facility if there is a large tidal range.

8 Establish two openings to promote flow-through currents in the vessel facility.

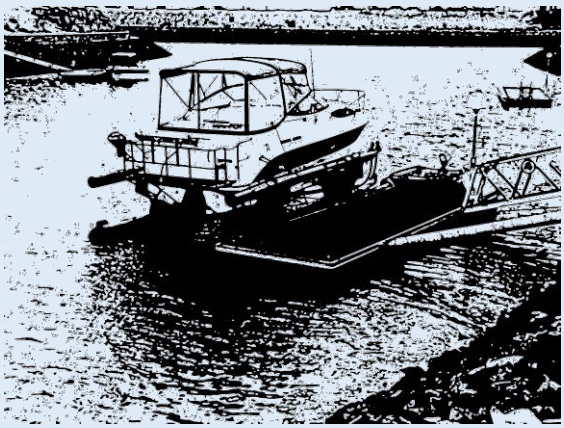
9 Design open marinas with as few enclosed water sections or separated basins as possible, especially in poorly flushed water bodies.

10 Establish curved corners instead of square corners, to eliminate stagnant water in the vessel facility.

11 Install floating wave attenuators instead of fixed breakwaters where appropriate.

12 Install mechanical aerators in the vessel facility to improve flushing and water quality where basin and entrance channel configuration cannot provide adequate flushing.

13 Where shorelines need structural stabilisation, rip-rap revetment is preferable to solid vertical bulkheads.



14 Use locally indigenous vegetative plantings to stabilise shorelines and protect disturbed areas from further erosion.

15 Design and install moorings to avoid scouring of riverbed or marine bed from the swinging action of restrained vessels. Planning authorities may have restrictions on the creation of swing moorings.

16 Minimise the construction of in- or over-water structures.

17 Over-water structures should be designed to maximise the penetration of sunlight into the water column where the catchment of pollutants by the structure is not a priority concern (eg walkways).

18 Install catchment devices into slipways, wharves and pontoons used for the maintenance of vessels and handling of bulk materials (such as fuel, oil, catch or bait) to avoid the release of materials into adjacent waters.

19 Avoid the use of timbers treated with copper chrome arsenate (eg permapine), creosote and pentachlorophenol in water structures.

20 Use materials such as recycled plastics, aluminium, steel, concrete and fibreglass where in- and over-water structures cannot be avoided.

OR

Choose naturally marine resistant renewable timbers, such as turpentine timber *Syncarpia glomulifera*.

OR

Endeavour to purchase pre-immersed treated timbers for use in aquatic construction (harmful volumes of leachate can be removed this way).

KEY NOTE

Restrictions on the use of treated timbers as in-water structures in the River Murray may apply. Please contact the Department for Environment and Water (DEW) for further information

Creosote is a timber preservative that is registered for use in the marine environment. However, creosote can release polycyclic aromatic hydrocarbons (PAHs) at toxic levels into the aquatic environment following immersion and is not recommended for use.

Copper chrome arsenate (CCA) is also a registered timber preservative for use in aquatic environments. CCA treated timber is known to undergo a certain amount of leaching, which is at its highest during the initial stages following immersion. The elements of this leachate tend to accumulate in the sediments and organisms immediately surrounding the timber, or are dispersed through the water column. There are also significant concerns with regard to the sustainability of treated timber disposal to landfill.

21 Install stormwater management devices such as first-flush diverters, gross pollutant traps, oil/water separators, hydrocarbon absorbers, sediment traps and/or soluble pollutant removers to control runoff. Wastewater treatment specialists should be consulted to determine which management system would be most effective for the vessel facility.

22 Install wash-down facilities with appropriate wastewater containment, treatment and disposal controls.

23 Install maintenance facilities with appropriate waste containment, treatment and disposal controls.

24 Install individual connections to moorings for wastewater pump out (ie blackwater and greywater).

25 Install roofed and bunded waste transfer and refuelling stations.

KEY NOTE

A number of waste oil transfer stations have been constructed at marinas, boat ramps and boat service facilities around the state. Provided they receive ongoing management and maintenance, these facilities reduce the impacts of maritime waste on the aquatic environment, and their construction and installation should seriously be considered at all vessel facilities around the state. Waste transfer stations can be designed for various kinds of wastes, including putrescible matter (including fish cleaning waste), paper and cardboard, iron and steel, plastics, tyres and batteries, depending on the uses made of the vessel facility.

5.4 Vessel facility operation

The function and design of vessel facilities can affect the efficiency and environmental performance of operations such as servicing and repairs, cleaning and waste management. While the behaviour of facility users can assist with pollution avoidance, it is also important to ensure that the facility itself accommodates this goal. For example, the catchment capacity of the slipway and hardstand areas, stormwater controls and services for waste management should reflect the risk of environmental harm from the types of vessels using the facility.

This applies to:

- vessel operators
- boat and yard club operators
- marina operators
- boat yard operators
- boat ramp operators.

Operators must:

Obtain environmental authorisations (an EPA licence) for prescribed activities of environmental significance under their control

KEY NOTE

A licence is required under the EP Act for the conduct of some marina and boating facilities (refer to Appendix 2) and some forms of high-pressure water blasting, abrasive blasting and painting as they are considered prescribed activities of environmental significance. Where a code of practice exists for an activity of environmental significance, the optimum requirements of the code contained within 'musts' will, if appropriate, form conditions of licence. However, due to the higher environmental risks associated with these activities, additional conditions of licence may also be applied, for example those relating to infrastructure, reporting or monitoring requirements. Conditions of authorisation must be adhered to or prosecution will result. For more information visit https://www.epa.sa.gov.au.

2 Ensure vessel facility is fit for the purpose of permitted vessel operations and avoids, as far as is reasonable and practicable, the release of pollutants to the environment (refer to the Key Note overleaf for guidance on assessing a fit-for-purpose facility).

OR

Advise vessel operators and contractors of the limitations of the vessel facility to manage pollutants and refer them to their individual responsibility to comply with the Environment Protection Act 1993, *Environment Protection (Water Quality) Policy 2015* and code of practice.

Operators should:

1 Restrict vessel operations on facilities that are not fit for the purpose and may result in the release of pollutants to the environment.

2 Provide and maintain purpose-built service areas with structural pollution and waste control mechanisms that are located away from the water's edge and stormwater drains for activities relating to vessel operations.

3 Ensure that permanently moored vessels (vessels with no registration or no means of propulsion) discharge no blackwater or greywater, whether treated or not, to waters. Discharge from any fitted greywater treatment system should only discharge to a land-based wastewater system. Blackwater and greywater holding tanks, where fitted, should be plumbed into a land-based wastewater system or access provided for a licensed waste contractor to pump out the tanks. Receipts for pump-outs should be kept and produced during audits by authorised officers.

4 Untreated greywater may not be discharged within an off-river marina, canal, near people in the water or adjacent to an SA Water off-take.

KEY NOTE

Vessel facility operators should decide what activities or wastes they will and will not permit within their site and communicate this to users accordingly. If, for example, a boat ramp operator (usually a local council) provides an area for vessel wash-down, provisions for the management of the wastewater generated are required. **Discharges of wash-down water to stormwater drains or directly to waters are not acceptable.** Similarly, if the vessel facility operator does not wish to provide for the management of fish wastes or any other activity or waste, this should be made clear to users.

Vessel facility operators can use the defence against a charge of an offence that they took all reasonable and practical measures to prevent the offence by providing clear signage and/or contracts outlining the limitations of the facility and the responsibilities of users when using the facility to prevent pollution.

Marinas, boat and yacht clubs should provide:

- emergency response equipment
- wastewater collection facilities or service agreements with waste transporters
- refuelling facilities
- slipping facilities with waste and wastewater controls
- waste transfer station(s) for oil, bilge water, paint, solvents, coolant, fish wastes, recyclables and garbage.

Slipways should provide:

- emergency response equipment
- slipping facilities with waste and wastewater controls
- waste transfer station(s) for oil, bilge water, paint, solvents and coolant.

Boat ramps should provide:

- emergency response equipment
- wastewater collection facilities
- wash-down facilities with wastewater controls
- waste transfer station(s) for oil, bilge water, coolant, fish wastes, recyclables and garbage.

A Clean Marinas Program exists in Australia as a national, voluntary accreditation system for marinas, yacht clubs, boat clubs, slips, boat yards and associated industry operators across Australia. The program not only provides an easy-to-follow system to develop valuable environmental practices but also rewards marina operators with real business benefits. The EPA encourages operators to seek Clean Marinas accreditation.

5.5 Dredging

Dredging can disturb aquatic habitats, spread exotic algae and invertebrates, re-suspend bottom sediments causing increased turbidity, and recirculate toxic metals, hydrocarbons, pathogens and nutrients that are found in sediments in the water column. Turbidity reduces sunlight available to aquatic vegetation, is known to contribute to seagrass loss and affects the safety of bathing waters. Physical disturbance and removal of dredged material in both inland and marine waters can have a substantial immediate and long-term impact on water quality.

This applies to:

- dredging operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators must:

1 Ensure that the necessary development application process is followed.

2 Obtain environmental authorisations (an EPA licence) for prescribed activities of environmental significance or engage an EPA licensed contractor to undertake the dredging activity.

KEY NOTE

An EPA licence will require the development, implementation and compliance with a dredging and dewatering management plan. The plan will address considerations for best practice management of the activity and disposal of spoil material. This will be assessed against the EPA dredging guidelines.

Requirements specified in licence conditions may include but are not limited to:

- the removal of solid matter from the bed of marine or inland waters using any digging or suction apparatus
- the deposition of spoil (and other excavation materials)
- spoil drainage
- avoiding the release of pollutants from dredging equipment.

Operators should:

1 Be aware that dredging within marinas disturbs hydrocarbons/oils, paints, and anti-scalant chemicals used on vessel hulls and proposals to dredge these locations may require sediment quality analysis and appropriate handling and disposal of contaminated spoil material.

2 Avoid dredging near SA Water off-takes. Contact SA Water at least one week prior to dredging in these areas to enable possible adjustments to be made at the off-take.

3 Educate vessel facility users, crew and staff on the importance of not causing further deposition (either directly or through erosion) of material into waterways resulting in the need for dredging.

4 If an existing vessel channel requires maintenance dredging more than once every four years, investigate reasonable and practicable options to increase circulation, reduce sediment accumulation or realign channel (if it will reduce future need for dredging).

5 Dredge channels to follow the course of the natural channel if possible.

6 Use tides to assist entry of deep-draught vessels.

7 Avoid temporary spoil sites.

8 Coordinate dredging proposals, particularly with beach renourishment.

9 Time dredging to occur when impacts are minimised.

10 Use locally indigenous vegetative plantings to stabilise shorelines and protect disturbed areas from further erosion.

KEY NOTE

Considerations for the timing of dredging should include the critical migration or spawning periods of fish, shellfish and birds, the peak periods of recreational use of waters and that dredging in particular seasons may reduce the risk of causing algal blooms, affecting aquaculture and fishery operations or impacting on seagrass.

The South Australian Research and Development Institute (Aquatic Sciences) or SARDI is a research provider to the fishing, aquaculture and environment industries. Before planning dredging operations, contact SARDI on (08) 8207 5400 for advice on critical migration and spawning periods of aquatic species.

5.6 Maintenance areas (includes slipways and hardstands)

If not managed effectively, vessel maintenance activities such as cleaning, mechanical repairs, scraping, sanding, pressure blasting and painting can put pollutants into aquatic environments. It is important to perform these activities in areas where the risk of environmental harm can be minimised.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators

- boat and yacht club operators
- contractors.

Operators must:

1 Obtain environmental authorisations (an EPA licence) for prescribed activities of environmental significance.

> **KEY NOTE**
>
> A licence is required under the EP Act for the conduct of facilities that perform repairs or maintenance of vessels (over a certain threshold) and for some forms of high-pressure water blasting, abrasive blasting and painting (including those that are subcontracted). These licences prescribe conditions of authorisation that must be adhered to or prosecution will result. For more information visit https://www.epa.sa.gov.au.

2 Ensure pollutants, to the maximum extent practicable, generated through maintenance operations are captured, contained, treated and reused or disposed of to a waste transporter or other appropriate waste management facility (eg sewer).

OR

Treat pollutants generated through maintenance operations to a standard suitable for aquatic or land-based discharge by ensuring the discharge does not contravene water quality criteria applicable to those waters or cause environmental harm.

OR/AND

Ensure facility users are made aware of the limitations of the facility to manage pollutants and refer to individual responsibility to comply with *Environment Protection (Water Quality) Policy 2015.*

3 Prior to periods of tidal inundation or anticipated flooding of maintenance areas, ensure that all reasonable and practicable measures have been undertaken to ensure pollutants cannot enter waters.

KEY REFERENCES

Bunding and spill management, https://www.epa.sa.gov.au/files/47717_guide_bunding.pdf

South Australia recycled water guidelines, www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/resources/policies/south+australian+recycled+water+guidelines

Operators should:

1 Perform all vessel maintenance activities on a concreted or otherwise sealed and bunded hardstand or slipway area to ensure that all waste and wastewater are contained. Moving vessels off the slipway to areas further inland for works is preferable.

2 Ensure stormwater drains are protected from vessel maintenance wastes and wastewaters through seals, bunds or first-flush diversion devices.

3 Regularly clean work areas to ensure optimum performance of pollution controls.

4 Install spray-drift controls (eg for painting, pressure water blasting). Curtains and portable screens can be effective.

5 Not perform abrasive blasting, pressure washing, hull scraping, sanding and painting on slipways or on moorings without catchment devices.

> **KEY NOTE**
>
> A number of slipways and hardstands around Australia have been modified to ensure wastes and wastewaters no longer enter aquatic environments. Usually this involves the construction of catch drains and collection trenches, pits or sumps covered by removable grating and fitted with screen or mesh baskets to allow for inspection and removal of solids. In some cases, the baskets have become too heavy to manually lift without the aid of machinery and modifications have been made to reduce the size of the solid material passing through the grates.
>
> It is recommended that the first screening of solid material be no more than 10 mm in diameter and the final screening before treatment be no more than 2 mm in diameter. Collection systems should be designed to collect and hold all waste and wastewaters generated and, importantly, the first flush of contaminated stormwater runoff (recommended to be the first 10 mm of rainfall). Wastewater can then be passed through oil/grease removal devices to detention tanks (above or below ground) where, depending on its final discharge destination (ie sewer, irrigation, reuse or aquatic), it may undergo further treatment to remove heavy metals, which will involve the addition of more complex chemical filtration components.

6 Take tides, wave action and associated inundation into consideration during placement of waste and wastewater controls on vessel maintenance areas.

7 Not perform maintenance activities during spring tides or at times of bad weather where the pollution controls may be rendered inoperable or ineffective.

8 Require users to complete an operating report card at the conclusion of their maintenance activity and provide the facility operator with access to the recorded information.

> **KEY NOTE**
>
> Report cards could be used to record information that act as a measure of accountability for having conducted a maintenance operation in an environmentally responsible manner. Having this type of record would be advantageous if ever there came a time where a maintenance operation was investigated for potentially causing environmental harm.

9 Consign any pollutants recovered from vessel facility after maintenance operations have ceased, and which have not been satisfactorily managed, to the generator of the pollutants.

10 Locate emergency management equipment within the maintenance areas or at very least within close proximity.

11 Train users in all aspects of environmental management related to the performance of vessel maintenance operations.

5.7 Vessel cleaning (including in-water hull cleaning)

The wash-down water produced when cleaning vessels may contain chemicals such as chlorine, copper, zinc, phosphates, ammonia, biofouling, fish waste, paint chips and introduced or invasive pest species. All of these have detrimental and accumulative impacts on water quality. Biofouling occurs when marine life, such as algae or barnacles, attach to any surface including hulls, anchors or fishing gear. Once attached, pests can be moved into and around Australia.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators
- contractors.

Operators must:

1 Not perform in-water hull cleaning that results in the removal of applied surface coating material (eg antifoulant), unless written approval by the EPA has been granted.

> **KEY NOTE**
>
> Hull cleaning aims to ensure that boats maintain their hull speed, fuel efficiency and appearance. Diver cleaning, using manual or power tools, is the most common form of in-water hull cleaning. Scrubbing hulls coated in antifouling paints releases toxic metals and possible pest species, which may contaminate the water and bottom sediment. If this task is performed in the water, there is little opportunity to recover and contain these toxic pollutants. Vessel hulls must therefore be cleaned in dry dock unless extraordinary circumstances prevail, in these cases EPA will evaluate and assess before an exemption is to be granted.
>
> Removing bio-foulants from the vessel before travelling to another location is very important to avoid the translocation of marine pest species. As such regular hull cleaning is advised. However, the EPA strongly discourages in-water hull cleaning and recommends that slipways be used, and the wastewater and solids captured for land-based disposal.
>
> Under certain circumstances, soft cloth cleaning of racing yachts, to remove minor build-up of slime and dirt, may be acceptable.

2 Remove vessel from water for hull and deck cleaning and make use of purpose-built slipways or wash bays with waste containment and wastewater controls.

OR

If vessel is afloat during deck cleaning, undertake measures to avoid the discharge of wash-down water that reflect the risk of environmental harm from the activity being performed.

KEY REFERENCES

Bunding and spill management, https://www.epa.sa.gov.au/files/47717_guide_bunding.pdf

Stormwater management, https://www.epa.sa.gov.au/environmental_info/water_quality/programs/stormwater

Operators should:

1 Apply a marine wax to the outside of the vessel and a protective film on glass windows. This creates a beading effect, reducing dirt and salt build up, and making it easier to clean.

2 Use soft brushes, sponges or towels to remove minor build-up of slime on hull.

3 Remove biofouling, using approved means, from the vessel before travelling to another location.

4 Rinse trailered vessels with freshwater after each trip, ensuring that the wastewater runoff does not re-enter the aquatic environment, and inspect the vessel for attached organisms. Remove any that are found and dispose of to a bin for landfill. Do not return organisms to water.

5 Clean and check anchor, fishing gear or seawater cooling systems on vessels as some marine pests can survive in the internal plumbing of vessels and can be translocated.

6 Report biofouling that has not yet been sighted before.

KEY NOTE

It is estimated that more than 250 exotic marine species have been introduced into Australian waters, although not all have become pests. Some that have invaded include broccoli weed (NSW, TAS, VIC), Asian Mussel (TAS, VIC, WA), Black-striped Mussel (eradicated from NT), Caribbean Tubeworm (QLD), Giant Fan Worm (NSW, SA, TAS, VIC and WA) and Northern Pacific Sea Star (TAS and VIC). Marine pests can be very costly to eradicate. They often spread rapidly and may prey on, or compete with and displace native species.

7 Ensure vessel engine is running smoothly. This reduces the amount of unburnt carbon in the exhaust that can accumulate on the deck and hull, requiring more cleaning.

8 Wash or rinse outboard motors in an area where the runoff drains to a pit and can be treated, reused or disposed of to sewer.

9 Install oil/grease separation or filtration devices in sumps where vessel wash-down waters are collected (eg boat ramp cleaning facilities).

10 Sweep and collect material from surfaces prior to rinsing.

11 Rinse vessel decks and exteriors with water only.

12 Check product labels and use low nitrogen and phosphorus detergents for onboard cleaning.

13 Use high-pressure water instead of chemicals to remove grime.

14 Use a mop and bucket or spill control equipment (absorbent sausages) to control wash-down water containing cleaning chemicals.

15 Dispose of wash-down water in bucket to sewer/septic systems or landscaped areas.

16 Mix the minimum amount of detergent required in a bucket to remove grime. Do not apply detergents directly onto brushes or the vessel.

17 Not use detergents where they can directly enter water, such as on the scum lines of the hull. Use warm water and/or rags or a brush instead.

18 Using warm instead of cold water leads to greater cleaning efficiency.

19 When cleaning, use a soft sponge or cloth. Pigmented (coloured) wastewater indicates that too much force is being used and that antifouling is being lost.

20 Ensure compliance with water use restrictions (if in place). Attach a trigger nozzle to the hose so it can be turned off when not in use.

5.8 Abrasive blasting, scraping and sanding

Uncontrolled abrasive blasting, scraping and sanding releases pollutants to soil, water or air, both on- and off-site. These pose risks to human health as well the ecosystem. Heavy metals may be consumed by bottom-dwelling organisms and passed up the food chain to humans. Heavy metals that are not incorporated into living tissue will remain in the environment, where they are an ongoing risk for future mobilisation and uptake.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators must:

1 Obtain environmental authorisations (EPA licence) for prescribed activities of environmental significance.

> **KEY NOTE**
>
> An EPA licence is required for the cleaning of materials by the abrasive action of any metal shot or mineral particulate propelled in a gaseous or liquid medium (otherwise than solely by using blast cleaning cabinets less than 5 m^3 in volume or totally enclosed automatic blast cleaning units). Open-air blasting is only permissible subject to the consent of the EPA, when the object is too large or too heavy to fit in a booth, or is a fixed structure. SafeWork SA should also be consulted on occupational, health, safety and welfare regulations.

2 Use a designated abrasives work area with waste containment, mechanical ventilation, vacuum and filter systems.

OR

Undertake measures to contain and collect dust for licensed waste disposal that reflects the risk of environmental harm from the activity being performed.

3 Comply with Australian Standard AS5436.1 Guide to lead paint management part 1: Industrial applications (1995) for the removal of lead-based surface coatings.

4 Collect and store removed solid wastes securely, prior to disposal to an approved waste facility. Waste contractors may require testing of the material before accepting it for disposal, particularly if it contains listed wastes.

Operators should:

1 Test for the presence of lead-based paints, using representative examples, on all painted structures to be scraped, sanded or blasted where the type of paint is unknown. Retain records of test paint samples.

2 Assume that antifouling paints removed from vessels older than 10 years contain tributyltin (TBT) unless tests prove otherwise.

Be aware that antifouling paints removed from vessels constructed before the 1970s may contain a variety of hazardous chemicals including arsenic, mercury and dichloro-diphenyl-trichlorethane (DDT). Paint residues from these vessels must be disposed of as listed wastes.

4 Use alternatives to abrasive blasting, such as vacuum sanders, paint peeling, mechanical buffing, scraping and manual sanding, or contract the work offsite.

5 Remove anodes before blasting, scraping or sanding (wet and dry), and replace them when the job is done.

6 Recycle zinc and magnesium anodes with other scrap metals.

7 When removing tough hull stains, minimise the use of stain removers and consider more abrasive rubbing or polishing compounds.

8 Use vacuum blasting/sanding equipment for outdoor cleaning. Vacuum cleaning methods use a standard abrasion inside a shroud that is in close contact with the work surface; a vacuum is applied to the shroud, removing the debris and piping it into a material collection and treatment chamber.

9 Investigate companies that recycle used abrasive material into new media or other products invest in a closed plastic medium-blast (PMB) system. These systems blast with small plastic bits. Once the blasting is completed, spent material and paint chips are vacuumed into a machine that separates the plastic from the paint dust. The plastic is cleaned and may be reused. Paint dust is collected for disposal.

10 Consider fabric filter (felted cloth, pulse air cleaned) and paper cartridges (pulse air cleaned) as dust collectors.

11 For outdoor dry sanding and scraping, use tarpaulins, hessian, shade cloth, polythene sheeting or similar screening materials to confine waste material and dust. The screening material should be tear resistant, UV resistant, fire retardant and be able to prevent the escape of fine dust.

12 Filter and treat wastewater from wet abrasive works for reuse.

13 Place material collected from blasting, sanding and scraping operations in disposal containers to prevent emissions to the atmosphere as soon as practical.

5.9 Pressure water blasting

In the process of removing paint and aquatic fouling from vessels, heavy metals such as copper, zinc and tin may be released. These may then be consumed by shellfish, snails, worms and other bottom-dwelling organisms, and passed up the food chain to fish, birds and humans. Heavy metals that are not incorporated into living tissue will remain in the sediments or water column, where they will increase the cost of dredged material disposal or result in the refusal for dredging approvals altogether. Aquatic fouling may also include invasive pest species.

This applies to:

- vessel operators
- slipway operators
- marina operators

- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators must:

1 Obtain environmental authorisations (EPA licence) for prescribed activities of environmental significance perform cleaning operations in designated cleaning areas with waste containment and wastewater controls (including spray drift).

> **KEY NOTE**
>
> An EPA licence is required for pressure water blasting that involves the use of solvents, surfactants, acidic or caustic solutions, or the production of paint sludges and residues or any other materials listed in Part B of Schedule 1 of the EP Act that is not lawfully disposed of to sewer. The addition of powdered material or grit will require a licence for abrasive blasting.

OR

Undertake measures to avoid pollution that reflect the risk of environmental harm from the activity being performed.

2 Comply with Australian Standard AS 4361.1 for the removal of lead-based surface coatings.

KEY REFERENCES

Pressure water blasting, https://www.epa.sa.gov.au/files/8426_guide_pressure.pdf

Operators should:

1 Test for the presence of lead-based paints on all painted structures to be pressure water blasted where the type of paint is unknown.

2 Retain records of test paint samples.

3 Ensure that pressure water blasting is only carried out during favourable wind conditions to prevent any fugitive emissions arising from the operation, creating a nuisance to any adjacent premises, the public or others.

4 Use high temperature water rather than chemicals for assisting with blasting operations.

5 Use durable and impermeable waterproof liners to prevent wastewater from escaping into the environment (which includes air, land and water) and to direct all wastewater runoff to a collection point.

6 Collect wastewater runoff from scaffolding structures.

7 To prevent spray drift, use one or more of the following environmental management strategies:

- locate moveable screens alongside and behind the operator
- use tarpaulins, hessian and polythene sheeting or similar materials to confine overspray (material should be tear and UV resistant)
- clad scaffolding in screens for open air cleaning.

8 Utilise wastewater reuse technologies before relying on disposal options.

9 Provide customers or members with alternative water sources, such as rainwater or suitable recycled wastewater for use in pressure water blasting.

5.10 Fibreglassing

Fibreglassing for small or large jobs can have environmental impacts. Some of the materials used can be dangerous to workers. The primary hazard comes from volatile organic compounds (VOCs) given off by resins. Some resins, catalysts and the solvents used for clean-up can be flammable.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators
- contractors.

Operators must:

Perform all fibreglass work in a shed or building with the doors closed using mechanical ventilation equipment that meets recommended standards.

OR

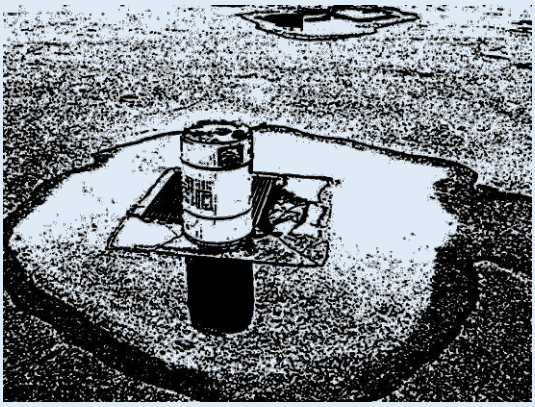
Undertake measures to control odour and dust from fibreglass works that reflect the risk of environmental harm from the activity being performed.

KEY REFERENCES

Ventilation for fibreglass works, https://www.epa.sa.gov.au/files/8235_guide_fibreglass.pdf

Fibreglass reinforced products, https://www.safework.sa.gov.au/news/fibreglass-reinforced-products#

Operators should:



1 For reinforced plastic fabrication, use a low styrene emission (LSE) resin with a styrene emission rate of not greater than 20 g/m^2 per 30 minutes.

2 Ensure the ventilation for the workshop is at least 10 air changes per hour.

3 Have extraction at or near floor level so that the air movement occurs throughout the workshop, and ventilates the complete work area.

4 Filter dust from the effluent gas using a dry media filter. Fabric or cartridge filters may be used provided the discharge contains less than 100 mg of dust per m^3 of exhaust air.

5 Ensure the minimum height of effluent discharge from a chimney is at least three metres above the highest building structure within a radius of 30 metres. A higher chimney may be necessary in some cases to achieve the design ground level criterion.

6 Discharge effluent gas vertically, through a chimney, at not less than 10 metres per second. Conical-type rain protectors or similar devices prevent vertical discharge, inhibiting dispersion. If rain protection is required, use a suitable vertical discharge cowl.

7 Where practical, use hand lay-up methods in preference to spray gun applications as hand lay-up releases less styrene.

8 Ensure that spray lay-up equipment is properly maintained and periodically cleaned. This will avoid glass jamming in the spray gun chopper mechanism and the generation of additional waste (resin and glass) when fixing it.

9 Use airless, air-assisted or high-volume low-pressure (HVLP) spray guns. Internal mix, airless spray guns result in lower styrene emissions than other types of spray guns.

10 Use a gun wash station or similar for the cleaning of spray equipment.

11 reduce the amount of grinding and sanding as much as possible by trimming with a knife or mechanical cutter when articles have solidified but not yet hardened.

12 Package dust from sanding and grinding prior to waste disposal.

13 Consult with supplier regarding recommended disposal for under-cured resin material. Avoid disposing resins to landfill.

5.11 Painting and varnishing

The metals contained within paint and other surface coating products have the potential to accumulate in toxic concentrations in the environment if they are not managed appropriately. Once they have reached toxic concentrations within the environment they can severely affect aquatic plant and animal species, sometimes resulting in physiological mutations. The effects of these changes can be far-reaching.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators
- contractors.

Operators must:

1 Not apply marine paints containing tributyltin (TBT).

2 Spray paint in designated structures with waste containment, mechanical ventilation and filter systems.

OR

Undertake measures to control odour and drift (particulates) from spray painting that reflect the risk of environmental harm from the activity being performed.

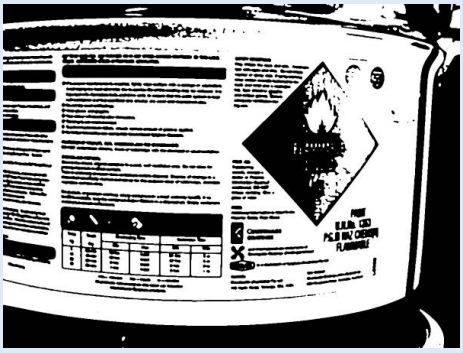
KEY REFERENCES

Australian Paint Manufacturers Federation, www.apmf.asn.au

Spray painting booths – control of air and noise emissions, https://www.epa.sa.gov.au/files/8358_guide_spraypaint.pdf

Spray painting and powder coating, https://www.safework.sa.gov.au/resources/spray-painting-and-powder-coating#

Operators should:



1 Maximise effectiveness of antifouling coatings by obtaining manufacturer's advice as to the most appropriate coating for a vessel's hull, having regard to:
   - the material of its construction
   - the proposed sailing patterns including vessel speed and frequency of activity
   - the type of work in which the vessel is likely to be engaged
   - the localities in which the vessel is likely to operate.

2 Improve antifouling paint adhesion and durability by ensuring angles and corners of the surface to be painted are bevelled or have a radius.

3 Vary the position of slipping blocks and supports at each slipping to ensure that areas under blocks are painted with antifouling.

4 Stock only TBT-free antifouling paint for customers or facility users to purchase.

5 Recommend to customers or members whose boats are rack or stack stored that they use alternatives to antifouling paint, such as polyurethane, hull wax or non-metallic epoxies since antifouling paint is not normally necessary for boats that are not continuously in the water.

6 Obtain technical advice from the Australian Paint Manufacturers Federation (APMF) on the correct application of TBT-free paints and removing or encapsulating antifouling paints.

7 Use corrosion inhibitors compatible with surface coating requirements, biodegradable and free from chromates, nitrates and nitrites. Corrosion inhibitors commonly contain zinc that can contaminate land and water.

8 Apply paint with brushes and rollers wherever possible.

9 Mix paint in drip trays under cover and in a sealed, bunded and well-ventilated paint bay.

10 When spray painting outdoors, fully enclose the vessel (sides, top and floor) or item being painted with temporary screening materials. Weight the edges of the screens to keep them in place.

11 Use efficient spray equipment (transfer efficiency >65%) such as HVLP spray guns.

12 Use electrostatic spraying methods. These require less pressure, produce little overspray, and use relatively little paint.

13 Use low volatile organic compounds (VOCs), high solids content and water-based paints or surface preparations instead of traditional paint and primer.

14 Keep spray guns and lines clean and well maintained to reduce emissions.

15 Clean up spilt paint (particularly water-based paint) and allow the remaining paint to dry.

16 Never clean brushes on rocks or other surfaces not intended for the purpose.

17 Use a wash station for cleaning spray equipment and scrape the paint cup free of residual paint with a spatula before cleaning the equipment with solvent.

18 Paint out excess paint onto an absorbent material such as a rag or newspaper. Allow it to dry before disposal.

19 Allow empty paint and thinner containers to air dry before disposal.

20 Use alternatives to chemical paint stripping. These will depend on the surface being stripped, the type of paint being removed, and the volume and type of waste produced. Alternatives include scraping, sanding, and/or abrasive blasting. Abrasive blasting should be a last resort.

21 If paint stripper must be used, use soy-based or water-based products (they are less hazardous).

22 Use a heat gun to remove paint and varnish where appropriate.

23 Prevent evaporation of solvents by using tight-fitting lids or stoppers. Reducing evaporation protects air quality, saves product and money.

24 Avoid teak cleaners containing acids (such as phosphoric acid or oxalic acid) or those labelled ‘caustic’, ‘corrosive’ or ‘acidic’. Clean teak with a mild, phosphate-free detergent with bronze wool.

25 Train employees to use less paint stripper, to store new and used paint strippers, to prevent leaks and spills, and which clean-up procedures to employ.

5.12 Welding and metal fabrication

Zinc from anodes, which are used to reduce metal corrosion, and other metals such as copper from marine constructions, are commonly found in toxic concentrations in and around marinas. Aquatic organisms concentrate many of these pollutants in their biological systems. Sediments in water bodies can also accumulate these pollutants to higher levels than in the water column, and in turn act as a source of emission. Tangible water quality improvements may not be obtained for some time after changes to behaviour until these secondary sources have dissipated.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators must:

Perform welding and metal fabrication in designated structures with waste containment.

OR

Undertake measures to control metal fragments and dust (particulates) from metal work that reflect the risk of environmental harm from the activity being performed.

KEY REFERENCES

Welding processes, https://www.safework.sa.gov.au/resources/welding-processes#

Hazardous manual tasks, https://www.safework.sa.gov.au/resources/hazardous-manual-tasks#

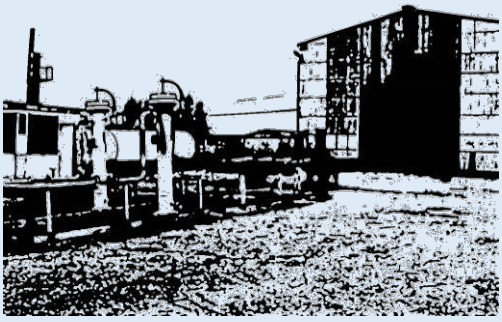
Operators should:

1 Erect screens to minimise the horizontal dispersal of metal fragments and seal floor to enable metal scraps and filings to be swept or vacuumed.

2 Conduct welding and thermal cutting in a well-ventilated area.

3 Use oxy-acetylene torches away from ignition sources such as oil, grease and rubber to avoid accidental fire and the generation of fumes and smoke.

4 Recycle scrap metal.



5.13 Engine maintenance and repair works

Engine maintenance, cleaning and repair works, if not controlled, can degrade water quality and threaten aquatic life. A large number of small discharges of oily waste add up to a significant problem. Oily waste contains polycyclic aromatic hydrocarbons (PAHs), which are carcinogens. Battery components contain lead and sulfuric acid which are toxic and corrosive. Degreasers used to clean metal usually contains volatile organic compounds (VOCs) that will pollute air and may pose a fire hazard. If solvents enter waterways, even in small quantities, they may render the water unfit for human consumption and result in the death of aquatic species.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators must:

Perform engine maintenance, cleaning and repair works in a designated roofed and bunded area with wastewater management controls.

OR

Undertake measures to control oils, oily water, solvents, degreasers, coolants, lubricants, fuels and greases from mechanical works that reflect the risk of environmental harm from the activity being performed.

KEY REFERENCES

Bunding and spill management, https://www.epa.sa.gov.au/files/47717_guide_bunding.pdf

Disposal of used hydrocarbon absorbent materials, https://www.epa.sa.gov.au/files/8424_guide_hydrocarbon.pdf

Stormwater management, https://www.epa.sa.gov.au/environmental_info/water_quality/programs/stormwater

Lead/acid batteries and battery charging, https://www.safework.sa.gov.au/news/lead-acid-batteries#

Managing risks of hazardous chemicals in the workplace, https://www.safework.sa.gov.au/resources/managing-risks-hazardous-chemicals-workplace#

Operators should:

1 Use engines with low emission ratings and have them serviced regularly.

> **KEY NOTE**
>
> The Outboard Engine Distributors Association of Australia (OEDA) announced a Voluntary Emission Labelling Scheme (VELS) that came into effect on 1 January 2007. The voluntary code would be based on international emission regulations and is supported by the major outboard distributors including BRP, Honda, Mercury, Suzuki, Tohatsu and Yamaha.
>
> Under the code, engines would have permanent, recognisable external labels that would identify the emission rating of the product. The star rating system will be as follows:
>
> - 0 star (high emission) – generally two-stroke engines
> - 1 star (low emission) – many two-stroke engines
> - 2 star (very low emission) – some two-stroke direct injection and four-stroke engines
> - 3 star (ultra low emission) – most two-stroke direct injection and four-stroke engines
> - 4 star (super ultra low emission) – for future technologies
>
> Low emission engines reduce air pollution, use less fuel and oil, produce less noise and smell, and have better resale value than higher emission engines. As well as investing in the most suitable technology when buying a new engine, the boating public can help the environment by ensuring boats and engines are kept in peak operating condition and being careful to avoid fuel spills.

2 Use a drip tray or similar under the engine to collect oil, grease, solvent or detergent.

3 Use a fuel stabiliser to protect engines from corrosion and sludge formation.

4 Clean engine parts with a brush or rag, rather than with solvent or aqueous degreasers such as alkaline or caustic soda.

5 Use a self-contained parts washer that is regularly maintained and ensure wastes are disposed of to a waste transporter.

6 Use water-based, non-VOC cleaners.

7 Never discard degreasing solvents in sinks, floor drains or onto soil.

8 Collect all waste oil for recycling and store in a roofed and bunded area.

9 Not use waste oil for dust suppression.

10 Not mix waste oil and grease with oily water (eg bilges), coolant or solvents.

11 Drain and crush oil filters for recycling.

12 Recycle rags contaminated with hydrocarbons with an industrial laundry service. Store rags contaminated with oil separately from rags contaminated with other hazardous substances such as solvents.

13 Collect all batteries for recycling.

14 Store all batteries in a roofed and bunded area.

15 Segregate waste batteries from flammable materials such as paper, rags, garbage and scrap metal with a physical barrier.

16 Store waste batteries upright and stack in layers separated with wood.

17 Inspect waste battery storage area regularly for leaks and case deterioration.

KEY REFERENCE

Annex VI of MARPOL 73/78, http://www.gard.no/web/updates/content/53059/annex-vi-of-marpol-7378-regulations-for-the-prevention-of-air-pollution-from-ships

5.14 Refuelling

The most frequently reported water pollution from the marina and boating industry is from fuel and oil. Spills from refuelling are of great concern due to the adverse effects on marine life and the amenity of aquatic environments. Small incremental discharges add up to significant impacts. Oily products contain carcinogenic polycyclic aromatic hydrocarbons (PAHs). These have been implicated with diseases in aquatic organisms and subsequent human health problems.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators
- port operators.

Operators must:

1 Not keep, sell or convey petroleum products unless authorised to do so under a SafeWork SA licence.

2 Ensure fuel dispensing facility is roofed and bunded.

3 Install trigger delivery nozzles with an automatic cut-off.

4 Display standard operating procedures which outline environment management practices

5 Place a fit for purpose fuel spill kit in close proximity to the facility, erect signage showing procedures for using the kit and ensure it is accessible (not locked away) at all times during refuelling operations.

6 Refuel vessel fuel tanks at designated fuel dispensing facilities and observe instructions for use.

OR

If refuelling with hand-held containers cannot be avoided, undertake measures to ensure no fuel is spilt into waters.

KEY NOTE

Fuels and oils if handled incorrectly, and in the wrong environment can become volatile, resulting in harm to both life and property. Diesel is classed as non-flammable; however, petrol (used primarily in recreational boating) is classed as a dangerous good and extreme care should be taken with its' handling. SafeWork SA should be contacted for advice on requirements for handling of petroleum products.

KEY REFERENCES

Bunding and spill management, https://www.epa.sa.gov.au/files/47717_guide_bunding.pdf

Australian Standard, *AS 1940:2004 − The Storage and Handling of Flammable and Combustible Liquids*, https://www.saiglobal.com/PDFTemp/Previews/OSH/as/as1000/1900/1940-2004(+A2).pdf

Petroleum Products Class 3.1 Motor Spirit, https://www.safework.sa.gov.au/resources/managing-risks-hazardous-chemicals-workplace#

Operators should:

1 Refuel away from other vessels.

2 Moor vessel securely.

3 Shut down main engine.

4 Put all passengers ashore and clear any refuelling equipment.

5 Turn off pilot light to gas refrigerators and hot water systems, etc.

6 Cut off electric power at main switch.

7 Close all hatches and openings to prevent ingress of vapours to the hull and bilge.

8 Check for static electricity.

9 Have an onboard vessel spill control kit (including fire-fighting equipment), commensurate with the size of the vessel, to access while refuelling.

10 Place spill control equipment near the refuelling point and use if needed.

11 Prior to refuelling, determine the likely volume to be pumped into each tank.

12 Make sure adequate lighting is available.

13 Block scuppers and place buckets or safety bags at each breather while refuelling.

14 Do not start dispensing until the outlet nozzle is inserted in the tank.

15 Never lock or jam the trigger of a dispenser into an open position.

16 Adjust flow rate to suit tank to be filled.

17 Be aware that the flow regulating valve in fuel dispensing nozzles may foam diesel fuel, resulting in blowback.

18 Maintain contact between hose nozzle and filler neck to prevent static sparks.

19 Maintain a visual check on the breather while refuelling.

20 while filling the tank, where possible, check for air escaping from the vent. When the tank is nearly full, you will feel a distinct increase in airflow, which is the signal to stop filling.

21 not remove the filler hose until the fuel flow has stopped.

22 lift the filler hose to drain all residual fuel into the tank.

23 be aware that traces of vapours may remain in the lower extremities of vessel (ie hull and bilges).

24 if fuel has spilt into bilges, pump the bilges manually into sealed containers or pump ashore and leave vessel wide open for at least 30 minutes to ventilate.

25 only permit passengers aboard when the vessel is completely free of vapours and engine has been started again.

26 when rolling or floating drums out to vessels is absolutely necessary, ensure that caps on drums or belly tanks in dinghies are completely sealed.

27 ensure drums and tanks are in good condition.

28 wherever possible, use mechanical lifting aids to minimise the risk of damage. This reduces the chance of accidental spillage and personal injury.

29 where possible, when decanting from small drums, one person should lift the drum and a second person should hold the funnel and check the fuel level.

30 use manual pumping when decanting from large drums.

31 where possible, avoid storing extra fuel supplies on vessels. If on-board storage of additional fuel is necessary, it must be kept in a secured approved flammable liquids container away from LPG storage cylinders.

32 attempt to contain fuel and oil spills unless it is petrol which is extremely flammable and spill containment should be left to professionals.

33 if the spill is small, absorbent pads should be immediately placed on the spill and then removed and disposed of to a licensed waste facility.

34 if the spill is large, professional help should immediately be sought. In the interim, try to contain the spill with available spill control equipment such as booms, mops and pads.

35 dispose of used absorbent materials less than 0.1 m^3 or 100 kg containing light-to-medium grade hydrocarbons to a licensed waste depot.

36 if the quantity of used absorbent material exceeds 0.1 m^3 or 100 kg, or the liquid absorbed is other than light-to-medium grade hydrocarbons or the liquid includes ‘listed wastes’ as set out in Schedule 1 Part B of the EP Act, the material should be directed to a licensed waste depot for appropriate treatment and/or disposal.

KEY REFERENCE

Disposal of used hydrocarbon absorbent materials, https://www.epa.sa.gov.au/files/8424_guide_hydrocarbon.pdf

Service providers should:

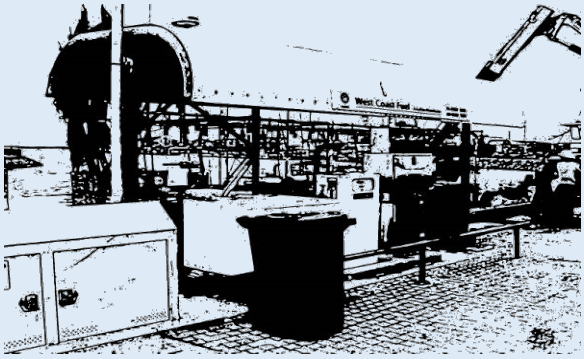
1 Ensure diesel fuel delivery nozzles are designed to minimise the foaming of diesel and thus avoid blowbacks.

2 Supply fuel collars (donuts) for drip containment on nozzles.

3 Regularly inspect and replace spill control equipment.

4 Establish a rule that refuelling must not be conducted over water in the marina unless it is conducted using the purpose-built dispensing facility.

5 Comply with the EPA Guidelines: Assessment of underground storage systems.



KEY NOTE

Underground storage systems (USS) are one of the major sources of soil and groundwater contamination. Groundwater contamination is a serious problem, as groundwater interacts with sensitive surface water and other ecosystems, and is used for drinking and irrigation. A number of operators are choosing to remove the risk of operating underground storage tanks altogether and are either having them removed or made redundant (this usually involves sealing them off). Remediation may be necessary if the integrity of the storage tank has at any stage been compromised.

5.15 Blackwater (marine waters)

Blackwater is any waste from toilets or urinals. It is defined either as treated or untreated (raw). It contains bacteria and viruses that can result in human illness from direct contact, or by consumption of affected fish and shellfish. It also contributes to nutrient build up in ecosystems that result in changes to habitat and the proliferation of nuisance species.

This applies to:

- vessel operators (who are not subject to the International Convention for the Prevention of Pollution from Ships Annex IV).

KEY NOTE

Recreational and commercial vessel operators are key users of the state's coastal waters and appreciate more than many their natural beauty and environmental qualities. Blackwater (sewage) discharged from vessels is more concentrated than domestic blackwater. Although discharged in relatively small amounts, it is an important source of pollution that can and should be avoided.

It is assumed that small amounts of untreated blackwater discharged into marine waters while a vessel is travelling in deep water pose few risks. While sewage does eventually break down in sea water, the extent to which this occurs depends on a number of factors. These include water circulation, tides, wave action, salinity, water temperature, and topography of the receiving environment (including built structures such as marinas).

However, when vessels travel near shore, the risk of untreated blackwater discharges being close to swimming beaches, shellfish gathering areas, aquaculture leases, marine parks, fishing grounds, estuaries, reefs and other areas of ecological significance is increased. In these areas, sewage from vessels poses significant environmental and public health risks (eg faecal indicator organisms such as *Enterococci* can survive between two hours and two days in the environment, depending on temperature and sunlight).

To manage these risks, the EPA, on behalf of the South Australian community, require all vessel operators to avoid discharging untreated blackwater into the states' waters, and particularly to those areas of most ecological, social and economic significance (ie within 3 nautical miles from land). Ideally, blackwater should be retained and disposed of to a land-based treated effluent reuse scheme. This means managing blackwater rather than just getting rid of it in the easiest way possible.

It is expected that vessel operators will consider the way in which they use their vessel and choose an appropriate strategy to avoid or manage blackwater discharges. This may involve using fixed holding tanks, portable retainment devices such as 'porta-potties', vacuum cartridges, flexible bladders and onboard treatment systems, or other approaches such as composting. It may also be through the planning of voyages to make use of land-based ablution facilities. There are no requirements for vessels that do not generate blackwater.

Vessels will be subject to inspection regimes such as random audits for their compliance with relevant blackwater and greywater requirements, and may be subject to environment protection orders or fines where compliance is lacking. For example, where a vessel containing occupants is moored within 3 nautical miles from land for an overnight period and only has a fixed fitted toilet(s) with a direct discharge overboard present, the vessel operator will be required to demonstrate how wastewater is to be disposed of in compliance with this code of practice, otherwise further regulatory action may follow.

Proof of wastewater pumping discharges can be provided via waste tracking forms and invoices, photographs (time dated) taken at the pump-out station, or a vessel log for all vessel wastewater discharges to land-based waste management systems.

Marine waters vessel operators must:

1 Only discharge untreated blackwater provided:

- the vessel is underway on marine waters
- the vessel is more than 3 nautical miles from the nearest land (see Appendix 1 for map), an aquaculture lease or people in the water
- blackwater has been macerated into a fine slurry. Note that pump valves on hand or electric pumps on a marine head are not considered to be suitable means of macerating blackwater.

2 Not use formaldehyde-based chemical treatments as a sanitising agent for toilets.

KEY REFERENCE

Managing vessel wastewater for black and/or grey water, https://www.epa.sa.gov.au

Marine waters vessel operators should wherever possible:

1 Use land-based amenity facilities for the disposal of blackwater.

2 Retain blackwater on board the vessel for disposal into a land-based wastewater collection facility connected to a treated effluent reuse scheme.

KEY NOTE

Acceptable land-based wastewater management systems include the following:

- **Wastewater collection facility:** a facility that is designed and constructed to receive the contents of a holding device for blackwater and greywater. Mooring owners and operators should provide for those vessels with fixed holding devices (ie pump out) and/or portable toilet facilities. Shore-based ablution facilities are an acceptable means for the disposal from portable units.
- **Waste transporter:** a mobile service provider contracted to remove wastes.
- **Sewage system connection:** some vessels moored for extended periods may, with approval from the system owner, plumb their vessel into a land-based sewage system.

Vessel operators should consult with the provider of the wastewater collection facilities to ensure that the facility can manage the capacity and nature of their vessel's wastewaters. For example, Port Lincoln's sewage system is vulnerable to high concentrations of salinity in wastewaters and freshwater flushing is advisable.

For more information on waste disposal stations, please contact DEW on (08) 8463 6800 or refer to the following link: River vessel waste disposal options.

3 Install low flush toilets – there are systems that use 0.4 L per flush.

4 Ensure blackwater collection, holding and transfer system meets the *Australian Standard AS 3542.*

5 Consider options to plumb to a land-based wastewater management system during extended mooring periods

6 Use GPS (Global Positioning System) functions to ensure compliance with acceptable discharge areas (ie confirm more than 3 nautical miles from land).

7 Maintain and operate toilets, holding devices, treatment systems and other relevant onboard technologies according to manufacturer's instructions. Perform regular integrity inspections.

8 Retain service records for onboard wastewater management system.

9 Plan voyages with regard to the location of adequate waste collection systems.

KEY NOTE

MARPOL is more stringent than this code and applies to large ships with potentially large volumes of blackwater generation. MARPOL forbids the discharge of treated blackwater from large ships inside the gulfs of South Australia.

MARPOL Annex IV Regulations for the Prevention of Pollution by Sewage from Ships entered into force on 27th September 2003. A revised Annex was adopted on 1st April 2004, and came into force on 12th September 2005.

This regulation applies to new ships engaged in international voyages, of 400 gross tonnage and above, or which are certified to carry more than 15 persons. Existing ships were expected to be compliant by 12th September 2010. The Annex requires ships to be equipped with either a sewage treatment plant or a sewage comminuting and disinfecting system or a sewage holding tank.

The discharge of sewage into the sea is prohibited, except when the ship has in operation an approved sewage treatment plant and is discharging comminuted and disinfected sewage using an approved system at a distance of more than 3 nautical miles from the nearest land (for MARPOL, land is defined as the boundary of state's waters, ie outside both gulfs and beyond Kangaroo Island), or is discharging sewage which is not comminuted or disinfected at a distance of more than 12 nautical miles from the nearest land.

The Marine Environment Protection Committee (MEPC) at its 55th session in October 2006 adopted revised guidelines on implementation of effluent standards and performance tests for sewage treatment plants. The revised guidelines applies to sewage treatment plants installed on board on or after 1st January 2010.

The MEPC also adopted a standard for the maximum rate of discharge of untreated sewage from holding tanks when at a distance equal or greater than 12 nautical miles from the nearest land.

Annex IV requires the following effluent standards from sewage treatment plants:

- total suspended solids (SS) <35 mg/L
- biochemical oxygen demand (BOD) <25 mg/L
- chemical oxygen demand (COD) <125 mg/L
- pH 6−8.5.

The MARPOL definition for nearest land means the baseline from which the territorial sea of the territory in question is established in accordance with international law. The exception is the north-eastern coast of Australia, for which individual latitude and longitude coordinates are provided. Refer to Appendix 1 for map of SA waters.

5.16 Greywater (marine waters)

Greywater is wastewater that has been used for washing, laundering, bathing or showering. This includes water containing dissolved or undissolved by-products such as fat and oil, food scraps that contain nutrients, household chemicals, soap and detergent rich in phosphate and nitrate, and microbiological pathogens (eg bacteria and viruses). If greywater is discharged into aquatic environments it can damage ecosystems and lead to nutrient enrichment (promote

growth of algal blooms) and pose human health risks. Greywater is considered less of a risk to human health than blackwater and therefore has lower standards for discharge compared to blackwater.

This applies to:

- vessel operators.

KEY NOTE

Greywater discharge from vessels is a comparatively low contributor to overall water quality but is still an important source of pollution in localised areas that can and should be avoided. The number of vessels that provide luxury facilities such as ensuite bathrooms, dishwashers, washing machines and even spa baths are on the increase. The greywater produced from these sources can be harmful to the receiving aquatic environment and other marine users.
It is of most concern when released nearshore in estuaries, bays, rivers and marinas.

Greywater discharge plumes may remain on the surface of marine waters and accumulate pollutants (particularly nutrients) around the vessel from which it is sourced or adjacent vessels. Excessive nutrients contribute to the growth of algae, which is known to cause problems for vessel operators, particularly within marina basins. There are a number of on-board wastewater treatment systems that can treat both blackwater and greywater to standards acceptable for marine discharge.

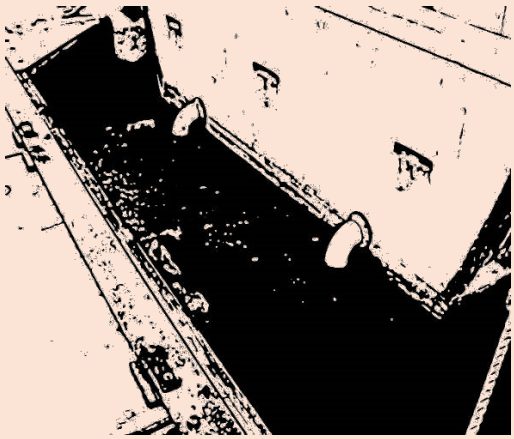
Greywater from a vessel will vary depending on the nature of and use made of the vessel. However the principles of pollution avoidance are the same for all vessels. As a consequence, the code of practice incorporates measures of flexibility for managing environmental risks depending on the circumstances involved.

In summary, the code of practice requires that vessel operators make an assessment of their vessel and the way in which they intend to operate it and undertake the most reasonable and practical measures to manage any greywater generated. For many operators, this will mean making use of structural devices on board, such as fixed, fitted holding tanks and/or the introduction of greywater treatment options, which include the use of treatment systems, grease-traps, disinfection or simple filtration units/components.

For others, it could mean choosing to discontinue the use of onboard washing machines or dishwashers when in sensitive areas, not using phosphate detergents or maintaining their current behavioural practices of minimising the use of cooking oils, and being vigilant in separating food stuffs from washing up water, etc. The goal is for achieving or maintaining improvement of some measure for all vessel operators.

Onboard treatment systems will never be fail safe in removing all pollutants that could cause harm and require significant ongoing maintenance. They will not suit vessel operators that are not committed to regular integrity inspections.

Operators must:



1 Only discharge untreated greywater provided:

- the vessel is greater than one nautical mile from the nearest land or people in the water
- the vessel is greater than three nautical miles from the nearest aquaculture lease
- it does not contain formaldehyde-based chemical treatments or visible solids.

If a vessel operator chooses to discharge within one nautical mile from the nearest land they must adhere to one of the following greywater management options:

2 Treat all greywater to AS 4995 using a properly maintained and approved greywater treatment system:

- no restriction to discharge, unless permanently moored or occupied within harbor, marina or canal – in the latter cases, no discharge is allowed
- undergo behaviour changes (eg use of environmentally friendly detergents).

OR

3 Partition greywater into two waste streams and manage as follows:

- containment of galley greywater in a holding tank and implement treatment (filter and disinfect) of the other greywater producing facilities (eg bathroom and laundry) before discharge to the environment without further restrictions
  - no restriction to discharge, unless permanently moored or occupied within harbor, marina or canal –in the latter cases, no discharge is allowed
  - undergo behaviour changes (eg use of environmentally friendly detergents)
  - adhere to Appendix 5 for non-galley greywater treatment requirements.

OR

4 Vessels with structural limitations (ie unable to support containment tanks or treatment units) to be managed as follows:

- install an in-line strainer for all greywater to pass through
- install a grease trap for galley water to pass through
- no discharge is allowed if permanently moored or occupied within harbor, marina or canal
- no discharge is allowed within 50 m of people in the water
- no discharge is allowed within three nautical miles from an aquaculture lease
- any discharge must not have visible solids present on or near the water's surface
- and operators undergo relevant behaviour changes (eg use of environmentally friendly detergents).

Vessel operators must provide, upon request from the EPA, proof for all vessel wastewater discharges to land-based waste management systems, including pump truck discharges.

For more information on waste disposal stations, please contact DEW on (08) 8463 6800 or refer to the following link: River vessel waste disposal options.

KEY NOTE

Vessels using greywater treatment systems manufactured to Australian Standard 4995, can discharge treated whole greywater providing each of the following specifications have been met in relation to the greywater (other than by a process of dilution):

- concentration of suspended solids is less than 50 mg/L
- concentration of grease is less than 25 mg/L
- concentration of nitrogen is less than 10 mg/L
- concentration of phosphorus is less than 1 mg/L
- concentration of enterococci is less than 40 cells/0.1 L.

Greywater from kitchen sinks/washbasins is generally minor in volume when compared to other onboard sources but can contain significant pollutants (such as cooking oils, fats, raw meat and dairy products). They are best controlled at the source (ie through behavioural practices), or be contained and directed to a suitable wastewater treatment facility.

Typical average daily flows include:

- kitchen: 10 L/person/day
- hand basin: 7 L/person/day

*(*Source: SA Health Code, *On-site Wastewater Systems Code 2013)*

Greywater from laundering, dishwashers and spas is high in salts, suspended and dissolved solids, and is more likely to contain high levels of phosphorus from the strong detergents and soaps that are often used. Phosphorus is proven to contribute to excessive algal growth in waterways, and estuaries, rivers and bays are particularly susceptible to additions of this nutrient.

Greywater from showering is also a concern for its impacts on environmental and public health. Due to its substantial volumes and flow rates, it can prove difficult to treat and/or retain. Filtration and disinfection addresses these risks.

Average daily flows:

- bath and shower: 32 L/person/day
- laundry: 31 L/person/day
- dishwasher: varies from 18L−40L per cycle depending on system.

*(*Source: SA Health Code, *On-site Wastewater Systems Code 2013)*

The term ‘biodegradable’ means the ability of a material to be broken down into its simplest chemicals such as water, carbon dioxide and mineral salts by organisms called decomposers (eg bacteria). The *Australian Standard AS 1792 for Biodegradability* requires 80% of the mixture to be degraded within 21 days if the product is to carry the label biodegradable. It is important to note that biodegradable detergents can harm the environment, and that wastewater should ideally be prevented from entering waterways.

KEY REFERENCE

A useful site that contains information on laundry products is www.lanfaxlabs.com.au

Managing vessel wastewater for black and/or grey water, https://www.epa.sa.gov.au

Vessel operators should:

1 Use land-based amenity facilities to shower, wash dishes and clothing wherever possible.

2 Retain greywater onboard the vessel for disposal into land-based wastewater collection facility connected to a treated effluent reuse scheme.

3 Install water-saving devices such as low-flow shower heads and tap aerators.

4 Install an onboard wastewater treatment system that meets the discharge standards outlined in this code to reduce the potential impacts on the aquatic environment.

5 Consider an onboard wastewater management system that enables both onboard containment, treatment and controlled discharge. Look for options to plumb the system to a land-based waste management device during extended mooring periods and use GPS (Global Positioning System) functions to ensure compliance with acceptable discharge areas.

Maintain and operate wastewater management system according to the manufacturer's instructions. Perform regular integrity inspections.

7 Retain service records for the onboard wastewater management system.

8 Retain user instructions on board the vessel at all times. This can include signage (stickers or labels) placed strategically around the vessel to advise on practices when cooking, cleaning utensils, washing clothes, showering, and swimming.

9 Check product labels, and use low nitrogen and no phosphorus detergents.

10 Scrape food stuffs into garbage container before washing dishes.

11 Avoid adding cooking oils, greases and dairy products to greywater.

12 Use all soaps and cleaners sparingly.

13 Avoid running the shower, dishwasher and washing machine simultaneously if a treatment system is used on board as the high volume will limit its effectiveness.

14 Plan voyages with regard to the location of land-based amenity facilities and adequate wastewater management systems.

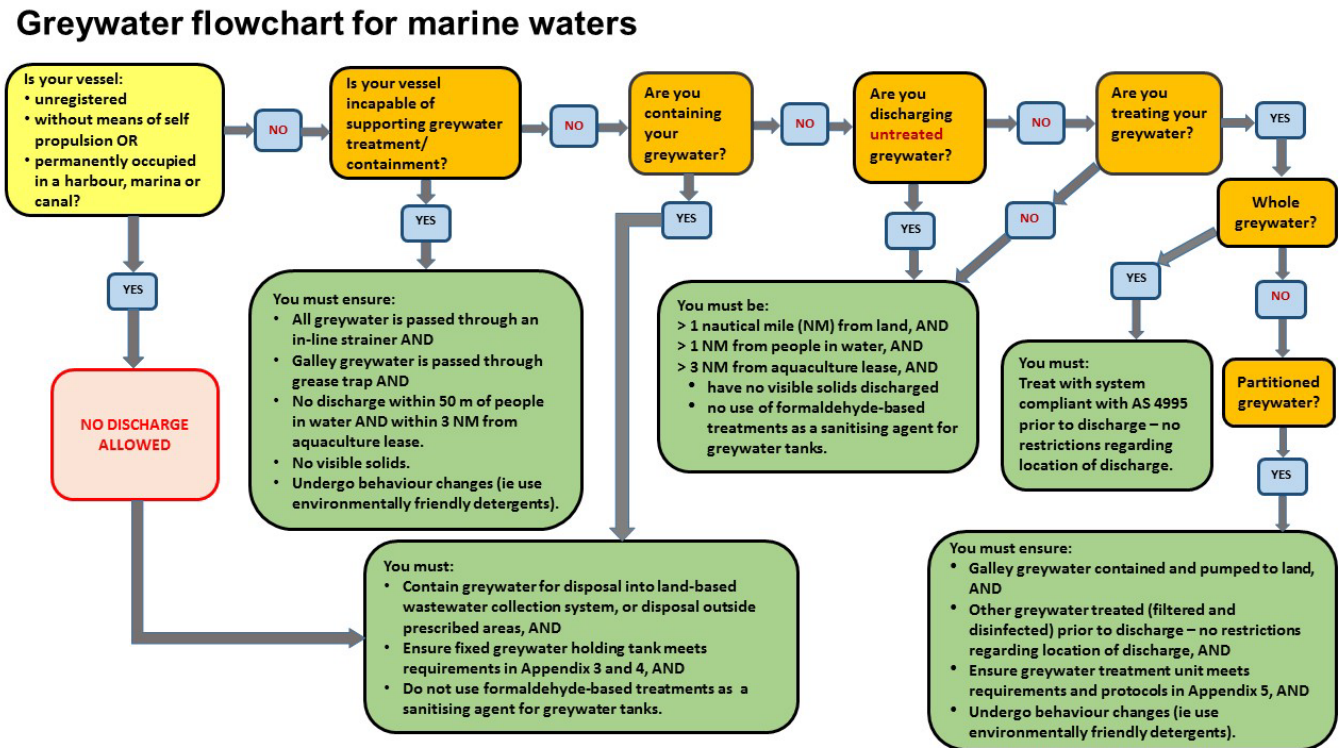


Figure 4 Greywater flowchart for marine waters

5.17 Blackwater (inland waters)

Blackwater is any waste from toilets or urinals. It contains disease causing bacteria and viruses that can result in human illness from direct contact, or by consumption of affected fish and shellfish. It also contributes to nutrient build up in ecosystems that result in changes to habitat and the proliferation of nuisance pest species.

This applies to:

- vessel operators.

KEY NOTE

Portable toilets, carry off holding devices, and fixed fitted toilets that are connected to fixed holding tanks are all acceptable containment devices on board vessels travelling on inland waters. Consider installing and maintaining wastewater management devices on your vessel through the services of operators who are members of a marine or boating association with an environmental code of ethics, accreditation program or similar.

Vessel owners must comply with the ***General environmental duty*** provision under the EP Act and the Water Quality Policy in relation to managing wastewater for both private and commercial vessels. Commercial vessels must be inspected for wastewater infrastructure compliance by an EPA accredited inspector every five years, or every second commercial survey. There is no mandatory requirement for inspections for private vessels, but the EPA recommends that private vessels should be inspected to ensure that wastewater cannot enter inland waters.

Vessels will be subject to inspection regimes for compliance with black and grey water requirements outlined in this code and may be issued with environment protection orders or fines where compliance is not being met. For example, vessels that are found to be moored for extended periods on inland waters where disposal of blackwater into land-based waste management systems cannot be practically demonstrated, will be subject to an environment protection order and/or fine.

KEY REFERENCE

Managing vessel wastewater for black and/or grey water, https://www.epa.sa.gov.au

Operators must:

1 Not permit blackwater to enter into any inland (fresh) waters.

2 Ensure that the vessel's fixed fitted toilet and fixed blackwater holding tank meet the requirements outlined in Appendices 3 and 4.

3 Not use formaldehyde-based chemical treatments as a sanitising agent for toilets.

4 Retain blackwater on board the vessel for disposal into a land-based wastewater collection facility.

5 Provide, upon request from the EPA, proof for all vessel wastewater discharges to land-based waste management systems, including receipts for pump truck discharges.

KEY NOTE

Acceptable land-based wastewater management systems include:

- **Wastewater collection facility:** a facility designed and constructed to receive the contents of a holding device for blackwater and greywater. Mooring owners and operators should provide for those vessels with fixed holding devices (ie pump out) and/or portable toilet facilities. Shore-based ablution facilities are an acceptable means for the disposal from portable units.
- **Waste transporter:** a mobile service provider contracted to remove wastes.
- **Sewage system connection:** some vessels moored for extended periods may, with approval from the system owner, plumb their vessel into a land-based sewage system.

Please contact DEW on (08) 8463 6800 or refer to Riverboat waste disposal options.

Operators should:

1 Install low flush toilets – there are systems that use 0.4 L per flush.

2 Maintain and operate all onboard wastewater management systems according to the manufacturer's instructions and perform regular integrity inspections.

3 Retain service records for onboard wastewater management system.

4 Plan voyages with regard to the location of adequate wastewater collection facilities.

5.18 Greywater (inland waters)

Greywater is wastewater that has been used in sinks and hand-basins and for washing, laundering, bathing or showering. This includes water containing dissolved or undissolved by-products such as fat and oil, food scraps that contain nutrients, household chemicals, soap and detergent rich in phosphate and nitrate, and microbiological pathogens (eg bacteria and viruses). If greywater is discharged into aquatic environments it can damage ecosystems, lead to nutrient enrichment (promote growth of algal blooms) and pose human health risks. Greywater is considered less of a risk to human health than blackwater and therefore has lower standards for discharge compared to blackwater.

This applies to:

- vessel operators.

KEY NOTE

For the most part, recreational and commercial vessel operators appreciate more than many, the natural beauty and environmental qualities of SA's inland waters. To ensure the long-term sustainability and current freedom surrounding the operating of vessels,
it is imperative that operators look towards minimising their environmental impacts, in particular greywater discharges. Greywater discharge from vessels is a comparatively low contributor to overall water quality but presents a significant risk factor in a vessel's sphere of influence that can and should be avoided.

As our inland waters are subject to a multitude of uses, each with their inherent 'right' to operate, it is important for a balance to be struck and stewardship demonstrated by users. Inland waters vessel operators have been responsible in avoiding blackwater discharges and this is to be commended. Some operators have chosen to go further and have managed greywater without waiting for legislative direction.

In developing this code of practice, the EPA was encouraged by the number of stakeholders willing to work towards a reasonable and practical outcome for the management of greywater from vessels and the amount of goodwill shown was notable.

Sources and volumes of greywater from a vessel vary depending on the nature of and use made of the vessel; however, the principles of pollution avoidance are the same for all. As a consequence, the code of practice incorporates measures of flexibility for managing environmental risks depending on the circumstances involved.

In summary, the code of practice requires that vessel operators make an assessment of their vessel and the way in which they intend to operate it and undertake the most reasonable and practical measures outlined to manage greywater. For many operators, this will mean making use of structural devices on board, such as fixed fitted holding tanks and/or the introduction of treatment systems or simpler filtration components. For others, it could mean choosing to discontinue the use of onboard washing machines or dishwashers, not using phosphate detergents, or maintaining their current behavioural practices of minimising the use of cooking oils and being vigilant in separating food stuffs from washing up water. The goal is for achieving or maintaining improvement of some measure for all vessel operators.

The greatest risk to human health from the discharge of greywater comes when vessels are moored alongside one another, especially within enclosed marina basins where water exchange is significantly reduced. It is also hazardous for individual operators who choose to moor in the one location for extended periods of time. Water extracted from the River Murray is often only filtered for use in the kitchen sink. In many cases, water used in the bathroom is direct from the River Murray and may contain pollutants released by an adjacent vessel, or even your own.

Onboard treatment systems will never be fail safe in removing all pollutants that could cause harm and require significant ongoing maintenance, especially in relation to the replacement of filters and disposal of solids/sludge.

Vessel owners must comply with the ***general environmental duty*** provision under the Environment Protection Act 1993 and the Environment Protection Policy (Water Quality) 2015 in relation to managing wastewater for both private and commercial vessels. Commercial vessels must be inspected for wastewater infrastructure compliance by an EPA accredited inspector every five years, or every second commercial survey. There is no mandatory requirement for inspections for private vessels, but the EPA recommends that private vessels should be inspected for wastewater infrastructure to ensure that wastewater cannot enter inland waters.

Vessels will be subject to random audits for compliance with blackwater and greywater requirements and may be penalised with Environment protection orders and/or fines where compliance is not being met. Vessel operators who are experiencing difficulties with achieving compliance should notify the EPA in writing as soon as is reasonably practical by clearly outlining the circumstances that will result in any non-compliance.

Operators must adhere to one of the following greywater management options:

1 Not permit greywater to enter into any inland waters by:

- containing greywater on board the vessel for disposal into land-based wastewater collection system Riverboat waste disposal options
- ensuring that the vessel's fixed greywater holding tank meets the requirements outlined in Appendices 3 and 4
- not using formaldehyde-based chemical treatments as a sanitising agent for greywater tanks.

OR

2 Treat all greywater to AS 4995 using a properly maintained and approved greywater treatment system:

- no restriction to discharge, unless permanently moored or occupied within harbour, marina or canal
- undergo behaviour changes (eg use of environmentally friendly detergents).

OR

3 Partition greywater into two waste streams and manage as follows:

- containment of galley greywater in a holding tank and implement treatment (filter and disinfect) of the other greywater producing facilities (eg bathroom and laundry) before discharge to the environment
- no restriction to discharge, unless permanently moored or occupied within harbour, marina or canal–in the latter cases, no discharge is allowed
- undergo behaviour changes (eg use of environmentally friendly detergents)
- adhere to Appendix 5 for non-galley greywater treatment requirements.

OR

4 Vessels with structural (ie unable to support containment tanks or treatment units) limitations:

- Install an in-line strainer for all greywater
- Install a grease trap for galley water
- no discharge is allowed if permanently moored or occupied within harbor, marina or canal
- no discharge is allowed within 50 m of people in the water
- any discharge must not have visible solids present on or near the water's surface
- and operators undergo relevant behaviour changes (eg use of environmentally friendly detergents).

Permanently moored vessels with no registration or viable means of propulsion must not discharge greywater, whether treated or not, to waters. In such instances, discharge from any fitted greywater treatment system must only be to a land-based wastewater system. All wastewater holding tanks must be plumbed into a land-based wastewater system or access must be provided for a licensed contractor to pump out the tanks. Receipts per pump out must be kept and produced during audits by authorised officers.

Permanently occupied vessels must not discharge greywater, whether treated or not, to waters, while moored in off-river marinas.

Commercially operated vessels utilised as stationary (not hire and drive) on-water accommodation or dining facilities, can only discharge greywater to a land-based wastewater management system or an approved treated effluent reuse scheme.

Garbage grinders must not be fitted to the vessel unless it is an essential component to an onboard wastewater treatment system.

Vessel operators must provide, upon request from the EPA, proof for all vessel wastewater discharges to land-based waste management systems, including pump truck discharges

For more information on waste disposal stations, please contact DEW on (08) 8463 6800 or refer to the River vessel waste disposal options

KEY NOTES

Greywater from kitchen sinks/wash basins is generally minor in volume when compared to other onboard sources but can contain significant pollutants (such as cooking oils, fats, raw meat and dairy products). They are best controlled at source (ie through behavioural practices) or contained and subsequently directed to a suitable wastewater treatment facility.

Average daily flows:

- kitchen: 10 L/person/day
- hand basin: 7 L/person/day

(Source: SA Health Code, *On-site Wastewater Systems Code 2013)*

Vessels using greywater treatment systems manufactured to *Australian Standard 4995–2009 Greywater treatment systems for vessels operated on inland waters*, can discharge treated whole greywater providing each of the following specifications have been met in relation to the greywater (other than by a process of dilution):

- the concentration of suspended solids is less than 50 mg/L
- the concentration of grease is less than 25 mg/L

- the concentration of nitrogen is less than 10 mg/L
- the concentration of phosphorus is less than 1 mg/L
- the concentration of enterococci is less than 40 cells/0.1 L.

Greywater from laundering, dishwashers and spas is high in phosphorus, salts, suspended and dissolved solids. Phosphorus is proven to contribute to excessive algal growth in waters. The River Murray is already subject to blooms of cyanobacteria (blue-green algae) that can make the water unsuitable for humans, livestock and wildlife.

The term 'biodegradable' means the ability of a material to be broken down into its simplest chemicals by organisms. The *Australian Standard AS 1792 – Biodegradability* requires 80% of the mixture to be degraded within 21 days. It is important to note that biodegradable detergents can harm the environment and should not enter waterways.

Greywater from showering is also a concern for its impacts on environmental and public health. Due to its substantial volumes and flow rates, it can prove difficult to fully treat and/or retain. In the revised greywater requirements, all water from the bathroom and laundry must be contained or treated using a simple, non-mechanical, gravity fed and cost-effective residential-style greywater treatment unit, prior to discharge.

Average daily flows:

- bath and shower: 32 L/person/day
- laundry: 31 L/person/day
- dishwasher: varies from 18−40 L per cycle depending on system.

(Source: SA Health Code, *On-site Wastewater Systems Code 2013)*

Vessel operators are reminded that the human and environmental health risks associated with the discharge of greywater (even treated greywater) are significant when vessels are moored alongside each other on inland waters. The source of bathroom water (shower and washbasin) is typically direct from the River Murray and it is possible that those on board vessels may be exposed to ingestion of pollutants shed by other boaters. Nutrient and pathogen loads may accumulate over many days before dispersion and mixing with river waters, particular within off-river marinas and closely moored vessels within on-river marinas.

KEY REFERENCE

A useful site that contains information on laundry products is www.lanfaxlabs.com.au

EPA, *The disposal of soaps and detergents*, https://www.epa.sa.gov.au/files/8431_soaps_detergents.pdf

EPA, *Wastewater requirements for vessels on inland waters,* https://www.epa.sa.gov.au/files/477474_info_wastewater.pdf

Operators should:

1 Use land-based amenity facilities to shower, and wash dishes and clothing.

2 Retain greywater on board vessel for disposal into land-based wastewater collection facility connected to treated effluent reuse scheme.

3 Reduce greywater volumes by installing water-saving devices such as low-flow shower heads and tap aerators.

4 Install water purification devices for water extracted from inland waters for use on-board (eg kitchen, vanity, shower, spa).

5 Consider on-board options to plumb system to land-based waste management devices during extended mooring periods and GPS (Global Positioning System) functions to ensure compliance with no-discharge zones.

6 Maintain and operate wastewater/water management system according to manufacturer's instructions. Perform regular integrity inspections.

7 Retain service records for onboard wastewater management system.

8 Provide user instructions on board the vessel to promote behaviours to reduce health risk (eg teeth cleaning with bottled water) and environmental impact (eg not using hair dyes). This can include signage (stickers or labels) placed strategically around the vessel.

9 Check product labels and use low phosphorus detergents for onboard laundry, dish washing and general cleaning.

10 Scrape food stuffs into garbage container before immersing dishes in water.

11 Avoid adding cooking oils, greases and dairy products to greywater.

12 Use all soaps and cleaners sparingly.

13 Avoid running the shower, dishwasher and washing machine simultaneously if a treatment system is used on board as the high volume will limit its effectiveness.

14 Record and retain waste tracking forms and invoices, or maintain a vessel log for all vessel wastewater discharges to land-based waste management systems.

15 Plan voyages with regard to the location of land-based amenity facilities and adequate waste collection facilities.

16 Use land-based amenity facilities to shower, and wash dishes and clothing.

17 Retain greywater on board vessel for disposal into land-based wastewater collection facility connected to treated effluent reuse scheme.

18 Reduce greywater volumes by installing water-saving devices such as low-flow shower heads and tap aerators.

19 Install water purification devices for water extracted from inland waters for use on-board (eg kitchen, vanity, shower, spa).

20 Consider on-board options to plumb system to land-based waste management devices during extended mooring periods and GPS (Global Positioning System) functions to ensure compliance with no-discharge zones.

21 Maintain and operate wastewater/water management system according to manufacturer's instructions. Perform regular integrity inspections.

22 Retain service records for onboard wastewater management system.

23 Provide user instructions on board the vessel to promote behaviours to reduce health risk (eg teeth cleaning with bottled water) and environmental impact (eg not using hair dyes). This can include signage (stickers or labels) placed strategically around the vessel.

24 Check product labels and use low phosphorus detergents for onboard laundry, dish washing and general cleaning.

25 Scrape food stuffs into garbage container before immersing dishes in water.

26 Avoid adding cooking oils, greases and dairy products to greywater.

27 Use all soaps and cleaners sparingly.

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29 Record and retain waste tracking forms and invoices, or maintain a vessel log for all vessel wastewater discharges to land-based waste management systems.

30 Plan voyages with regard to the location of land-based amenity facilities and adequate waste collection facilities.

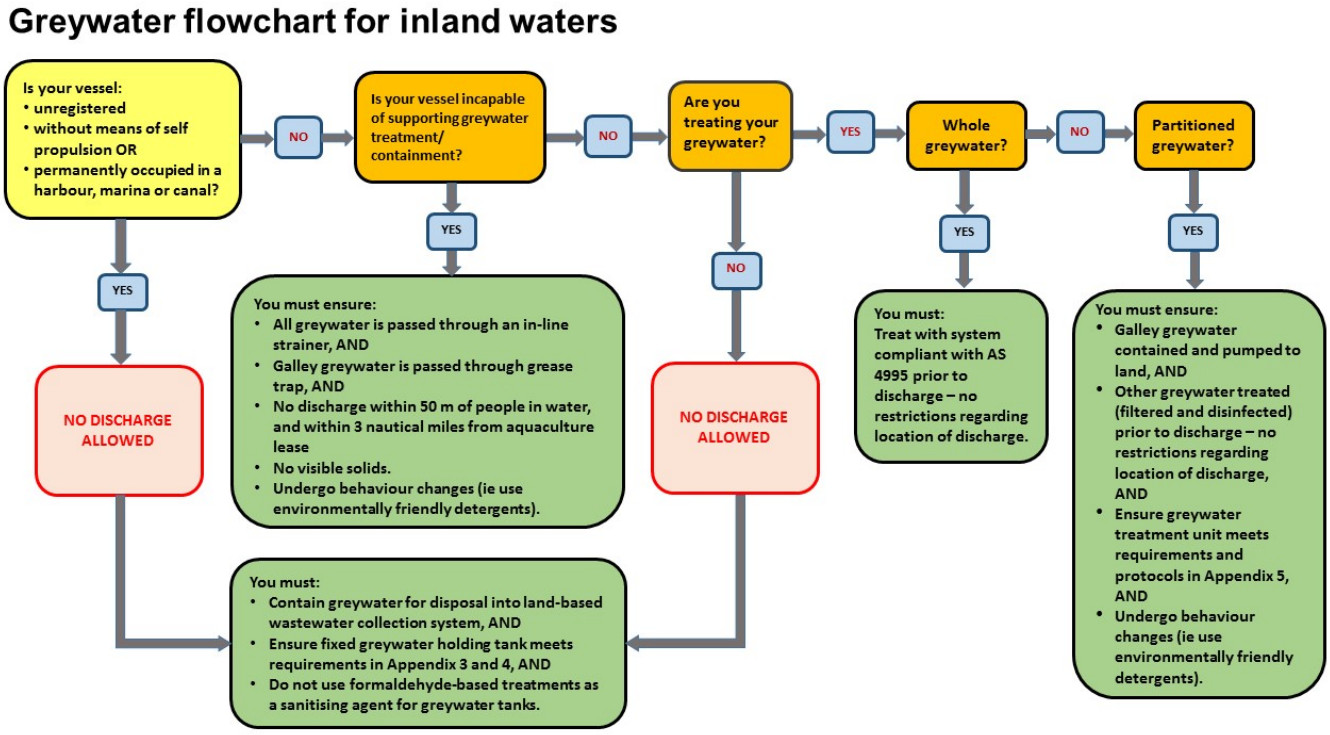


Figure 5 Greywater flowchart for inland waters

5.19 Bilge water

A large number of small discharges of oily waste add up to a significant problem as it contains polycyclic aromatic hydrocarbons (PAHs). These are carcinogens and have been implicated in diseases of aquatic organisms and subsequent human health problems.

This applies to:

- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators
- boat and yacht club operators.

Operators must:

1 For all vessels operating on state waters where oily bilge water is generated, install and maintain oil filtration devices on bilge pumps.

OR

Place commercially manufactured oil absorption material in bilges (eg bilge socks/rats).

2 Not pump bilge water (unless for safety of the vessel) into a waterway or soil if it contains visible signs of oil, hydrocarbons or other wastes.

3 Not use detergent or emulsifier in bilge water.

KEY REFERENCE

EPA, *Disposal of used hydrocarbon absorbent materials*, https://www.epa.sa.gov.au/files/8424_guide_hydrocarbon.pdf

Operators should:

1 Use, maintain and dispose of filters and absorption devices according to manufacturer's instructions.

2 Maintain engines regularly to prevent oil and fuel leaks to the bilge. In particular, check fuel lines for cracks and loose connections.

3 Use polypropylene bilge socks in preference to biodegradable items.

5.19 Biofouling

Marine pest fouling on vessels can have significant impacts on the marine environment, human health and the economy. Such impacts include destruction of marine habitats and adverse effects on tourism, fishing, marine industries and coastal values. Marine pests can be introduced into, or translocated between, locations in Australia on the hulls of vessels (as hull fouling), entangled in deck gear or in damp or fluid-filled spaces (niche areas) such as anchor lockers, bilges, sea chests and internal seawater systems.

This applies to:

- boat and yacht club operators
- vessel operators
- slipway operators
- marina operators
- boat yard operators
- boat ramp operators.

Operators must:

Comply with sections 5.7 Vessel cleaning and 5.11 Painting and varnishing.

KEY NOTE

If you think you have identified any marine pest species (either known to be in Australia or a suspected new pest) contact Fishwatch on 1800 065 522.

Signs of a suspected pest could include unusually heavy biofouling, dominance of the fouling by one species, or a 'new' species not seen before in your region. If possible, collect some specimens and keep them in a sealed plastic bag in the freezer until they can be taken for identification.

In South Australia, *Caulerpa taxifolia* has colonised significant areas of the Port River waterways. It is considered a serious threat to seagrass meadows. For information on areas closed to anchoring, visit PIRSA.

The European Fan Worm *Sabella spallanzanii,* was first recorded at Outer Harbor in 1985. It can now be found along the central metropolitan coastline and at Kingscote on Kangaroo Island. The worm has out-competed molluscs, ascidians, worms and algal species to become the dominant species.

In 2018, Pacific Oyster Mortality Syndrome (POMS), a disease which affects Pacific Oysters *Crassostrea gigas* was detected in the Port River. This disease causes rapid death and high mortality rates in farmed Pacific Oysters and can spread quickly if introduced. Please refer to the PIRSA website for details of relevant bans, alerts and procedures relating to POMS in the Port River.

Operators should:

1 Increase awareness of marine pest risks and management among vessel operators, vessel facility personnel and general users.

2 Incorporate biofouling management practices into environmental management systems and be prepared for emergency situations (eg declared outbreaks).

3 Provide and maintain vessel facilities to allow proper marine pest vessel maintenance.

4 Manage vessel facility infrastructure for marine pest risks.

5 Remove biofouling from vessel at an EPA licensed facility with adequate waste and wastewater controls to capture and dispose of waste material.

6 Remove slime (primary biofouling) from the hull with a soft cloth.

7 Rinse trailered vessels with fresh water after each trip, ensuring that the wastewater runoff does not re-enter the marine environment, and inspect the vessel for attached organisms. Remove any that are found and dispose of to a bin for landfill. Do not return organisms to water.

8 Where practical, allow your vessel to drain and air dry after each trip. Air drying is effective in killing most small pest species in about 24 hours.

9 Ensure hulls and other areas of vessel prone to fouling are painted with antifouling systems (refer to section 5.11 Painting and varnishing).

10 Regularly maintain the antifouling and anti-corrosion coatings of the following niche areas of the vessel, which are particularly susceptible to biofouling growth – bow and stern thrusters (cavitation forces), bilge keels, cooling and propulsion scoops, rudder hinges and stabiliser fin apertures.

11 Repair, as soon as practical, damage to antifouling paint as a result of grounding, collision or mechanical impact, even if the area of damage is relatively minor. Landing barge operators should be particularly vigilant.

12 If a vessel has remained at the same site (ie on a mooring, at anchor or alongside a wharf) for an extended period of time (two−three months or more), inspect its hull and niche areas and in the event that it has secondary biofouling, slip and clean those areas before departing the locality.

13 Regularly inspect and maintain unpainted hull appendages such as anodes, velocity probes and echo sounders.

14 Regularly polish propellers to maintain operational efficiency and to prevent biofouling. Painting propellers and propeller shafts with silicone fouling release coatings can maintain efficiency and enable self-cleaning, limiting the need for regular polishing.

15 Inspect and clean equipment routinely (including mooring lines, anchors, chains and warps).

16 Ensure inspection regimes, hull, equipment and niche area cleaning are adequate for the type of vessel. For example, slow-moving wooden vessels, such as sail training vessels, may be at higher risk of colonisation by marine pests and are vulnerable to infestation by wood boring organisms. Lighters tend to remain in situ for long periods and may become heavily fouled.

17 Ensure dredges that work in one area all the time undergo regular inspections to ensure that the vessel is not becoming a reservoir for marine pests. Hoppers, suction and discharge pipes, cutter heads and buckets should be thoroughly cleaned with all spoil removed.

18 Be aware of the risks of translocating marine pests between mainland and offshore islands, especially ferry operators.

19 Maintain written records (eg a log book) that includes operational activities (eg sailing patterns of vessel), hull and equipment cleaning (eg dates, methods and locations at which such activities took place), application of antifouling coating (eg date, location and type of coating applied).

5.20 Ballast water

Most introduced aquatic species have ‘hitchhiked’ into Australian waters and been transferred between state waters in vessel ballast water or attached to the hulls or internal water systems of vessels. Such species are considered pests if they threaten human health or environmental, social and economic values. Introduced aquatic pests are a major threat to the balance of aquatic ecosystems, commercial fishing and aquaculture industries. Pest species can be carried and spread by both domestic and international travelling vessels.

Operators must:

1 Follow the requirements established under the Commonwealth *Biosecurity Act 2015* and the Australian Ballast Water Management Requirements (please check for updates) for details.

2 Keep accurate and comprehensive records of the status of ballast water on a voyage-by-voyage basis.

KEY NOTE

The Commonwealth Department of Agriculture and Water Resources manages ballast water requirements nationally, including domestic trips to and from South Australia.

The *Biosecurity Act 2015* replaces the *Quarantine Act* as Australia's primary piece of legislation used to manage the biosecurity risks posed by ballast water and sediments. Under this Act, domestic ballast water arrangements come into force on 8 September 2017. The *Australian Ballast Water Management Requirements*, provides guidance on how vessel operators should manage ballast water when operating within Australian seas in order to comply with the Biosecurity Act.

See www.agriculture.gov.au/biosecurity/avm/vessels/ballast/ for more information.

Operators should:

1 Remove sediment from ballast tanks in controlled conditions in port, at a vessel mooring/repair facility or slipway. Such sediment should be disposed of in a suitable land-based sediment reception facility.

2 Ensure that all practical steps are taken during ballast water uptake to avoid sediment accumulation. This can include avoiding areas with current phytoplankton blooms, shallow water where propellers may stir up sediment and where dredging is or has recently been carried out.

3 If sediments are to be disposed of at sea, vessels should ensure that, whenever possible, sediments (and water used to flush sediments) should be disposed of at least 200 nautical miles from the nearest land and be in water at least 200 m in depth.

KEY NOTE

Vessels may be exempt from exchange requirements if the master reasonably decides that such exchange would threaten the safety or stability of the vessel, its crew, or its passengers because of adverse weather, vessel design or stress, equipment failure, or any other extraordinary condition. The discharge of water that has not been managed due to these circumstances may be permitted, provided that its occurrence can be substantiated.

KEY REFERENCES

Ballast water, http://www.agriculture.gov.au/biosecurity/avm/vessels/ballast/australian-ballast-water-management-requirements

Aquatic pests, http://pir.sa.gov.au/biosecurity/aquatics/aquatic_pests

Biofouling, http://pir.sa.gov.au/biosecurity/aquatics/biofouling_and_ballast_water

Harbors and Navigation Regulations 1994, Part 14, Division 2 − Ballast Water, https://legislation.sa.gov.au/LZ/C/R/HARBORS%20AND%20NAVIGATION%20REGULATIONS%202009.aspx

The National System for the Prevention and Management of Marine Pest Incursions, www.marinepests.gov.au/national-system/Pages/default.aspx

5.21 Vessel recovery (sunken or abandoned)

Accidents do happen and pollutants can subsequently be released to the environment. It is important under such circumstances to undertake whatever measures are reasonable and practicable to minimise environmental harm. This may mean notifying emergency response authorities immediately in order to ensure that the best available equipment and expertise is used to clean up pollutants. Reporting incidents of serious or material environmental harm is a legislative requirement under the EP Act.

This applies to:

- vessel operators
- marina operators
- port operators
- boat and yacht club operators.

Operators should (if it is safe):

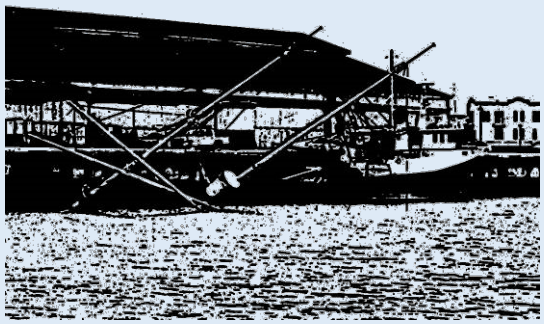
1 Contain the sunken vessel using a combination of booms, tarpaulins and/or other structures.

2 Empty the vessel's fuel tanks and reuse or safely dispose of the fuel.

3 Empty the vessel's wastewater tanks (blackwater and greywater).

4 Remove and recycle the following vessel parts and fluid:

- oil and oil filter
- batteries
- radiator coolant
- engine (recycle as scrap metal)
- any metal with reuse value, such as lead, zinc, aluminium and magnesium
- all mercury containing devices (ie some electronic equipment, bilge switches, pumps and barometers)
- vessel hull.



KEY REFERENCE

Harbors and Navigation Act 1993, Division 2−Clearance of Wrecks, https://legislation.sa.gov.au/LZ/C/R/HARBORS%20AND%20NAVIGATION%20REGULATIONS%202009.aspx

6 Further reading

Australian and New Zealand Environment Conservation Council 1997, *Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand,* ANZECC, Canberra.

––2003, *Waste Reception Facilities in Australian and New Zealand Ports,* ANZECC, Canberra, viewed 3 December 2018, https://www.amsa.gov.au/waste-reception-facilities-australian-ports

Business SA and Partners 2002, *Small Business Environmental Management Solutions*, Business SA, Adelaide, viewed 9 February 2017, https://www.epa.sa.gov.au/files/47726_sbes.pdf

Coast Protection Board SA 2002, *Policy Document,* CPB, Adelaide.

Development Act 1993 (SA), viewed 3 December 2018, https://www.legislation.sa.gov.au/LZ/C/A/DEVELOPMENT%20ACT%201993.aspx

Development Regulations 2008 (SA), viewed 3 December 2018, https://www.legislation.sa.gov.au/LZ/C/R/DEVELOPMENT%20REGULATIONS%202008.aspx

Environment Protection (Air Quality) Policy 2016 (SA), viewed 3 December 2018, https://www.legislation.sa.gov.au/LZ/C/POL/ENVIRONMENT PROTECTION (AIR QUALITY) POLICY 2016.aspx

Environment Protection (Water Quality) Policy 2015 (SA), viewed 3 December 2018, https://www.legislation.sa.gov.au/LZ/C/POL/ENVIRONMENT%20PROTECTION%20(WATER%20QUALITY)%20POLICY%202015.aspx

Environment Protection (Noise) Policy 2007 (SA), viewed 3 December 2018, https://www.legislation.sa.gov.au/lz/c/pol/environment%20protection%20(noise)%20policy%202007/current/2007.-.un.pdf

––2013, *EPA Guideline: Disposal of used hydrocarbon absorbent materials,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8424_guide_hydrocarbon.pdf

––2012 EPA, *EPA Guideline: Spray painting booths – control of air and noise emissions*, EPA, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8358_guide_spraypaint.pdf

––2012, *EPA Guideline: Bunding and spill management,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/pdfs/guide_bunding.pdf

––2010, *EPA Guideline: Waste transport certificate,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/4771381_guide_wastetransport.pdf

––2010, *EPA Guideline: Dredging and earthworks drainage,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8492_guide_dredging.pdf

––2007, *EPA Guideline: Waste transfer form,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/4771414_guide_wastetracking.pdf

––2006, *EPA Guideline: Independent verification of monitoring programs,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8493_guide_monitoring.pdf

––2005, *EPA Guideline: Assessment of underground storage systems*, EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/4771278_guide_uss.pdf

––2004, *EPA Guideline: Disposal of soaps and detergents*, EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8431_soaps_detergents.pdf

––2004, *EPA Guideline: Stormwater management for wash bays,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/7593_water_wash.pdf

––2003, *EPA Guideline: Abrasive blasting,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8308_guide_abrasive.pdf

––2003, *EPA Guideline: Fire protection services pipework systems – wastewater removal,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8423_guide_fire.pdf

––2003, *EPA Guideline: Pressure water blasting,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8426_guide_pressure.pdf

––2003, *EPA Guideline: Ventilation of fibreglass works,* EPA, Adelaide, viewed 3 December 2018, https://www.epa.sa.gov.au/files/8235_guide_fibreglass.pdf

Harbors and Navigation Act 1993 (SA), viewed 3 December 2018, https://www.legislation.sa.gov.au/LZ/C/A/HARBORS%20AND%20NAVIGATION%20ACT%201993.aspx

Harbors and Navigation Regulations 1994 (SA), viewed 3 December 2018, https://www.legislation.sa.gov.au/LZ/C/R/HARBORS%20AND%20NAVIGATION%20REGULATIONS%202009.aspx

MARPOL 1973−1978, *International Convention for Prevention of Pollution from Ships*, viewed 3 December 2018, https://www.amsa.gov.au/environment/regulations/marpol/

On-site Wastewater Systems Code 2013, viewed 3 December 2018,

https://www.sahealth.sa.gov.au/wps/wcm/connect/ba6ead0048f0d8ab828287f25a3eb7d6/2013SAHealth_On-site_Wastewater_Systems_Code_April.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-ba6ead0048f0d8ab828287f25a3eb7d6-mwN1Pxj

SA Planning Portal, viewed 3 December 2018, https://www.saplanningportal.sa.gov.au/planning_reforms/new_planning_tools/planning_and_design_code

Standards Australia 1996, *AS 3542−1996: Pleasure Boats – Toilet Waste Collection, Holding and Transfer Systems,* viewed 3 December 2018, www.saiglobal.com

Standards Australia/Standards New Zealand 2004, *AS/NZS 4360:2004 Risk Management*, viewed 3 December 2018, www.saiglobal.com

7 Glossary

ANZECC	Australia New Zealand Environment Conservation Council
AMSA	Australian Maritime Safety Authority
AQIS	Australian Quarantine and Inspection Service
activity	includes the storage or possession of a pollutant
air	includes any layer of the atmosphere
biofouling (primary)	the attachment of marine organisms to any part of a vessel, any equipment attached to or on board the vessel, or to marine infrastructure such as aquaculture equipment, mooring devices or the like no more than a slime layer (biofilm) on the vessel hull, internal water systems and/or onboard gear and equipment
biofouling (secondary)	fouling that is anything more than a primary layer (slime/biofilm), on the vessel hull, internal water systems and/or onboard gear and equipment; it could include organisms such as mussels, barnacles and seaweeds
blackwater	toilet wastewater or human sewage
boat ramp	a facility for the launch or retrieval of vessels
boat yard	a facility where vessels are built, stored and maintained
bund(ing)	an impervious structure that surrounds an area to prevent escape of pollutants
coastal waters of the state	means any part of the sea that is from time to time included in the coastal waters of the state by virtue of the *Coastal Waters (State Powers) Act 1980* of the Commonwealth
commercial vessel	a vessel used for industrial, commercial or scientific purposes; includes a vessel of a class declared by regulation to be a class of commercial vessels
domestic travel	vessel travel in Australian waters
emergency management plan	a plan prepared by an organisation to provide a swift, efficient and cost-effective response to medical, fire, care and shelter, and communications needs after disasters such as product spills, earthquakes, explosions or fires
environment	means land, air, water, organisms and ecosystems, and includes: a human-made or modified structures or areas b the amenity values of an area
environmental authorisation	a works approval, licence or exemption
environmental harm	any harm or potential harm to the environment (of whatever degree or duration) and includes: a an environmental nuisance b anything declared by regulation (after consultation under section 5A of the *Environment Protection Act 1993*) or by an environment protection policy to be environmental harm

environmental incident record	details location, time, date, nature, source and management strategies undertaken regarding environmental (harm) incidents
environmental management system	a systematic approach to dealing with the environmental aspects of an organisation's operation; a 'tool' that enables an organisation of any size or type to control the impact of its activities, products or services on the natural environment
Environment protection order	an environment protection order issued under Division 2 of Part 10 of the *Environment Protection Act 1993*
galley	part of a vessel used for food preparation
galley greywater	wastewater produced within a vessel's galley; includes water containing putrescible waste such as food scraps, oil, fat, grease and/or other harmful substances
garbage	food wastes, or discarded or useless material
general environmental duty	under the *Environment Protection Act 1993*, a person must not undertake an activity that pollutes, or might pollute the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm
greywater	wastewater that has been used for washing, laundering, bathing or showering
harbour	has the same meaning as in the *Harbors and Navigation Act 1993*
holding tank	a container designed to receive and hold wastewater, constructed and installed so that it may be emptied by pumping out its contents to a waste disposal facility or waste transporter or within permitted aquatic discharge zones
HVLP	high-volume low-pressure
IMO	International Maritime Organization
inland waters	the surface waters of the state that are not marine waters, but includes the Coorong and the waters between the Murray Mouth and the barrages at Goolwa
kitchen sink	part of a vessel used for food preparation and utensil cleaning
land	means, according to context: a land as a physical entity, including land covered with water b any legal estate or interest in, or right in respect of, land
licence	a licence under Part 6 of the *Environment Protection Act 1993* to undertake a prescribed activity of environmental significance
licensed waste depot	waste depot licensed under Part 6 of the *Environment Protection Act 1993*
listed pollutants	pollutants, outlined in Schedule 2 and 3 of the *Environment Protection (Water Quality) Policy 2015*, that must not be discharged or deposited into water or onto land from which it is likely to enter water
listed waste	has the same meaning as in Schedule 1 Part B of the *Environment Protection Act 1993*

marine waters	the coastal waters of the state or any part of the sea that is within the limits of the state, and includes any estuary or tidal waters
marina	any aquatic facility for the mooring, berthing, storing, or securing of two or more vessels
material safety data sheet (MSDS)	information sheets on products that manufacturers are required to provide which outline the composition, applications and precautions that need to be taken when using the products
moor	to make fast to the shore, a buoy, a jetty, a wharf or to anchor
mooring	a place or fixture to which vessels tie up, or the act of making fast to the shore, a buoy, a jetty, pontoon, piles, lock, a wharf, or to anchor
nearest land	measured from low water mark
operator	means the person or organisation in charge of a port, marina, boat ramp, boat and yacht club, boat yard, slipway or vessel and can include a charterer or an agent of the owner or charterer
partitioned greywater	means greywater that is split into two streams, galley greywater and other greywater producing facilities (eg bathroom and laundry)
permanently occupied vessel	any vessel where persons are living on board for 30 consecutive days or as assessed by the marina operator
permanently moored vessel	any vessel that has no registration or no means of propulsion
pollutant	a any solid, liquid or gas (or combination thereof) including waste, smoke, dust, fumes and odour, or b noise, or c heat, or d anything declared by regulation (after consultation under section 5A of the *Environment Protection Act 1993*) or by an environment protection policy to be a pollutant, but does not include anything declared by regulation or by an environment protection policy not to be a pollutant
PAH	polycyclic aromatic hydrocarbons which are carcinogens
portable toilet	toilet fitted with a transportable waste-holding compartment
prescribed activity	means an activity of environmental significance specified in Schedule 1 as amended from time to time by regulation
responsibility for pollution	under the *Environment Protection Act 1993*, the occupier or person in charge of a place or vehicle at or from which a pollutant escapes or is discharged, emitted or deposited will be taken to have polluted the environment with the pollutant (but without affecting the liability of any other person in respect of the escape, discharge, emission or depositing of the pollutant)
riprap revetment	rock walls which have the capacity to dissipate wave energy
sewage	the waste matter that passes through sewers
sewer	an artificial conduit, usually underground, for carrying off wastewater and refuse, as from a town or city

slipway	structure consisting of a sloping way down to the water from the place where vessels are built, repaired or maintained
state waters	state waters include inland waters, estuarine and marine waters (which include coastal state and territorial waters vested in the state)
stormwater	rainwater runoff
swing mooring	a permanent mooring that sits on the bed of a river or sea floor with a floating buoy attached and is used to secure a vessel
TBT	tributyltin, found in antifouling paint
vessel	a ship, boat or craft or a structure that is capable of navigation
vessel facility	marinas, boat/yacht clubs, boat yards, slipways, boat ramps, moorings, jetties and wharves
vessel facility developer	the applicant for a development of a vessel facility recorded by the relevant planning authority
volatile organic compounds (VOCs)	evaporated organic solvents (eg hydrocarbons or alcohols, or unburnt liquid fuels) that are known or suspected to have environmental or health effects (eg solvents, thinners, acrylic lacquers and fuel)
wastewater collection facility	facility that is designed and constructed to receive the contents of a holding device for vessel wastewaters
waste transfer (reception) stations	structure designed to temporarily store wastes in an environmentally responsible manner (such as waste oil, bilge water, oil absorbent materials and garbage)
waste transporter	a mobile service provider contracted to remove wastes
whole greywater	mixed greywater from the vessel's galley, laundry and bathroom

8 Websites

Australian Maritime Safety Authority: https://www.amsa.gov.au/environment/regulations/marpol/

Department of Agriculture and Water Resources: www.agriculture.gov.au/biosecurity

Boating Industry Association of Australia: https://www.bia.org.au

Department of Planning, Transport and Infrastructure: https://www.dpti.sa.gov.au

Environment Protection Authority: https://www.epa.sa.gov.au

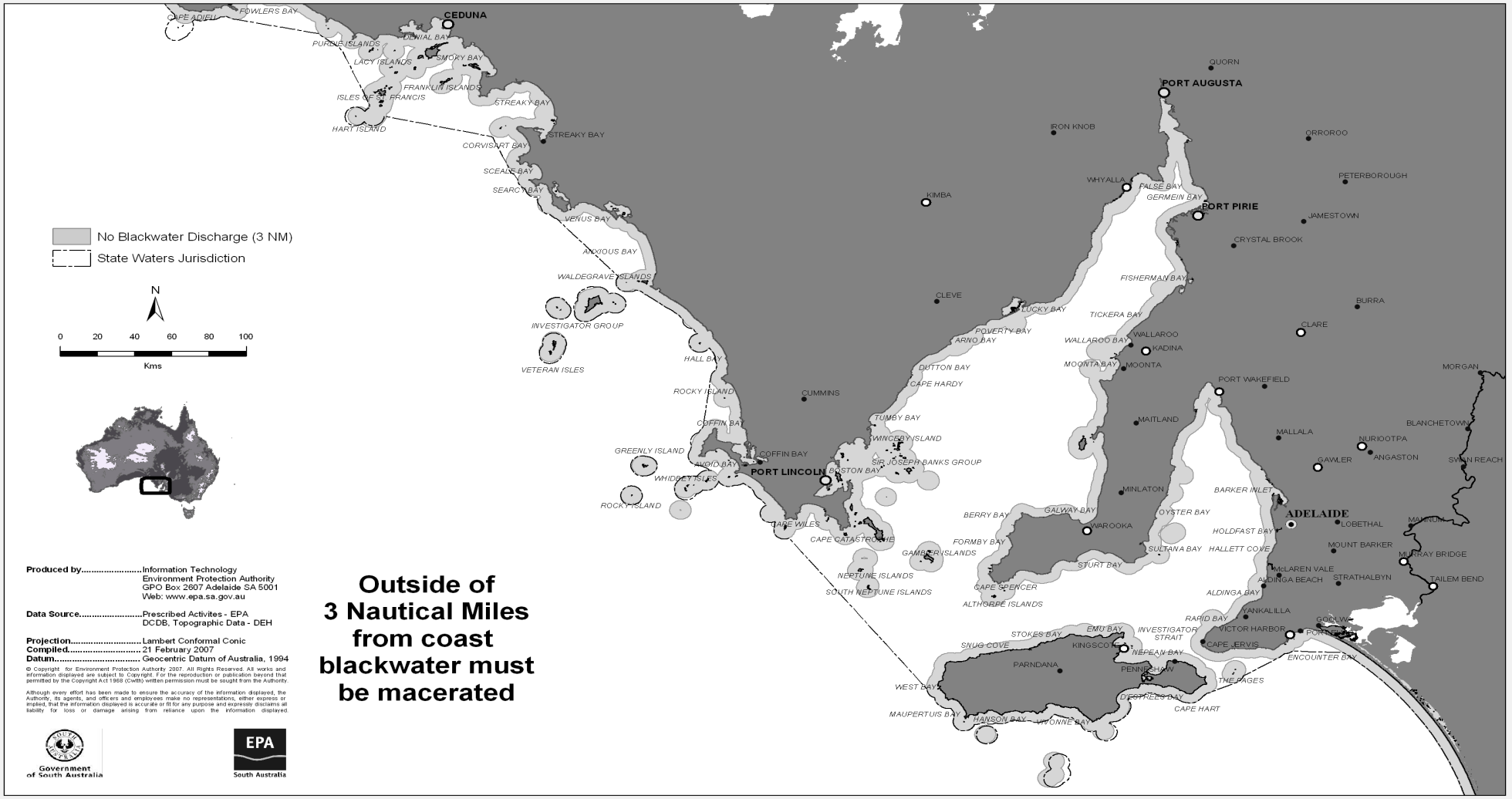
International Maritime Organisation: www.imo.org

Marina Association of Australia: https://www.marinas.net.au

SA Planning Planning: https://www.saplanningportal.sa.gov.au

SafeWork SA: https://www.safework.sa.gov.au

Appendix 1 SA marine waters



Appendix 2 Marina and boating industry prescribed activities of environmental significance listed in Schedule 1 of the *Environment Protection Act 1993*

Schedule 1 Part A 8 (4) (a)(b)

(4) Marinas and Boating Facilities: *the conduct of*

(a) facilities comprising pontoons, jetties, piers or other structures (whether on water or land) designed or used to provide moorings or dry storage for 50 or more powered vessels at any one time; or

(b) works for the repair or maintenance of vessels with the capacity to handle 5 or more vessels at any one time or vessels 12 metres or more in length.

Schedule 1 Part A 2 (1)

2 Manufacturing and Mineral Processing

(1) Abrasive Blasting: *the cleaning of materials by the abrasive action of any metal shot or mineral particulate propelled in a gaseous or liquid medium (otherwise than solely by using blast cleaning cabinets less than 5 cubic metres in volume or totally enclosed automatic blast cleaning units).*

Schedule 1 Part A 2 (12)

(12) Surface Coating: *the conduct of*

(a) works for metal finishing, in which metal surfaces are prepared or finished by means of electroplating, electrolyse plating, anodising (chromating, phosphating and colouring), chemical etching or milling, or printed circuit board manufacture, being works producing more than 5 kilolitres per day of effluent; or

(b) works for hot dip galvanising; or

(c) works for spray painting and powder coating with a capacity to use more than 100 litres per day of paint or 10 kilograms per day of dry powder.

Schedule 1 Part A 2 (14)

(14) Maritime Construction Works: *the conduct of works for the construction or repair of ships, vessels or floating platforms or structures, being works with the capacity to construct or repair ships, vessels or floating platforms or structures of a mass exceeding 80 tonnes.*

Appendix 3 Inland waters vessel design requirements for fixed fitted toilet and fixed holding tank

Pipework

1 The pipework leading to the tank and the pipework used for the discharge of the tank must be:

   a Fabricated from stainless steel, fibre-composite, polyvinyl chloride (using solvent welding techniques or equivalent) or some other corrosion-resistant material.

OR

   b Protected internally by fibre-composite, rubber or some other continuous liner and protected externally by a coating.

2 Outlet and flushing pipe fittings must be covered with a screw-in cap or equivalent when the female side of minimum 40-mm Treloar-Kamlock quick coupling (or equivalent) is not in use. (Some large vessels may employ non-standard fittings, eg 65 or 80 mm, and use purpose-built wastewater collection facilities through private negotiations.)

3 All pipework external to the hull of a vessel must be rigid and securely fixed to the vessel structure. Flexible pipework shall only be used inside the hull of a vessel, eg to manage vibration from macerating devices.

4 Flushing and pump-out pipes should not contain any 90° bends unless it is structurally unavoidable. (Note: as is the case with many mono-hull vessels, enhancing the diameter of pipework, eg 50 mm, will generally be necessary in this instance.)

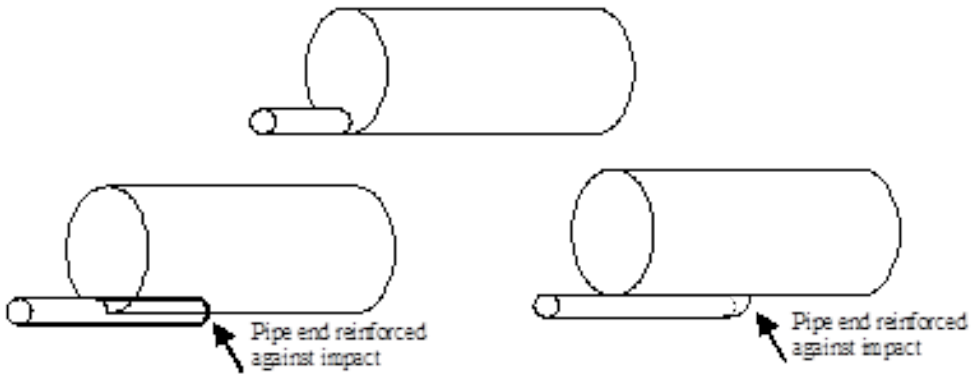
5 No fittings which could allow for the escape of any waste from the system should be installed along the pipework, other than by pump out from the outlet pipe.

6 Flushing and outlet points must be labelled and be approximately 150 mm above the rim level of the lowest toilet pan. If a loop in the pipework is used to achieve this height it must be able to be readily inspected. These requirements, while desirable for ease of pump out and inspection are not essential for greywater treatment systems (however still applies to blackwater and greywater holding tanks).

7 All pipework (excluding vent pipe) must be a minimum of 40-mm nominal diameter and marked sewer or colour coded to international marine standard. It is recommended that new vessels use 50-mm nominal diameter pipework to take advantage of planned pump upgrades to pump-out stations.

8 All exposed pipework must be protected from ultra-violet rays.

9 Invert of outlet and flush pipe must be no higher than 40 mm from the bottom of the holding tank and not protrude below the bottom of the tank.



Acceptable options for pipe connection to holding tank

Holding tank

1 Must be:

a Fabricated from stainless steel, fibre-composite, polyvinyl chloride that meets AS1260 or AS1254 (using solvent welding techniques or equivalent) or some other corrosion-resistant material. Polyvinyl chloride that meets AS 2544 is not acceptable

OR

b Protected internally by fibre-composite, rubber or some other continuous liner and protected externally by a coating.

2 For multi-hull vessels, a deflector plate must be present, mounted forward of the holding tank, preferably with 300 mm clearance to holding tank and be of substantial strength so as to prevent damage. Greywater treatment systems below deck must have a deflector plate or be of sufficient strength to withstand impacts (ie similar to the strength of the pontoons).

3 For multi-hull vessels, holding tanks must be braced and strapped rigidly mounted to the joists (where possible) of the vessel to prevent movement.

4 Flexible holding tanks (collapsible toilet holding tanks) may be used only in mono-hull vessels, and contained completely below deck level or within the enclosed cabin area. They must be installed in such a way that prevents movement within the hull of the vessel under all conditions.

5 Holding tanks must be shaped internally to be self-cleansing.

6 All holding tanks must be completely flushed with fresh water during pump out.

7 All holding tanks must have a vent pipe fitted to the topmost point of the tank which must rise continuously and have:

a a minimum of 25-mm diameter (40 mm for new vessels),

b a minimum of 300 mm above rim of highest toilet pan

c have a sewer cap with an insect screen fitted onto the outlet end of the breather pipe.

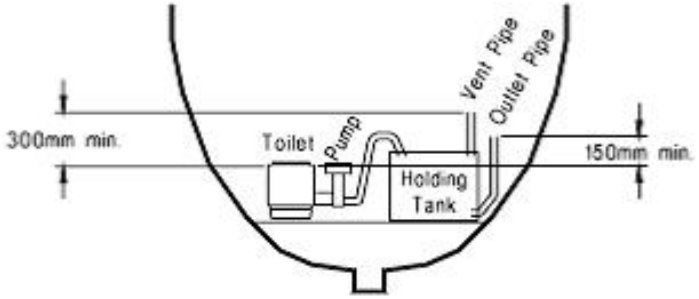
8 For multi-hull vessels, a minimum of 100 mm clearance from water surface should be maintained between the bottom of all external tanks and pipework when the vessel is fully laden and in the trimmed position. (Note: if 100 mm clearance cannot be met, all external tanks and pipework must not be in contact with the water or as a minimum have greater protection from collision.)

9 Discharge from the system can only occur by pumping out to land-based waste disposal systems (can include fixed or mobile units).

10 If greywater is plumbed to fixed blackwater holding tanks, the pipework must be designed to retain a water seal trap at all times to minimise health risks.

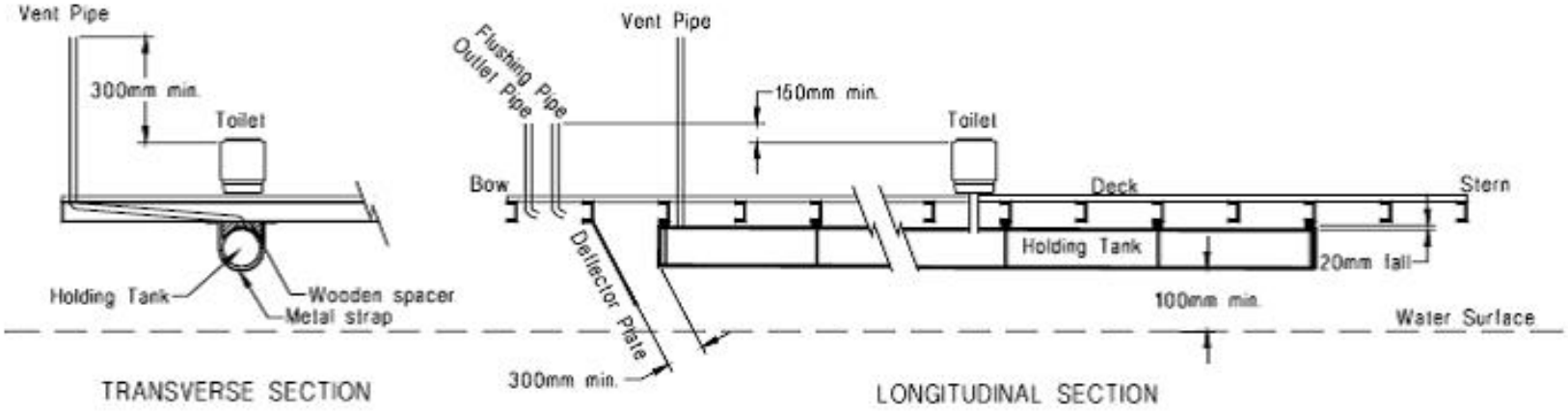
11 A grease arresting device should be fitted to the kitchen sink to prevent the clogging of pipework and holding tank.

Appendix 4 Typical arrangements for toilet wastes systems on inland waters vessels



TRANSVERSE SECTION

MONO HULL VESSELS



TRANSVERSE SECTION

LONGITUDINAL SECTION

PONTOON HULL VESSELS

Appendix 5 Non-galley greywater treatment protocols

Details of non-galley greywater gravity fed treatment units

Non-galley treatment units must meet the following criteria:

- Fabricated from:
  - stainless steel
  - fibre-composite (FRP)
  - polypropylene (PP)
  - polyethylene (PE)
  - polyvinyl chloride (PVC that meets AS1260 or AS1254 – not AS2544)

  OR

  - other corrosion-resistant material, eg non-ferrous metal.
- If made out of pipe, the unit must be no less than 150 mm in diameter.
- If installed below deck on multi-hull vessels, must be protected behind a pontoon or deflector plate, as described in Appendix 3.
- Units must have a minimum holding capacity of 5 L per person (berth) on the vessel with disinfection achieved by 1x 20 g BCDMH spa-type tablet (not stabilised Trichlor swimming pool) in a floating dispenser, for every four persons on the vessel, topped up weekly, ie:
  - 2–4 berths ⇨1 tablet
  - 6–8 berths ⇨2 tablets
  - 10–12 berths ⇨3 tablets
- Considerations must be made for the ability of the unit to cope with expected maximum flow rate under gravity head, to avoid greywater backing up into showers, etc, or bypassing filter pads (ie greywater treatment unit must meet boat greywater flow needs).
- Greywater must be gravity fed through a minimum 240-mm thickness of filter pads (eg 6 x 40 mm) to remove coarse solids and assist settling/capture of finer materials. Suitable filter media include polyester Japanese (koi) filter mat or thermal poly-propylene/ethylene compound (TPPC/TPEC) Matala® type.
- Pump discharge is not recommended nor endorsed.
- All filter pads must be washed out, using a high pressure hose away from the riverbank and the vessel, after every two weeks of use for commercial vessels and four weeks for private vessels. However for vessels which are only used occasionally, it is recommended that filter pads and the greywater unit be cleaned at the end of each period of use, to avoid them standing unused in an unclean state for an extended period, which may result in putrefaction and subsequent odour and bacterial risks.
- Boat operators and owners must document maintenance records and provide details upon request by the EPA.
- Operators must use gloves and eye protection when cleaning and handling used filters to minimise health risks.

Appendix 6 Members of Code of Practice External Advisory Group (as at 2008)

Mr Brett Kelly	Adelaide Fabrication Services
Mr Marijan Glamocek	Adelaide Ship Construction International
Mr Peter Bolton	Blue Sky Marine
Mr Glen Jones	Boating Industry Association of South Australia, Marina Association of Australia
Mr Andrew Hayes	Boating Industry Association of South Australia
Mr Tim Went	Cruising Yacht Club of South Australia
Mr Ron Greening	Greenings Landing
Mr John Milham	Holdfast Quays Marina
Ms Val Boxhall	Department of Environment and Heritage (Coast and Marine)
Mr Mike Cooney	Department for Transport, Energy and Infrastructure
Captain Walter J Stuart	Falie Charters
Ms Wendy Limbert	Houseboat Concepts
Mr Scott Limbert	Houseboat Concepts
Mr Peter Tucker	Houseboat Hirers Association
Captain Ian Kuhl	One and All
Mr Dennis Walter	Port Adelaide Sailing Club
Mr Brian Thomas	Port Princess Dolphin Tours
Mr Chris Mitchell	Port River Dolphin Cruises
Mr Jim Theodore	Port River Marine Services
Ms Celia Schollar	River Murray Boat Owners Association
Mr Colin Hill	River Murray Urban User Group
Mr David Harries	Royal South Australian Yacht Squadron Inc
Mr Justin Phillips	Seafood Council
Mr Kingsley Haskett	Searles Boatyard
Ms Claire van der Geest	South Australian Fishing Industry Council/SeaNet
Mr Robert Holme	South Australian Maritime Museum
Mr Peter Briggs	South Australian Recreational Boating Council
Mr Andrew Chapman	The Marina Hindmarsh Island
Mr Tom Chapman	The Marina Hindmarsh Island
Mr Ian McKenzie	The Marina Hindmarsh Island
Mr John Phillips	The Trailer Sailer Association of SA
Mr Gary Love	Ukee Boat Club
Mr John Woollatt	Yachting SA