

Environment Protection Authority

**Proposed licence fee structure under the
Environment Protection Act 1993 for the
operation of desalination plants that
discharge waste to marine waters**

Public consultation

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Public consultation

The EPA seeks your views regarding the proposed licence fee structure under the *Environment Protection Act 1993* for the operation of desalination plants that discharge waste to marine waters. This consultation paper may also be obtained from its [website](#). Comments are required to be submitted by 31 March 2012.

Specific matters the EPA seeks your views about include the following:

- The principles upon which the proposed fee structure is based
- The proposed fee structure including fee reductions for periods when small plants are non-operational
- Proposed zones where higher salt discharge fees would apply
- Proposed pollutant discharge load calculation methodology
- Proposed transitional and commencement arrangements.

All submissions received by the EPA during the consultation period will be acknowledged and treated as public documents unless provided in confidence, subject to the requirements of the *Freedom of Information Act 1991*, and may be quoted in EPA reports. Comments may be forwarded by mail, facsimile or email to:

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Website: www.epa.sa.gov.au

Nếu cần thông ngôn viên, xin quý vị gọi cho Dịch Vụ Thông Phiên Dịch (TIS Toàn Quốc) qua số 131 450 và nhờ họ gọi cho Environment Protection Authority qua số (08) 8204 1920.

ប្រសិនបើលោកអ្នកត្រូវការជំនួយដើម្បីឲ្យបានយល់អំពីព្រឹត្តិបត្រនេះ សូមទូរស័ព្ទលេខ 131 450 ក្នុងអង្គរពេលម៉ោងធ្វើការ រួចស្នើសុំជួបអ្នកបកប្រែភាសាខ្មែរមួយរូប ហើយប្រាប់ឲ្យគេទូរស័ព្ទលេខ 8204 1920។

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Executive summary

Desalination is a key element of the South Australian water security plan *Water for Good*. This plan recognises that there are environmental issues associated with desalination and notes that the disposal of brine (ie wastewater containing high concentrations of dissolved salt) is a key issue that requires comprehensive management.

Consequently, the South Australian Government has approved significant reforms to licensing requirements regarding desalination under the *Environment Protection Act 1993* (the Act). This includes extending licensing requirements to plants discharging waste to marine and inland waters that do not contain chemical additives. It is intended that the new licensing requirements will apply to plants with a production capacity of greater than 200 kilolitres (kL) per day.

Licensing allows the Environment Protection Authority to specify conditions of operation such as requirements to implement measures to prevent or minimise pollution. These reforms will commence after an associated licence fee structure has been approved by the government.

The proposed fee structure reflects the environmental impacts of desalination and associated costs of regulating this activity via licensing under the Act. Like other licence fees, the proposed fee structure is made up of three parts. These are a flat minimum fee of \$55.50, environment management fees, and pollutant load based fees where discharges exceed specified levels. Key features of the proposed fee structure are summarised as follows:

- Environment management fees are to be based on waste discharge volumes.
- Discharges of up to two megalitres (ML) per year would not be subject to environment management fees. This recognises that there may be times when small plants are not in commercial use and are only periodically operational for essential maintenance. In the case of larger plants, discharges associated with maintenance are expected to be significantly greater and at a level that poses an environmental risk, and consequently, environment management fees would still apply.
- Annual environment management fees for plants that discharge waste to marine waters would range from \$2,930 for small plants, up to \$17,580 for plants that discharge more than 10,000 ML of waste per year.
- Under this proposal, small desalination plants that are already licensed under the Act would be subject to significantly reduced environment management fees.
- Under the existing licensing system pollutant load fees apply to a number of water pollutants if discharges exceed specified levels. These fees will apply to some desalination plants.
- Reflecting the toxicity of concentrated salt to aquatic organisms, salt pollution load fees of 0.5–2 cents per tonne for discharges to marine waters are also proposed. The minimum fee would apply to discharges into waters where natural dilution rates are likely to be quickest, with higher fees applying for discharges to waters where there is more limited dilution. These fees would apply to salt discharges of 75,000 tonnes per year or more.
- Where desalination plants discharge waste back into the same water body from which source water is extracted for processing, pollution loads would be calculated on the basis of the difference between pollutant concentrations in the discharge stream and ambient concentrations in the receiving environment, which is then multiplied by total discharge volume. This would provide an estimate of the increase in pollutant loads in areas around discharge points. This load would be subject to pollutant load fees subject to specified thresholds being exceeded.
- In situations where pollutants are discharged into a different water body from which source water is extracted for processing, it is proposed that load fees be charged on the basis of the total loads discharged, subject to specified thresholds being exceeded. This reflects the fact that this waste is being discharged to an environment where previously it was not present.

In order to provide sufficient time for operators of desalination plants who will be affected by these reforms to prepare for the new licensing requirements, it is proposed that they will commence six months after their finalisation and all affected parties would be notified by the EPA.

Operators of desalination plants that are currently not licensed under the Act, but will require a licence as a result of these reforms, will need to submit a licence application. The current application fee is \$173. However, operators of desalination plants that are currently licensed under the Act will automatically be licensed under the new regulatory arrangements and will not be required to apply for a new licence.

1 Introduction

Desalination is a key element of the water security plan for South Australia *Water for Good*. Desalination is increasingly being used for a variety of purposes, including the supply of potable water, for irrigation and for industrial purposes.

The water security plan recognises that there are environmental issues associated with desalination, and notes that the disposal of brine (ie wastewater containing high concentrations of dissolved salt) is a key issue that requires comprehensive management. Consequently, the government has approved significant reforms to licensing requirements regarding desalination under the *Environment Protection Act 1993* (the Act).

These reforms are summarised as follows:

- Desalination is to become a specific activity subject to licensing under the Act.
- Licensing requirements will be extended to include plants that discharge waste¹ to land, plants discharging waste that does not contain chemical additives, and also networks of small plants which desalinate water underground that are within close proximity of each other (ie one km²).
- These requirements will apply to plants discharging waste to wastewater treatment systems that are not licensed under the Act, but not plants where all waste is discharged to licensed sewage treatment works, licensed community wastewater management systems, and licensed industrial wastewater treatment facilities.
- Desalination plants currently licensed under activity 8(7) of the Act, 'Discharges to Marine and Inland Waters', will instead be licensed under the newly prescribed activity of water desalination.

It is intended that these licensing requirements will apply to individual plants with a production capacity of greater than 200 kL/day, and networks of plants which desalinate water underground that have a combined production capacity of greater than 200 kL/day.

In the case of desalination plants that discharge waste to marine waters, the most significant aspect of these reforms is that discharges that do not contain chemical additives will also be regulated via licensing.

Licensing allows the Environment Protection Authority (EPA) to specify conditions of operation such as requirements to implement measures to prevent or minimise pollution.

As a consequence of these reforms, Schedule 22—Activities of Major Environmental Significance under the *Development Regulations 1993* will also be amended. This will result in more desalination plants being subject to approval requirements under the *Development Act 1993*. This will help ensure that desalination plants are constructed and operated in a way that minimises environmental risk.

These reforms also necessitate the development of an associated licence fee structure for desalination in the *Environment Protection Regulations 2009* (the Regulations). The new licensing requirements will commence after an associated licence fee structure has been approved by the government.

It is the matter of an appropriate licence fee structure that is the subject of consultation. This document discusses proposed licence fees for desalination plants that discharge waste to marine waters. Proposed licence fees for desalination plants that discharge waste to inland waters and land are discussed in a [separate consultation paper](#).

However, before the proposed fees are discussed, the following provides a summary of environmental issues that have necessitated the reforms to licensing requirements.

¹ Waste is broadly defined in the Environment Protection Act 1993 to include any discarded, rejected, abandoned, unwanted or surplus matter.

2 Environmental issues

Salinity in well mixed open seawater in South Australia is typically within a range of 35,000–37,000 mg/L, whilst seawater desalination plants typically discharge waste with a salinity of about 60,000–80,000 mg/L into receiving environments. Ecotoxicity testing indicates that the impacts of concentrated salt can be more significant than that of chemicals in discharges from desalination plants². The method of waste disposal, the dispersion and dilution properties of the waste, and the particular local environment may also require large areas for mixing to return salinity to background concentrations.

The ambient salinity of a region is the result of hundreds of years of climatic and hydrodynamic factors. While the salinity at a local scale may vary over the course of a day or a season, even with this variability taken into account, the long-term salinity range is quite stable. Consequently, organisms living in a region are accustomed to the particular salinity range of an area, and exposure to salinity outside of this range can be harmful.

In some areas of South Australia's marine waters, the ambient salinity range is naturally elevated due to very low freshwater input, semi-enclosed geography and high evaporation rates. For example, in the Gulf St Vincent and Spencer Gulf, the salinity range naturally increases the further the distance from the Southern Ocean. This results in natural salinity of 37,000–40,000 mg/L towards the head of Gulf St Vincent, while in Spencer Gulf natural salinity can be up to 48,000 mg/L at Port Augusta³. In these areas, organisms can be under additional stress regulating the higher salt load through their cells.

The increased energy requirement of maintaining the internal salt/water balance of cells due to increased salinity can also make organisms more susceptible to toxicity from other pollutants in discharges including chemical additives such as anti-scalants and concentrated pollutants removed from the product water. In the case of most aquatic species, eggs, larvae and juveniles can be the most sensitive to toxicants, including salt. Discharges of waste can therefore adversely affect recruitment, breeding, growth and survival of resident plants and animals, particularly those that cannot move away from a discharge plume.

The discharge of waste from a desalination plant into any waterway has the potential to cause impacts if it is not dispersed and diluted as quickly and efficiently as possible. This is particularly important when the location of the outfall is situated in close proximity to sensitive habitats, as poorly mixed or dispersed waste can result in toxicity to the receiving environment. Studies regarding desalination plants indicate that short-term increases in salinity above background levels can result in sub-lethal effects on sensitive organisms.

² SA Water Proposed Adelaide Desalination Plant Environmental Impact Statement. Hydrobiology Pty Ltd 2006, *Ecotoxicity of Effluent from the Proposed Olympic Dam Desalination Plant*.

³ De Silva Samarasinghe JR, Bode L and LB Mason 2003, 'Modelled response of Gulf St Vincent (South Australia) to evaporation, heating and winds', *Continental Shelf Research* 23: 1285–1313.

Nunes RA and GW Lennon 1986, 'Physical property distributions and seasonal trends in Spencer Gulf, South Australia: an inverse estuary', *Australian Journal of Marine and Freshwater Research* 37: 39–53.

3 Proposed licence fee structure

The proposed fee structure is based on the principles of ‘user pays’ and ‘polluter pays’ as applies to all existing licensed activities under the Act. Like other licence fees, the proposed fee structure is made up of three parts. These are a flat minimum fee, environment management fees and in the case of some licensees, pollutant load based fees. Proposed fees would be subject to annual adjustment in line with inflation.

3.1 Flat minimum fee

The annual flat minimum fee of \$55.50 covers the minimum paperwork that is common to all licences regardless of the nature of the activity undertaken.

3.2 Environment management fees

Together with the flat minimum fee, these fees reflect the regulatory effort required to manage licensed activities. Proposed annual environment management fees for desalination plants that discharge waste to marine waters are summarised in Table 1 and discussed as follows:

- Fees are to be based on the volume of waste discharged.
- A minimal level of operation for which no environment management fee would be charged. This recognises that there may be times when plants are not in commercial use and are only periodically operational for essential maintenance. Discharges of up to 2 ML/yr would not be subject to environment management fees. This level of discharge is associated with the maintenance of small plants. In this case, the EPA’s regulatory effort would be minimal and consequently, only the flat minimum fee would be charged. This provides operators of small plants with a low-cost option for maintaining a licence when they are not commercially operational, thereby avoiding the inconvenience and cost of applying for a licence each time a plant is to be used commercially. In the case of larger plants, discharges associated with maintenance are expected to be significantly greater and at a level that poses an environmental risk, and consequently, environment management fees would still apply.

Table 1 Proposed annual environment management fees for desalination plants where waste is discharged to marine waters

Discharge to marine waters	Up to 2 ML/yr	> 2–1,000 ML/yr	> 1,000 –10,000 ML/yr	> 10,000 ML/yr
Fee*	\$0	\$2,930	\$7,032	\$17,580

* In the Environment Protection Regulations 2009 all fees are expressed in terms of fee units: \$2,930 = 5 fee units, \$7,032 = 12 fee units, \$17,580 = 30 fee units.

Under this proposal, small desalination plants that are already licensed under the Act would be subject to significantly reduced environment management fees. As already indicated, under current regulatory arrangements some plants are licensed under activity 8(7) of Schedule 1 of the Act, ‘Discharges to Marine and Inland Waters’. This category covers a broad range of activities. A detailed assessment indicates that the licence fee structure for activity 8(7) does not accurately correspond with the regulatory effort required by the EPA in the case of desalination plants. This assessment indicates that in the case of small plants, existing environment management fees are too high, whilst in the case of large plants, these fees are too low.

Under the Regulations, licensees who hold a licence that authorises two or more prescribed activities of environmental significance at a site are only required to pay environment management fees on one activity, ie the activity that is subject to the highest fee. Consequently, businesses already licensed under the Act to undertake other activities at a site where a desalination plant is operated would be subject to licensing of their desalination plant including conditions of licence. However, they would not be required to pay additional environment management fees unless the environment management fee for the desalination plant is higher than any other prescribed activity undertaken at the site.

3.3 Pollutant load based fees

These fees are based on the polluter pays principle. Some desalination plants will be subject to load fees for a number of existing prescribed water pollutants listed in the Regulations when specified discharge thresholds are exceeded. These pollutants may include nitrogen, phosphorus, organic matter, suspended solids, copper and zinc. A salt pollutant load fee is also proposed. As indicated, concentrated salt is toxic to aquatic organisms and therefore is a pollutant.

Proposed load fees for salt discharges from desalination plants to marine waters are summarised as follows:

- Salt is to be defined in terms of total dissolved solids as applies under the Regulations.
- This fee would apply to salt discharges of 75,000 tonnes per year, or more. A licensing threshold of a production capacity of greater than 200 kL/day means that relatively small desalination plants will be subject to licensing requirements. This is reflective of the application of the precautionary principle. Accordingly, the proposed threshold at which load fees for discharges of salt to the marine environment would apply is also based on the precautionary principle. This means that plants with a production capacity of about 1 gigalitre per annum would be subject to load fees for salt discharges.
- A base fee of 0.5 cents per tonne⁴. Fees for discharges in specified locations would range from 0.5–2 cents per tonne based on the zone weightings listed in Table 2 and illustrated in Figure 1. These fees are calculated by multiplying the base fee by the zone weighting for a listed area. The minimum fee would apply to discharges into waters where natural dilution rates are likely to be quickest, with higher fees applying for discharges to waters where there is more limited dilution. A fee of 1 cent per tonne would apply for discharges to Lower Spencer Gulf and Lower Gulf St Vincent, whilst a fee of 1.5 cents per tonne would apply for discharges into the upper reaches of Gulf St Vincent and there would be a fee of 2 cents per tonne for discharges into the upper reaches of Spencer Gulf.

Table 2 Proposed zone weightings and fees for salt discharges

Location	Weighting	Fee (cents/tonne)
Upper Spencer Gulf	4	2
Upper Gulf St Vincent	3	1.5
Lower Spencer Gulf	2	1
Lower Gulf St Vincent	2	1
Bays outside Spencer Gulf & Gulf St Vincent	2	1
All other marine waters	1	0.5

Bays outside of Spencer Gulf and Gulf St Vincent that would be subject to a zone weighting for salt discharges are listed:

- Baird Bay
- Coffin Bay
- Denial/Smoky Bay
- Guichen Bay
- Nepean Bay
- Rivoli Bay
- Scele Bay

⁴ As indicated, in the Environment Protection Regulations 2009 all fees are expressed in terms of fee units: ½ cent = 0.00092 fee units, 1 cent = 0.00184 fee units, 1½ cents = 0.00276 fee units, 2 cents = 0.00368 fee units.

- Streaky Bay
- Venus Bay
- Waterloo Bay.

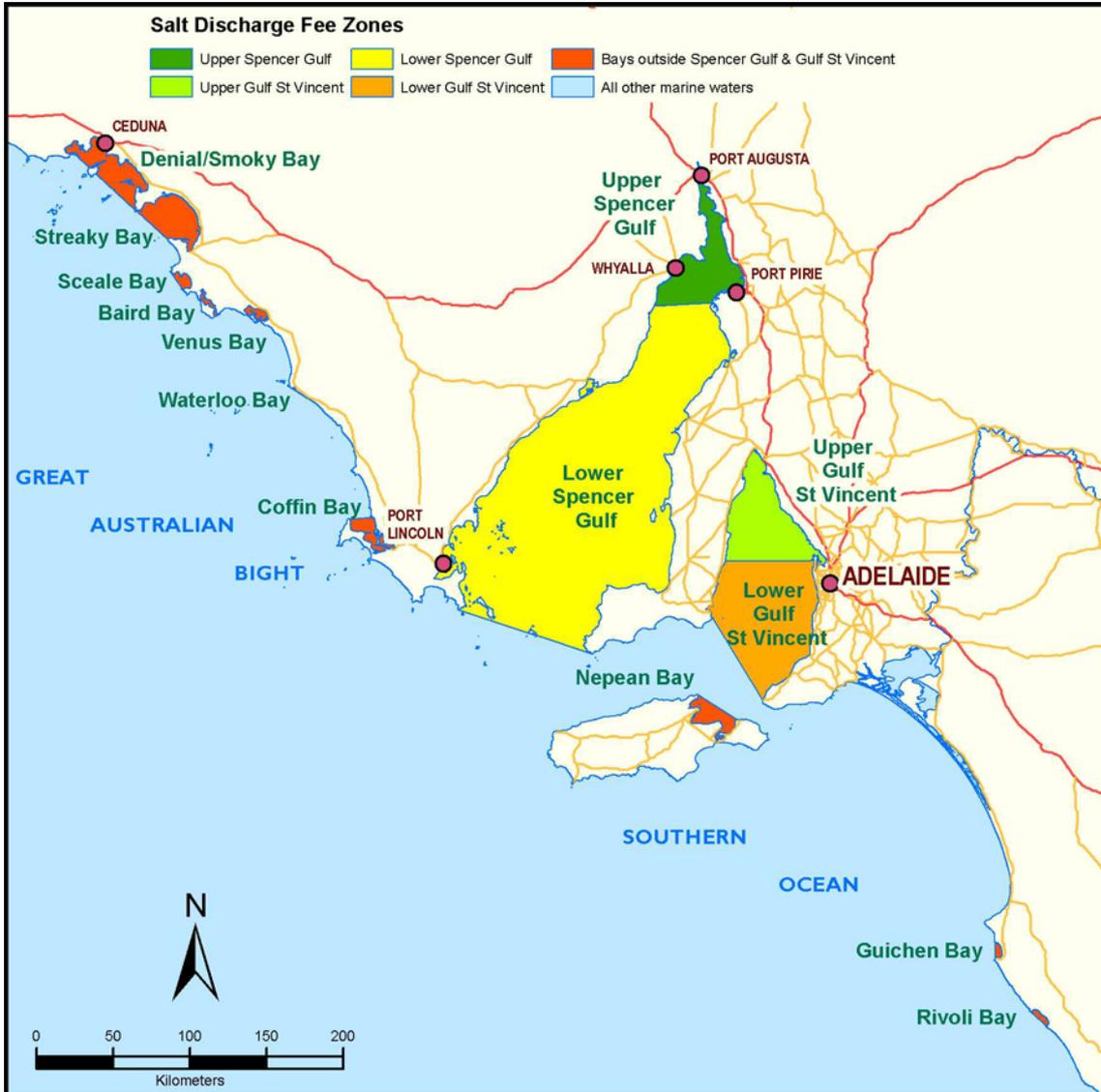


Figure 1 Proposed zones for higher salt discharge fees⁵

⁵ Source: EPA

4 Proposed definition of discharges of organic matter from desalination plants

Under the existing fee system organic matter is subject to pollutant load fees when discharges exceed 1,000 kg/yr (ie one tonne/yr). While organic matter can be measured in several ways, it is currently defined in the Regulations as a reference to biochemical oxygen demand (BOD). BOD is a measure of the oxygen used by micro-organisms to decompose organic waste in water over a set period of time. Large quantities of organic waste, particularly from wastewater treatment plants contribute to high BOD, which in turn deprives other aquatic organisms of oxygen.

Whilst BOD is therefore suitable for measuring organic matter in discharges from wastewater treatment plants, it is unsuitable for measuring organic matter discharged from desalination plants which is primarily concentrated matter removed from intake water. The organic matter in the discharge is likely to be dominated by coloured compounds and weak acids that are not readily broken down by micro-organisms and as such have a relatively low BOD.

In the case of desalination plants that discharge waste to marine waters, the environmental risk of organic matter is primarily related to the total organic loading and its tannin colour which can reduce light transmission through water. This has been shown to be a significant contributor to the loss of seagrass in marine environments. Total organic carbon (TOC) is therefore a more appropriate indicator of this environmental risk because it includes all the components of organic matter that relate to discharges from desalination plants. Consequently, in the case of discharges from desalination plants, it is proposed to define organic matter as a reference to total organic carbon.

5 Proposed methodology for calculating pollutant discharge loads

Under the current licensing system, the EPA is required to charge load fees on listed pollutants being discharged to the environment (subject to specified thresholds being exceeded), irrespective of whether or not the pollutants were already in the environment and are being discharged back into the environment as a result of a resource extraction process such as desalination. In this situation, unless pollutants are discharged into a different environment from which they are extracted, the environmental impact of a resource extraction process is primarily through its impact on pollutant loads by increasing concentrations of pollutants.

Two separate load calculation methods for pollutants, including salt, that are discharged from desalination plants are therefore proposed. These are for discharges to the same water body from which source water is extracted for processing, and for discharges to different water bodies from which source water is extracted. These methods are discussed as follows.

5.1 Discharges to same water body from which source water is extracted

In this situation, desalination plants extract pollutants and salt from water and then discharge them back into the environment at higher concentrations, which results in the salt discharges acting as a pollutant. This results in an increase in pollutant loads in areas around discharge points that take time to disperse in the environment.

It is proposed that in this case, the pollution load would be calculated on the basis of the difference between pollutant concentrations in the discharge stream (which would include pollutants added during the desalination process) and ambient concentrations in the receiving environment, which is then multiplied by total discharge volume. This would provide an estimate of the increase in pollutant loads in areas around discharge points. This load would be subject to pollutant load fees dependant on specified thresholds being exceeded.

5.2 Discharges to different environment from which source water is extracted

In situations where pollutants are discharged into a different water body from which source water is extracted for processing, it is proposed that load fees be charged on the basis of the total load discharged, subject to specified thresholds being exceeded. This reflects the fact that this waste is being discharged to an environment where previously it was not present. An example would be the extraction of groundwater from an aquifer which does not naturally discharge into the marine environment, followed by desalination and discharge of wastes to marine waters.

6 Commencement date and transitional arrangements

In order to provide sufficient time for operators of desalination plants who will be affected by these reforms to prepare for the new licensing requirements, it is proposed that they will commence six months after their finalisation and all affected parties would be notified by the EPA.

Operators of desalination plants that are currently not licensed under the Act but will require a licence as a result of these reforms will need to submit a licence application. The current application fee is \$173.

In the case of desalination plants that are already licensed under activity 8(7) of Schedule 1, no licence application will be required. Transitional provisions have been developed to ensure that existing licences to operate desalination plants will automatically be transferred to the newly prescribed activity of desalination upon commencement of these reforms. These provisions will also allow holders of these licences to continue operating their desalination plants for the same term and under the same licence conditions as specified in their existing licences.