

## Dredging and earthworks drainage

Updated June 2010

*EPA 396/10: This guideline provides information for those planning to dredge in marine or inland waters, and outlines the factors for consideration in earthworks drainage after dredging. It applies to the waters of South Australia only; these waters generally extend 3 nautical miles from the coast, but include more of what are known as the 'historic bays'. Across the major gulfs, waters of South Australia extend three miles to sea from lines joining Cape Carnot (south of Port Lincoln) to Vennachar Point, on the western end of Kangaroo Island, and from Cape Willoughby (eastern end of Kangaroo Island) to Newland Head, near Victor Harbor<sup>1</sup>.*

### Legislation

The *Environment Protection Act 1993* (the Act) promotes the principles of ecologically sustainable development (ESD); in particular, section 25 of the Act imposes the general environmental duty on all persons undertaking an activity that may pollute to take all reasonable and practicable measures to prevent or minimise any resulting environmental harm. Environmental harm is defined in section 5 of the Act and further specified in clause 12 of the *Environment Protection (Water Quality) Policy 2003* (Water Quality Policy).

Some commercial activities are of a size or type more likely to result in environmental harm; they are designated 'Prescribed Activities of Environmental Significance' and are listed in Schedule 1 of the Act. Schedule 1 prescribes both dredging<sup>2</sup> and earthworks drainage as activities of environmental significance, requiring specific licences under the Act.

### Licensing requirements for dredging

Licensing conditions are set to minimise the environmental impacts from dredging. The disposal of spoil ashore is strongly favoured, and the environmental performance of the operation must be monitored and must be subject to independent verification.

In preparing an application for a licence to dredge in marine or inland waters the following issues should be considered:

- A development approval must be obtained from the relevant planning authority—either local council or the Development Assessment Commission—before a licence application can be considered.
- Management of the environmental performance of the project should be determined.
- A consultant should be identified to carry out independent verification of monitoring [see EPA guideline, *Regulatory monitoring and testing: Independent verification requirements* (December 2006)].

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<sup>1</sup> In practice, it is unlikely that anyone would want to dredge outside State waters, but it is possible that persons would want to dump spoil in waters under Commonwealth control.

<sup>2</sup> Dredging is the removal of solid matter (over 9 m<sup>3</sup>) from the bed of any marine waters or inland waters by any digging or suction apparatus, but excluding works carried out for the establishment of a visual aid to navigation and any lawful fishing or recreational activity.

- Material to be removed should be sampled and analysed before operations commence.
- Establish whether the supernatant<sup>3</sup> water exceeds any criteria in Schedule 2 of the *Environment Protection (Water Quality) Policy 2003*. This will also indicate if the sediment itself might be considered contaminated for use as land fill.
- Initial information on the quality and consistency of the spoil will guide the choice of method for dredging—for example, if the spoil has a high proportion of fines, turbidity may have to be contained within silt curtains.
- Determine likely disposal sites on land, and what planning controls might affect dumping spoil and draining supernatant water from those sites. Consider also how supernatant waters might affect local wetlands, aquifers or watercourses.
- The plan should represent best available technology economically achievable (BATEA) for all stages of the work and should be documented in the application.
- Ample time for public consultation should be allowed, including time for the Environment Protection Authority (EPA) to consider the public response. Prepare duplicate dredging plans for public access during the period for public comment.

At this stage formal application for a licence could be made. An application must include:

- the location of the site to be dredged
- the site for disposal
- physical and chemical condition of the spoil
- results of elutriation<sup>4</sup> tests
- an assessment of how long supernatant waters must be retained to comply with criteria
- predictions of environmental effects
- the monitoring plan, and details of the independent verifier

The extent of impacts will be monitored during work; if actual effects are more severe or more extensive than suggested in the application, work may be stopped. The most obvious effect with most dredging is the plume of sediment, which is easily seen by members of the public.

## **Dredging operational guidelines**

It is not appropriate for the EPA to require strict compliance with water quality guidelines at a dredge site; rather, the objective is to minimise environmental impact over the entire operation. The environmental impact of dredging is a function of the following factors:

### **Condition of the affected waters**

Most dredging occurs in ports or inland waters, where ambient water may be of lower quality than in immediate surrounding waters.

### **Physical type of substrate**

Chemical processes and their rates are usually related to particle size. Most maintenance dredging for existing channels removes relatively fine sediment, usually with high organic content, that has drifted into the previous cut.

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<sup>3</sup> 'Supernatant' water is the water from which settleable solids have been removed in a settling pond or by a similar method.

<sup>4</sup> Elutriation tests wash the dredged material with a view to collecting the washing media and testing to quantify the contaminants of interest.

## Temperature of water and of sediment

The rate of chemical reactions that release pollutants is subject to the temperature of their environment.

## Contamination of the substrate

For chemical pollutants this is related to the physical form of that substrate—for example, fine organic-rich sediments tend to retain metals as relatively insoluble sulphides. Some ports (for example, Port Adelaide, Port Pirie and Wallaroo) have a long history of heavy metal contamination.

## Living pollutants

Pests, parasites and diseases are forms of pollution that can multiply, so unlike most metals and many organic compounds there is no threshold that presents an 'acceptable' level of contamination. There is a known problem with cysts of dinoflagellates and other algae, which can proliferate as 'blooms' or 'red tides' and either release toxins or cause fish deaths as oxygen in the water is used up. Licences will likely include conditions to deal with spoil taken from known algal bloom areas.

## Method of dredging

Methods that send spoil to land are practicable only within a few hundred metres of that land. The final impact of dredging depends on the period in which the spoil can react chemically and how the supernatant water is treated to remove particulates or pollutants. In most inshore areas, licensees would be required to bring material ashore to be de-watered, and to treat the supernatant water to bring suspended solids and dissolved pollutants below guideline concentrations at the point where the water is discharged.

## Amount of spoil to be moved

The pH (level of acidity or alkalinity) of dredge spoil can change when it is lifted from the sea floor or inland waterbeds and brought into contact with oxygen in the air. Generally, the water in the spoil tends to become more acid (lower pH). As pH drops, organic material can become a source of free ammonia, which is toxic to marine or freshwater organisms when in sufficient concentrations. Any heavy metals in the spoil tend to dissolve into discharge water, and can move from the dewatering structures via the discharge system. The surface area of the spoil is the main controlling factor, as a deep, low surface pond will allow slow oxidation and a shallow, well-mixed pond will allow a speedy oxidation.

## Exposure and elutriation tests

Conditions may be imposed requiring a licensee to apply exposure and elutriation tests to the spoil—that is, exposing a sample, then washing it with seawater or freshwater and testing the water for pollutants. The results will aid planning for the best time and method of dredging.

## Retention of supernatant water

Conditions may be imposed relating to how long the supernatant water is to be retained—for example, by ponding—to bring levels of suspended solids within guideline values.

## Notifying the public

The EPA must be assured that the public understand what is proposed in the area that might be affected by dredging or spoil treatment. The dredging proponent must put accurate information before the public.

- For any significant project, comprehensive descriptions, diagrams and photographs of the site to be dredged, the method of dredging, and the site for disposal will be required. Results of sediment and water analyses and comparison with the tables in the Water Quality Policy should be available.
- Copies of the dredging plans should be made available at local council offices, libraries and appropriate state government offices where the public will be able to take notes and otherwise check material.

- In country areas the local newspaper may come out only one day a week. The time for public consideration and comment starts from when the EPA announces by public advertisement that it has received the application.
- Consideration should be made of producing a printed leaflet for 'letterboxing' the immediate area, or a summary sheet to accompany the photographs and charts that will make up the main public display.

## Exotic pests

As part of national initiatives to minimise the risk of exotic pests carried on ships from establishing in Australia, environment and port agencies are promoting the concept of the 'invader unfriendly' port. Just as on land weeds establish more readily on recently cleared or disturbed sites, so in the sea potential pests may establish more readily if there is recently dredged bottom on which natural populations have not yet re-established.

Each port in Australia is compiling a baseline list of species found in the port, both natural and introduced, which will be the basis for the port's environmental management; ships entering the port will be assessed for the risk that they carry pests not yet present in the port. Port management will aim to minimise the number of pests in the port, and their resulting transfer to ships working out of that port. Port environment managers should consider the best season for dredging to reduce opportunities for exotic pests to establish.

## Monitoring and verification

Monitoring and verification reports must be completed and lodged with the EPA; failure to do this is likely to breach a licence condition and may be penalised.

## Earthworks drainage

Dumping of dredging spoil onto land requires authorisation of the activity of earthworks drainage<sup>7</sup>; this is particularly to control runoff of turbid water from the site. An authorisation may not be required if it can be shown that the discharge water will have a concentration of suspended solids less than 25 milligrams per litre. A development approval must be obtained from the relevant planning authority (local council or the Development Assessment Commission) before an application can be assessed.

The site should be constructed so that water can be retained until solids have settled. Release of the water should be controlled so that it does not re-suspend solids as it runs to the catchment. All water contained in the spoil, or used to slurry the spoil for pumping (the supernatant water), must be retained until its physical and chemical qualities conform with the minimum criteria set by the Water Quality Policy for pollutant discharges to fresh and marine waters of South Australia.

Spoil that is not contaminated—as indicated by the initial information gathered—can be used constructively.

## Currency of these guidelines

These guidelines offer advice to assist with compliance with the general environmental duty and specific environmental policies. They are subject to amendment and persons relying on the information should check with the EPA to ensure that it is current at any given time.

This guideline has been updated in June 2010 to remove references to repealed legislation only. The EPA is proposing to update this dredging guideline more comprehensively in 2011. If you have any suggestions for what should be included in a future guideline, please email them to [epainfo@epa.sa.gov.au](mailto:epainfo@epa.sa.gov.au) with a subject line 'Gerard Hocking: Dredging guideline review'.

## 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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## Further information

### *Legislation*

Legislation may be viewed on <[www.legislation.sa.gov.au](http://www.legislation.sa.gov.au)>

Copies of legislation are available for purchase from:

Service SA Government Legislation Outlet	Telephone:	13 23 24
Adelaide Service SA Centre	Fax:	(08) 8204 1909
108 North Terrace	Internet:	< <a href="http://shop.service.sa.gov.au">shop.service.sa.gov.au</a> >
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