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# Dredging at The Entrance channel

Council has dredged The Entrance channel when needed since 1993. Dredging the channel assists in:

- maintaining an exchange of water between the Tuggerah Lakes estuary and the ocean
- preserving the existing ecological values of the Tuggerah Lakes estuary
- reducing flood risks to life and property in low-lying areas around the Tuggerah Lakes estuary
- providing sand nourishment aiding in erosion and coastal protection of the North Entrance and Entrance beaches
- enhancing navigation within the channel.

## How often is dredging conducted?

Dredging is only undertaken when one or more of the following triggers are reached. This means dredging is not required every year. This measure is a result of recommended actions from the Tuggerah Lakes Estuary Management Plan to ensure that the program is run only when it is required which takes subjectivity out of the decision making process, makes the process more transparent and saves rate payers money by not undertaking unnecessary works.

The triggers for dredging are:

- the throat of the channel (near the southern tip of the sand spit) at The Entrance reduces to an estimated width of less than 15m measured at mid tide level
- the flood tide sand shoals threaten to block the ebb tide dominant channel along the northern/eastern side of the entrance area and/or
- the flood tide shoals threaten to block the main channel east of the bridge.

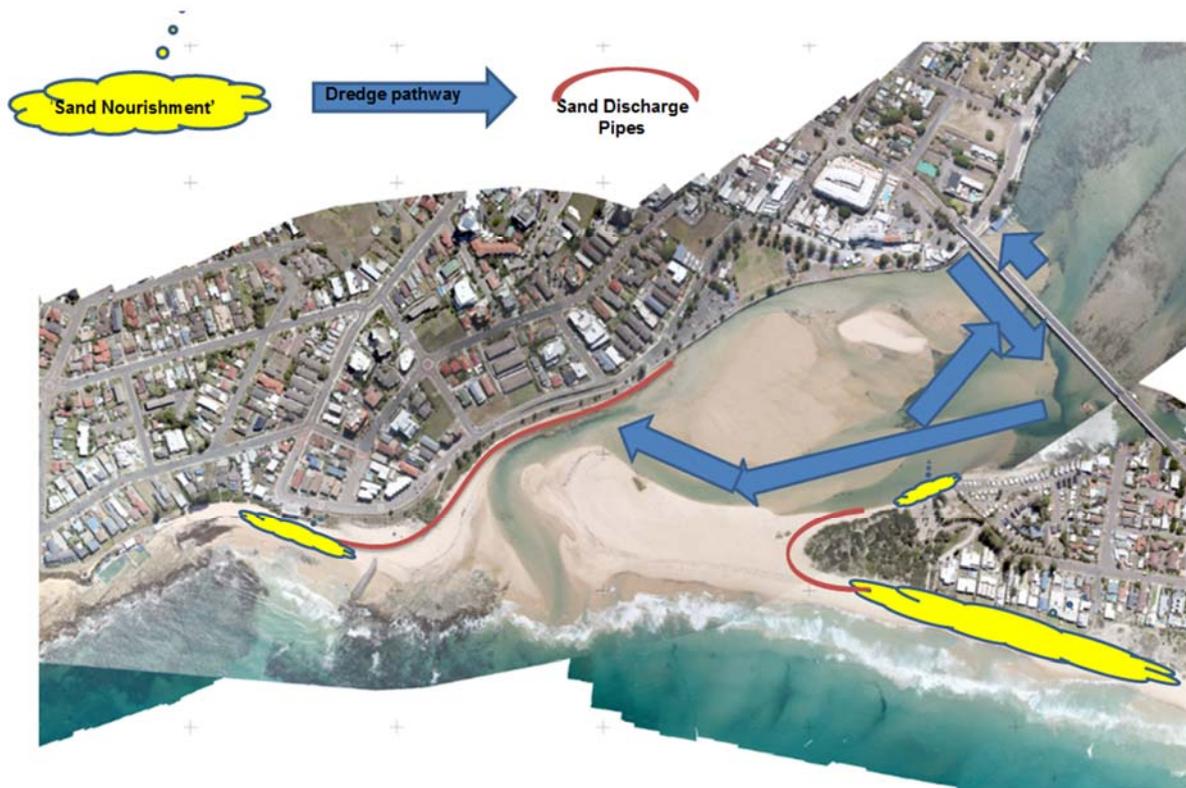
Not all triggers necessarily have to be met to trigger the program. The primary trigger for the 2018 dredging program is that the sand shoals are threatening to block the ebb tide dominant channel along the north/eastern side of The Entrance. Estimating these measurements has been assisted by a camera installed to monitor the entrance of the channel.

## Dredging program 2018

The 2018 dredging program will be carried out between April and December 2018. An indicative map is provided below of the areas to be dredged and nourished with sand, the program is subject to change given results of periodic surveys carried out at intervals before and during dredging. A post dredging survey will also be performed to quantify that the program has met with the proposed targets.

Sand extracted from the channel will be pumped to The Entrance and North Entrance beaches. The primary intention is to replenish sand on the beaches and offshore shoals to assist in coastal erosion hazards. Some consideration is also being given to sand nourishment inside the channel fronting Dunleith Caravan Park and Karagi car park. During the program, there is likely to be some disruptions to the car park and reserve area at Karagi Park, The Entrance North.

## 2018 Dredge Pathway and Sand Nourishment Areas



To dredge, Council has obtained the necessary approvals from the State Government to ensure the operations are undertaken in the most environmentally friendly manner and that measures are put in place to prevent environmental harm. These approvals include the EPA Licence - 3200 under the Protection of the Environment Operations Act 1997 (POEO Act). This licence permits Council to extract up to 100,000m<sup>3</sup> of sand from The Entrance channel per year.

Council also aims to carry out dredging during the time of year when threatened birds such as the Little Tern (*Sternula albifrons*) and Pied Oystercatcher (*Haematopus longirostris*) are not using The Entrance or Karagi sand spit for breeding or feeding, and to avoid the busy summer beach going/tourist season. Unforeseen circumstances may delay start or extend the dredging program and if this occurs Council will implement measures aimed at mitigating risks to the public and threatened fauna.

## Water quality monitoring

A condition of the licence is also to monitor water quality during dredging activities to ensure there is no negative impact on the environment. To do this Council monitors pH and Total Suspended Solids (TSS) during dredging activities.

The pH scale is used to measure the acidity of a solution on a scale of 0-14. Dredging can affect pH when Acid Sulfate Soils (ASS) are disturbed and exposed to air. ASS is the common name given to soils and sediments containing iron sulfides. When exposed to air, these soils can produce sulfuric acid which can be harmful to plants and animals. Water samples collected during dredging activities should generally have a pH level of between 6.5 and 8.5. The pH levels in Tuggerah Lakes vary daily and seasonally.

TSS consists of organic and inorganic solid materials that are carried in suspension within the water column. These particles can include silt, sand, microalgae and industrial waste. A high concentration of TSS can reduce water quality. Dredging consists of transporting and depositing silt and sand sediments. TSS is therefore an expected component of undertaking these activities. Water samples collected during dredging activities should generally have a TSS level of below 50mg/L.

Other factors that may alter pH and TSS levels include:

- rainfall
- time of day
- water temperature
- amount of algal or plant growth in the water
- discharges of industrial wastes
- atmospheric deposition (acid rain, dry particle deposition)
- burning of fossil fuels by cars, factories and smelters.

**Water Quality Tolerance Table:** [Environmental Protection Licence 3200\(Opens in a new window\)](#)[\(Opens in a new window\)](#).

Pollutant	Sampling Method	Limit
pH	Probe	6.5-8.5
Total Suspended Solids (TSS)	Grab	50mg/L

Conditions of EPL3200:

- sampling at any point 50 metres from the dredge in operation
- sampling once daily between 30 minutes and 60 minutes of dredge operation commencement.

## Monitoring data

[The Entrance Channel Dredging Monitoring Data \(Opens in a new window\)\(Opens in a new window\)](#)

## Pollution incident response management plan (PIRMP)

Have a question? Take a look at the [Waterways and Coastal Protection Pollution Incident Response Plan\(Opens in a new window\)\(Opens in a new window\)](#) (PIRMP) EPL 3200 for more information.

### Why does Council dredge The Entrance?

Council dredges The Entrance channel to the Tuggerah Lakes estuary to maintain exchange between the estuary and the ocean. This may offer some benefit:

- to preserve the existing ecological values of the estuary
- to reduce flood risks to life and property in low-lying areas around the estuary
- to enhance navigation within The Entrance Channel

### What would happen if we didn't dredge?

The channel would go through a cycle of closing and opening. This is a completely normal process. It may cause the ecology of the estuary to experience some change. It is understood in the event of a major flood event the channel would overtop/ self-scour and open anyway to let the flood waters out naturally.

## Why don't you build a breakwall/s instead of dredging?

The impacts of building a breakwall or twin breakwalls at The Entrance has been investigated by numerous coastal engineers over the past decades. The most recent study commissioned by the NSW State Government's Office of Environment and Heritage found that all breakwall options considered within their study did not self-scour (except under extreme flood conditions) meaning that maintenance dredging, such as the current program, would still be required to maintain an open channel with the ocean.

Construction of any breakwall/ training wall at The Entrance Channel will therefore not replace the need to dredge, the dredging program would still need to be undertaken to maintain an exchange of water between the estuary and the ocean. The studies additionally found that the construction of a breakwall would provide no added benefit to the lake in terms of flushing or improving water quality in the lake.

## What happens with the sand?

If feasible, the dredged sand is used to beneficially renourish areas that have been determined through visual inspections and aerial drone surveys. The use of dredged sand for renourishment has three main aims:

- to provide maximum environmental benefit to the dune system by protecting the dunes and the ecosystems reliant on them
- to protect the recreational amenity of the beach for the community
- to keep the sand circulating within the complex entrance system to prevent a loss of sand over time. This is necessary to maintain the sand spit, The Entrance sand bar and flood tide shoals that are the natural control on lake levels and provide protection of the estuary from ocean storms.

Therefore, the sand is pumped onto the northern shore of The Entrance channel with the aim of nourishment of the beach, dunes and offshore shoals for coastal erosion protection measures. The exact location of sand placement is determined year to year based on the current environmental conditions and competing demands. Sand may also be pumped to The Entrance beach to cover exposed rock shelves that exist in the wash zone which pose a safety risk to the public and have resulted in previous beach closure. Some sand may be placed in front of Dunleith Tourist Park and Karagi car park to replenish the shoreline at this location.

## Will piles of sand be placed on the beach?

Dredged sand will be placed on the beach on occasions in such a way to try and avoid large piles of sand from accumulating. Council will aim to ensure the beach resembles a natural slope at the end of the program. If required, bulldozers or other heavy machinery will be used to reshape the beach.

## How long will it take?

The dredging generally takes around six months to complete with approximately 1000 hours of dredging undertaken during this time. During this time, dredging will take place six days a week (Mon-Sat) between:

- 6am and 6pm, Monday – Friday
- Saturday 6am and 2:30pm (and up to 6pm when necessary)

## Why is it being done through the school holidays?

Dredging is undertaken during the autumn and winter months for a number of environmental and social reasons:

- The threatened birds species the Little Tern (*Sterna albifrons*) is known to breed on The Entrance sand spit and feed within the entrance channel during the spring-summer months
- Commercial fishers have indicated their preference for the dredging to not be undertaken during the prawning season which generally ends by March
- For aesthetic and safety reasons' dredging is not undertaken during the peak tourist season in the area which coincides with the December (summer) school holidays.

## When do you dredge?

Dredging is only undertaken when a set of triggers are reached which means dredging is not required every year. This measure saves rate payers money by not undertaking unnecessary works.

The triggers are:

- The throat of the channel (near the southern tip of the sand spit) at The Entrance reduces to an estimated width of less than 15m measured at mid tide level. Estimating this measurement has been assisted by the CoastalComms camera installed to monitor The Entrance
- The flood tide sand shoals threaten to block the ebb tide dominant channel along the northern/eastern side of The Entrance area
- The flood tide sand shoals threaten to block the main channel east of the bridge.

### **What are you doing to ensure no environmental harm?**

To undertake dredging Council must gain the necessary approvals from the State Government to ensure the operations are undertaken in the most environmentally friendly manner and that measures are put in place to prevent environmental harm. These approvals include a licence under the Protection of the Environment Operations Act 1997 (POEO Act). One of the conditions of the licence is to monitor water quality during dredging activities to ensure there is no negative impact on the environment.

Council ensures its procedure for dredging The Entrance channel exceeds government requirements in terms of environmental protection. Council also undertakes the dredging during the time of year when threatened birds are not using The Entrance or sand spit for breeding or feeding.

### **Why aren't you collecting wrack from the lake while the dredging is happening?**

Operating the dredge and the wrack and algae collector requires skilled staff who have had special intensive training and hold certain licences. Council does not always carry enough staff with this level of training to operate both of the machines simultaneously. Strategies are being developed so that part way through the program both machines should be able to be deployed at the same time. During this dredging period Council may also use external companies to collect wrack from the estuary, allowing both programs to run at the same time.

## How close can I get to the dredge and discharge points?

For your safety, when in the water you should not approach within 50m of the dredge or the pipes in the water behind it and you must obey the safety signs around the discharge point on land. Staff will be present at the outlet point on the ocean beach to also help manage public safety.