

# Lake Wollumboola - Fact or Fiction

***“The sand bags used to protect the Little Tern nests from waves stopped Lake Wollumboola from opening.”***



In 1997, under the supervision of a National Parks and Wildlife Service staff member, Shorebird Volunteers placed a 2 bag high row of sand bags on the ocean side of the Lake Wollumboola sand bar.



The NPWS confirmed that the sand bags were removed by March 1998 at the end of the Little Tern nesting season and well before the August 1998 natural opening of Lake Wollumboola.



When the Lake opens, the water pours into the ocean with tremendous force eroding the sand bar. The water level drops more than 2 metres until it reaches sea level.



The area of the Lake is approximately 7 square kilometres. With this area of water at a depth of more than 2 metres, sand bags could not have prevented the Lake opening.

If sand bags were present they would have been swept away with the rest of the dune, as anyone who has witnessed the Lake waters surging out would know.

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***“Ballast from sailing ships was thrown overboard and can be seen when Lake levels are low.”***



The rocky pavements and jumbles of stone, which can be seen in the Lake at low water levels, are rocky reefs and wave cut platforms, not ships' ballast.

Lake Wollumboola was formed 6,000-8,000 years ago, after the last Ice Age. Rising sea levels caused sand to build up closing off a shallow river valley, which gradually filled with water and sediments from the catchment.

These ancient sandstone reefs were part of the coast millions of years ago, when the sea level rose higher than it is today and before the Lake was formed.

According to this geological history, at no time could Lake Wollumboola be deep enough for large ships to enter and drop their ballast.



Rocky Reef Long Bow Point



Rocky Reef Boalla Point



Rocky Reef Island

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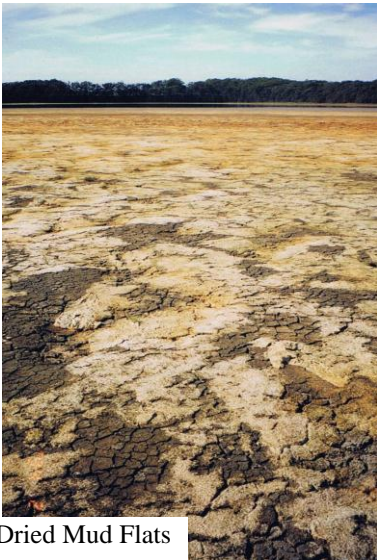
**“Lake Wollumboola used to be a sandy Lake.”**



Sediment surveys undertaken in 1999 show that the Lake bed has areas of sand as well as clay and silt. The distribution of the sediment types is clearly defined and has changed little over the last 200 years.

- Sand east of Sheepwash Creek to the sand bar and south along the dunes.
- Clay and silt deposited in the central part of the Lake.
- Silt and fine-grained sand at the mouths of Coonemia, Downs and Wattle Corner Creeks.

The sea tassel Ruppia (sea grass) grows mainly in the muddy central basin, but also in other areas when lake levels are high.



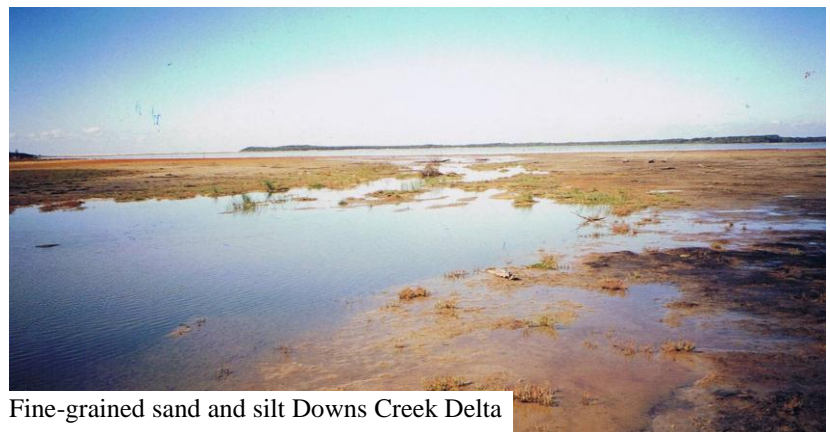
Dried Mud Flats



Ancient white sand between ocean and Lake



Black ooze Wattle Corner Creek



Fine-grained sand and silt Downs Creek Delta



Beach sand on berm

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“Lake Wollumboola needs flushing out every so often.”



Lake openings have minimal impact on removal of nutrients because they have accumulated over thousands of years in the sediments. Nutrients are released into the Lake waters when it refills and are recycled by the sea grass and water birds.

Lake Wollumboola is a naturally closing and opening lagoon. There is no reason for it to be opened artificially to “flush it out.” NPWS will open the Lake should houses be threatened with flooding. This would occur at a Lake height of over 2.75 metres above mean sea level.

Studies of Lake water quality and nutrients in the sediments show that nutrients in the water, the sediments and the aquatic plants are part of the natural process and are the foundation for the Lake’s abundant vegetation and wildlife.

The nutrients are not due to pollution. However development expansion in the catchment would increase nutrients and pollutants to damaging levels, causing nutrient enrichment and algae blooms and changing the Lake’s ecology.

Nutrients such as phosphorus and nitrogen have washed into the Lake from the catchment. They are recycled into the sediments as the plants grow and die or are released into the water and air.

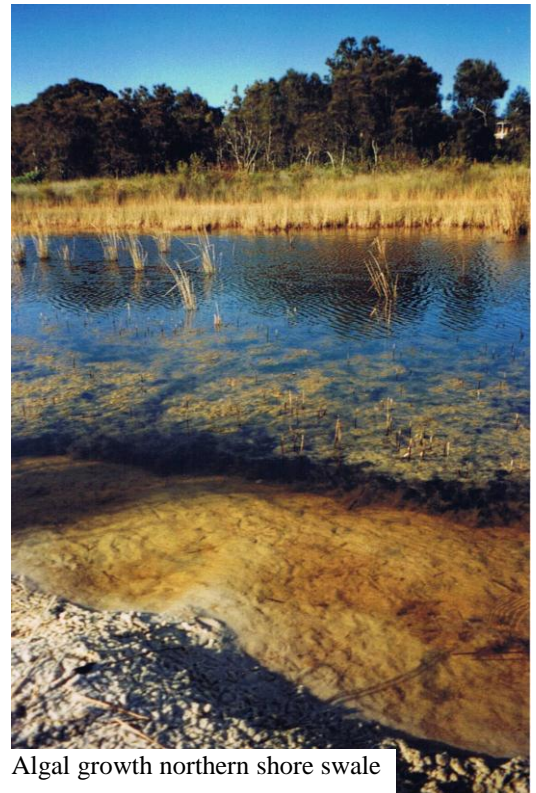
Nutrient levels in the water change with the seasons, with temperature and rainfall and runoff from the catchment. In Lake Wollumboola nutrient levels can vary more than other coastal lakes, with high levels resulting in algae blooms.



Dinoflagellate – a phytoplankton of spectacular colour



Ruppia sea tassel (aka sea grass) is abundant in the Lake



Algal growth northern shore swale

# Lake Wollumboola - Fact or Fiction

**“It is OK to open Lake Wollumboola because it would open soon anyway?”**



It is not OK to artificially open Lake Wollumboola. Lake Wollumboola opens naturally when the Lake level reaches the height of the lowest part of the sand bar. Openings are governed by the water level and the height of the sand bar, as Lake Wollumboola is perched above mean sea level.

Hydrological surveys established that the water level for a natural opening is between 2.75m to 2.9m above mean sea level. As the photo shows natural openings occur when the Lake waters overtop the sand bar and merge with the ocean, usually at high tide and under storm conditions with big seas.

People opened the Lake at much lower levels, 2.23m in 2011 and 2.45m in 2006, as measured by the automatic logger in the Lake. These openings took place at low tide.

As a consequence the Lake waters dropped by more than 2 metres, exposing about 60% of the Lake bed and

causing significant erosion of the sand bar. The area of the Lake is approximately 7 square kilometres, with a depth of over 2 metres, so this large volume of water exerts tremendous energy as it carves out the sand bar and pours into the ocean.

Mechanical openings at low tide cause much greater erosion of the sand bar than natural openings at high tide. Photographs of the 1998 natural opening show a gentle natural opening by comparison with the 2006 and 2011 catastrophic openings. Natural openings are more likely to close rapidly than artificial openings.



2006 trench



2011 fish kill - a result of illegal opening of the Lake

Mechanical openings cause both short term and long term damage to the Lake and its ecology including: massive fish kills, loss of habitat for the Endangered Little Tern, death of sea grass and algae, odours from hydrogen sulphide gas.

Mechanical openings are also likely to cause more frequent openings due to a lower sand bar, change the

Lake ecology to a more marine environment, wetlands miss out on prolonged inundation, some fish species may benefit but not others.

The NPWS is prepared to open Lake Wollumboola at the lowest point of the sand bar, if houses are threatened with flooding and the Lake is predicted to rise with more rain.



1998 natural opening



2011 illegal opening

# Lake Wollumboola - Fact or Fiction

**“Bird numbers are exaggerated. Lake Wollumboola has not supported 20,000 birds.”**



Ms Joy Pegler noted ornithologist, has recorded bird species and numbers every month at Lake Wollumboola since 1993.

NPWS has published an analysis of her records in “Patterns of Waterbird assemblages in Lake Wollumboola.” July 2003 based on three study areas, including the South West Bay, the North West Bay and the Ocean site.

The highest number of birds recorded was 18,320 with another record close to this number. High numbers occurred during drought in 2003.

The NPWS has stated in the Jervis Bay National Park and Woollamia Nature Reserve Plan of Management, 2011 that “When Lake levels are low the lake is estimated to support at least 20,000 birds

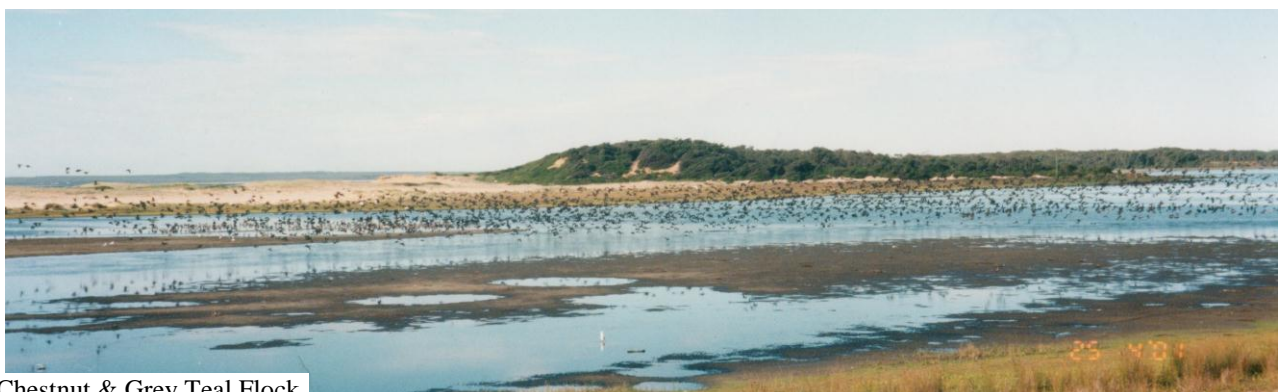
with water fowl, particularly Black Swan, Chestnut Teal and Grey Teal making up the largest numbers”.

NPWS has accepted the 20,000 estimate because important bird habitats such as Downs Creek Estuary adjacent to private land are inaccessible for bird counts and would have supported many more birds.

- Lake Wollumboola is recognised as a globally Important Bird Area on the basis of Ms Pegler’s records for regularly supporting more than 1% of the estimated world populations of Black Swan and Chestnut Teal with flocks of over 13,000 Swans recorded.
- Lake Wollumboola is also recognised as internationally significant for providing habitat for 33 migratory bird species.



Black Swan



Chestnut & Grey Teal Flock

## **References**

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Jervis Bay National Park and Woollamia Nature Reserve draft Plan of Management 2007 NPWS.

Keating J and Pegler J. "Patterns of Waterbird assemblages in Lake Wollumboola." July 2003. NPWS.