

Information regarding the fishkill and current conditions in the Myall Lakes

Naturally occurring low salinity and cold water conditions have lead to fish dying in the Bombah Broadwater in Myall Lakes National Park. This situation, although infrequent, has occurred in the past and is the result of higher than usual rainfall in the catchment, combined with lower than usual water temperatures over winter..

The fish are being infected by Winter disease, a disease caused by the *Saprolegnia* fungus. The disease is limited to fish and most commonly occurs when fish are exposed to prolonged cold temperatures and low salinity.

Fishkill in the Myall Lakes

Fish sampled by Department of Primary Industries (DPI) on 20 August 2008 near Bombah Point in the Myall Lakes National Park have been diagnosed with Saprolegniosis or Winter Disease. This disease is caused by *Saprolegnia* fungus – a fungus that is only known to cause disease in fish.

Affected fish have visible fungus around their mouths and gills which appear as a brown deposit in the affected areas. Winter Disease is most commonly observed when fish are exposed to prolonged cold temperatures and low salinity.

The DPI advises any fish caught with fungus around their mouths and gills should be returned to the water. They advise healthy fish with no sign of Winter Disease can still be caught and consumed.

Fishers – recreational and commercial – who catch any fish they think may have Winter Disease or any other disease are encouraged to promptly report their suspicions to NSW DPI on **1300 550 474**.

Fisheries experts at DPI expect that when temperatures and salinity increase in the Bombah Broadwater, the fish will recover.

Further information is available at www.dpi.nsw.gov.au or by calling **1300 550 474**.

Why is the water so fresh and the temperature so low in the Broadwater?

High rainfall in the area in the last few years means that the catchment is saturated. Typically, when it rains there is a rapid increase in river flow from the catchment, then a gradual decline to the normal or base flow. However, if the catchment is saturated, water keeps draining out of the soils into the river once rain events have passed and it takes much longer for the river to return to normal or base flow conditions. Over the 2008 winter, river flows have been 2 to 12 times higher than the normal or base flow.

The higher than normal amounts of fresh water flowing from the upper Myall River into the Broadwater has kept salinity very low in the Broadwater over the entire winter.

In addition to increased rain over the winter, lower than average winter air temperatures have also resulted in cold water temperatures in the Myall Lakes.



Why has salinity in the Broadwater and the Myall River at Tea Gardens stayed low for so long?

Minor floods following storms in May and June 2008 pushed salt water down the lower Myall River. This volume of water, combined with continuing large volume of fresh water that is draining out of the soils of the catchment and the sands around the lakes, is pushing against the salt water and keeping it a long way downstream.

Once river flow drops to normal or base flow conditions and tidal salt water works its way back upstream, salinity in the lower Myall River and Broadwater is expected to slowly increase.

These low salinity conditions that affect the lower Myall River and Broadwater are infrequent but quite natural. In 1997 the salinity in the Myall River at Tea Gardens was very low for an extended period, similar to the conditions that are present now.

When will temperatures rise and salinity increase?

Water temperature is linked to air temperature. As the weather warms up, the water will warm up.

The Broadwater is influenced by tides that travel 22km up the lower Myall River from Port Stephens. Currently, the large volume of fresh water being delivered from the catchment into the Myall River is much greater than the normal volume of salt water pushing its way upstream with the tides. Once river flows drop to normal or base flow conditions then salinity in the Broadwater should slowly increase as the tidal salt water works its way back upstream.

If rain continues, is it likely fresh water conditions will persist.

Research on the ecology of the Myall Lakes

The Coastal Catchments Initiative is an Australian Government initiative that focuses on improving water quality in coastal 'hot spot' areas. Great Lakes Council received \$2.09 million in funding from the Australian Government to implement the Great Lakes Coastal Catchment Initiative (CCI) in partnership with government agencies and the local community.

The focus of the CCI has been to identify ways to reduce the impacts of sediments and nutrients on the Wallis, Smiths and Myall Lakes. The Department of Environment and Climate Change (DECC) was engaged by Great Lakes Council as part of this project to undertake scientific investigations and monitoring to gain an understanding of the processes that are occurring in the lakes and the threats to the health of the lakes. In addition, there have been a number of other scientific investigations that have occurred in the Myall Lakes since the blue green algae outbreak in 1999–2000. In combination, these scientific studies have given the DECC a much better understanding of the ecology and hydrology of the Myall Lakes system and also the threats to the health of the lakes.

The Myall Lake has been assessed as in very good ecological health showing 'high conservation values'. The Broadwater, on the other hand, has been impacted by pollution from the catchment and has been assessed as 'moderately disturbed'. The greatest threats to the health of the Broadwater are from sediment and nutrient inputs delivered from the catchment via the Myall River.

The main product of the CCI is the Water Quality Improvement Plan for the Wallis, Smiths and Myall Lakes. The Plan outlines the targets, catchment management actions and costs of

actions to redress threats to the lakes. The Plans are on public exhibition from 1st September to 10th October. More information on the CCI project and the Water Quality Improvement Plan can be obtained from the Great Lakes Council website www.greatlakes.nsw.gov.au

Are current conditions at the mouth of the Myall River contributing to water quality problems in the Myall Lakes and Myall River?

No.

The Myall Lakes system can be described as a large 'retention basin' capturing flows from the Myall River and then slowly releasing these flows into the Port Stephens estuary. Dissipation of waters from the lake to the ocean is slow due to the constriction of the lower Myall River which is long (22km) and narrow. It is estimated that it could take 750–800 days to flush the entire volume of the Myall Lakes system. That is, the natural hydrology of the Myall Lakes is one of retention of water and slow release to the ocean.

Monitoring of river levels (Graph 1) shows that since April 2008, water flowing from the upper Myall River catchment is well above normal or base flow levels. After rain in May and June it was 8 to 12 times base flow, by early July it had declined to 4 times base flow and in early September reached 2 times base flow – this is 4 months of higher than normal amounts of fresh water flowing into the Broadwater. Most recently the rains in early September have again raised the level of the river and the Lakes.

Monitoring of lake heights show that tides are still reaching the Broadwater. Tidal exchange occurs via the very narrow 22km long Myall River. The tidal range is typically less than a few cm but can be seen in the monitoring data. This tidal range is considered to be normal.

All of the river and lake level monitoring shows that the large volumes of fresh water that are coming into the lake system are flowing out via the lower Myall River. If the mouth of the river was choked or blocked then the lake should be getting deeper as time goes on. If the river was blocked, water running down the river to Tea Gardens should be building up and flooding Tea Gardens. Lastly, if the river was blocked or choked, then the tide shouldn't be able to get in, so there should be smaller tides at Tea Gardens and no tide in the Broadwater. In fact, there is a normal tidal signal in the Broadwater. All of this evidence shows clearly that the volume of water flowing through the entrance of the Myall River at Tea Gardens is completely normal – in fact it is actually coping quite well with two to four times the base flow volume of freshwater. What we are seeing at the mouth of the Myall River at Corrie Island near Tea Gardens, is possibly less flow through the eastern channel being compensated for by more (faster) flow through the northern/western channel. The data is very clear that there is no reduction in the volume leaving the river (i.e. no nett blockage), just a temporary increase in the amount of fresh water flowing into Port Stephens.

Why is the water so brown in the Myall River at Tea Gardens?

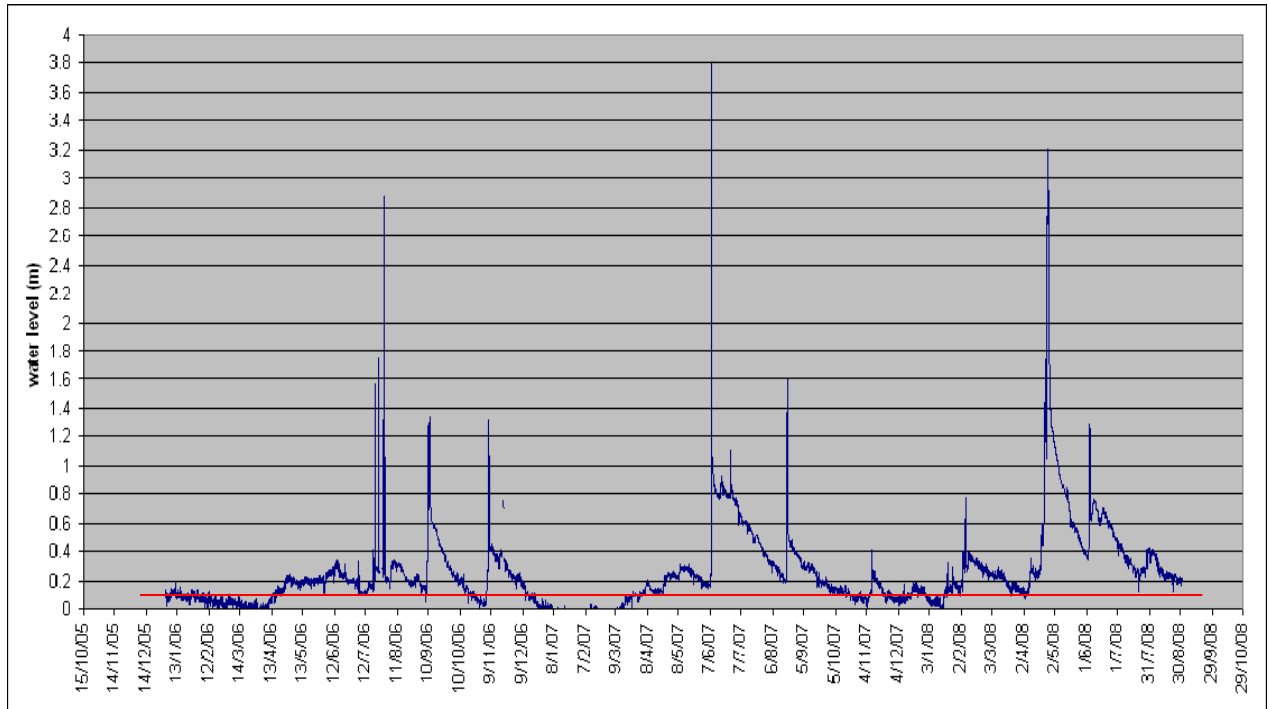
The turbidity and suspended matter in the lower river is a natural, though not very frequent, occurrence. The colour and suspended matter in the water is quite normal, but is present in the lower river now because the salinity is low. Formation of flocculated particles in water occurs in all estuarine rivers when the freshwater mixes with increasingly saline water, the process starts at salinities of about 2 parts per thousand and continues to salinities of 8 to 10 parts per thousand. River waters contain many microscopic organic and very fine sediment (clay) particles. When they mix with saline waters, the particles clump together producing invisible microscopic colloids. Those colloids continue to join-up into the flocculated material that is visible, and as the salinity increases, eventually settle out. Most of the time, the salinity changes that result in this phenomenon are not near Tea Gardens, but either in the upper Myall River below Bulahdelah or in the Broadwater. The fact that these processes are happening in the river at Tea Gardens demonstrates how far down the Myall River the fresh water has pushed to mix with the salt water.

The occasional presence of fresh river water and the associated presence and settlement of organic and clay particles is actually a very important and beneficial situation for the Myall River estuary. The material which is flocculating and dropping out of the fresh water is the

food for many of the invertebrate animals (including prawns) in the system and these are in turn for higher predators such as fish. Basically this is a huge food bonus for fish and prawns and should provide the basis for continuing productivity in the estuary when the low salinity waters retreat.

Graph 1: River Height at Bulahdelah

Base flow is approximately 0.1 m. The red line roughly indicates normal or base flow conditions. The graph clearly shows very high river flows for the past 4 months. At the end of August flows were decreasing but were still double the normal flow conditions. Rain in early September would have increased flows again.



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September 2008