Fact sheet - Blackwater

Blackwater is a natural and environmentally beneficial process that occurs when carbon compounds are leached into the water from organic litter (leaves, twigs, bark) in much the same way that tea is leached from tea leaves.

When this occurs, the water colour typically darkens to the colour of black tea due to the decaying plant matter prompting a sudden depletion of dissolved oxygen in the water.

What causes blackwater?

Blackwater forms when a buildup of leaf litter occurs during prolonged dry periods and then it floods washing it into waterways. Although blackwater occurs naturally, the magnitude and timing of floods have been altered by the collection and delivery of water for agriculture. Less frequent flooding allows large quantities of organic material to accumulate on river banks and floodplains.

The severity of blackwater events is determined by the amount, age and type of leaf litter and whether it has been previously submerged in water. Debris from River Red Gums is particularly problematic as it contains large amounts of dissolved organic carbon. High air and water temperatures also contribute to increased bacterial activity, lower concentrations of dissolved oxygen in water and a stronger colour reaction.

What are the environmental impacts?

Blackwater usually has short-term harmful impacts on the environment. Low levels of dissolved oxygen combined with toxic components of some organic matter, can lead to hypoxic blackwater and the death of aquatic organisms. Native fish and crustaceans are especially vulnerable to oxygen deprivation, although fish are sometimes able to escape the badly affected areas by swimming upstream or downstream.

The chemicals released from organic material can make water bodies more alkaline or acidic, disrupting normal pH balances and resulting in toxic effects on aquatic organisms. Large bodied native fish begin to suffer when dissolved oxygen falls below 4-5mg O^2 /L.

Values of blackwater: Despite short term effects on aquatic organisms, the floods which lead to blackwater provide essential carbon and nutrients for the long-term health of rivers, floodplains and wetland ecosystems, particularly after prolonged drought. In the long term, native fish, waterbirds and other organisms benefit from the boost in food supplies that supports breeding cycles.

Managing blackwater: Flooding is a natural feature of Australian river systems and the capacity to prevent the impacts of blackwater is limited. The frequency or severity of such events can be reduced by managing water systems to maintain or reinstate natural wetting and drying cycles and ensuring flows are adequate to reoxygenate water. Regular flooding in winter and spring washes away organic material from floodplains whilst temperatures and bacterial activity are low and reduces the fall of leaf litter by alleviating stress on trees. Post-flooding water releases may help flush out blackwater and improve water quality.

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