



Technical Background: Fish kill highlights the need for Collombatti-Clybucca Floodplain Restoration

Significant pre-Australia day rainfall (180+mm over 4 days from 20th to 23rd) filled sections of the Macleay floodplain, particularly drains, billabongs and backswamps. Previous to this rain event, most of these areas had been quite dry during most of last year. However, reasonable rainfall during the last few months of 2014 saw low lying wetland areas verdant with pasture grass such as Water Couch and Paspalum.

The standing water from the pre-Australia Day rain event remained on the floodplain over the Australia day long weekend, a long enough period for these pasture grass and semi-aquatic plants to become submerged, die and then rot. During decomposition of this organic matter bacteria consumed the oxygen in the water. In addition to this deoxygenation, a complex series of chemical reactions occur, particularly with the soil, which also consumes dissolved oxygen from the water column. These processes add a cocktail of chemicals to floodwaters changing acidity and heavy metal levels, and other important water properties.

The hypoxic (lack of dissolved oxygen) conditions in these drains and backswamps is enough to kill fish in those water bodies. The photo with the mullet and eels is taken upstream from the Menacrabinni tide restricting gate on Menacrabinni Lane. Hundreds of dead eels and mullet were observed.

Between the 26th and 28th of January another 80+mm of rain pushed the now deoxygenated flood waters from the backswamps and drains into the estuary. A major fish kill was observed on Thursday 29th January in Clybucca Creek (between Kemps Corner and Clybucca) where a wide variety of aquatic organisms perished including benthic organisms such as polychaete worms, crabs, prawns and fish.

Macleay Oyster farmers were scrambling on Friday morning, removing all their oysters from the area as predicted low pH water will inevitably follow this low Dissolved Oxygen event. Low pH may cause mass mortality of their oyster stock.

Over the last 100+ years an extensive network of drains and tide restricting gates has been constructed over the Macleay Floodplain which has increased the potential for and frequency of low dissolved oxygen or 'Blackwater' events. With improved land management the magnitude and frequency of these catastrophic environmental events can be reduced and this objective should continue to be focus of key agencies and land managers.

Over drainage has resulted in the oxidation of acid sulfate soils. The drainage network provides an efficient pathway for the movement of floodwaters however it also efficiently moves blackwater, acidic groundwater and associated by-products. General impacts of the drainage works include, clearing of native vegetation and fauna habitat, oxidation of acid sulfate soils, consolidation and erosion of soils, loss of fish passage and habitat, low dissolve oxygen discharge and poor water quality.

During normal conditions, with a drain water level at mean sea level (0 m AHD) the Collombatti-Clybucca drainage network holds approximately 500 ML of deoxygenated acidic water (pH ~ 3) that has high concentrations of aluminium and iron. *This equates to approximately 220 Olympic swimming pools of vinegar (pH ~ 3) being discharged into the river at the first flush of a rainfall event. (Gamore and Rayner, 2015).*