Healthy Waterways 2011 Flood Forum

Healthy Waterways held a Flood Forum on 31 August 2011 to tell the story of the floods six months on, and how they have affected different areas in South East Queensland.

Six speakers presented on topics varying from sediment, hill slope and gully erosion, through to organic and inorganic pollutants and the effects they are having on animal and plant communities in Moreton Bay. A snapshot of these presentations has been provided below.

Gully and Channel Erosion

Nina Saxton- Griffith University

A more recent analysis of gully and channel erosion rates has shown that the amount of sediment loads entering gullies and stream channels has been underestimated in the Lockyer, Bremer and Knapp catchments.

The floods in the Lockyer and Bremer catchments were estimated to have a frequency of between 1 in 35 and 1 in 45 year recurrence interval, respectively. However, the flash flooding that occurred in the top of the Lockyer catchment had a magnitude of between 1 in 100 year and 1 in 1000year recurrence interval.

Due to changes in land use and clearing of vegetation, extensive gullying has occurred in South East Queensland. Gullies were first initiated between 1932 and 1950 based on Knapp Creek catchment data and have continued to grow and erode with every run-off event. It is also worth noting that our historically drier catchment areas tend to be where most agricultural land use occurs and where channel and gully erosion is greatest. The type of vegetation is a key factor to how stream channels will react during a flood. Where more natural vegetation is present, streams and gullies were shown to sustain less damage and recover more quickly after the flood.

Sediment Loads, Human Health and Salinity

Julia Playford- Department of Environment and Resource Management

Over 1 Million tonnes of sediment was washed down the river system and into Moreton Bay during the 10 days of flooding in South East Queensland. This is three times the annual load of sediment normally deposited in Moreton Bay and is expected to be underestimated as many samplers failed during the floods.

One of the worst affected creeks within Brisbane for chemical contamination was Oxley Creek; it became the focus for the Department of Environment and Resource Management (DERM) to conduct an intensive sampling of metals, inorganic and organic contaminants. The results indicated that contamination levels were well below anticipated concentrations but nickel and zinc exceeded drinking water guidelines and nine metals were considered to have exceeded trigger levels. Of 216 chemicals that were tested, DERM found that only two pesticides (metolachlor and dimethoate) exceeded the guidelines.

In regards to human health, Entrococchi levels were exceptionally high due to sewage overflows; levels were found to continue to be high at some sites until May. This caused beaches and rivers to be closed for recreational purposes for prolonged periods.

Salinity was reduced to the lowest level Moreton Bay has ever seen with only 5ppm shown in the Brisbane River and the highest turbidity recorded in a decade (80 NTU) in the week following the flood. The persistence of high turbidity was due largely to the very small particle size of sediment (< 4µm) which took a long time to settle out of solution.

Coral fared reasonably well during the flood with 60% of off-shore reefs unaffected, while in-shore reefs had a fine sediment layer and some coral bleaching, but appear to be recovering. There has been notable increase in dugong and turtle deaths north of Moreton Bay with many animals showing body conditions consistent with

starvation. It is possible that poor water quality linked with reduced food availability may have affected the animal's ability to avoid boat traffic and their breath holding capability.

Moreton Bay

Andy Steven- CSIRO

Data collected by CSIRO over 20 weeks of intensive sampling and monitoring in Moreton Bay has shown changes in the levels of nutrients, turbidity, phytoplankton and zooplankton in the days after the flood. It took approximately 20 weeks for the Bay to return to a level of normality.

Some of the initial effects of the flood on Moreton Bay were; increased turbidity and stratification in the water column, there was no light penetration in Brisbane River for the week following the flood and nutrient levels increased. This was shown to cause a short lived phytoplankton bloom in Eastern Bay followed by a zooplankton bloom.

Coral and Seagrass

Rod Connolly- Griffith University

Some possible long term effects are already evident in current measurements, with others likely to unfold in the next 6-12months and beyond.

Communities dominated by hardier Coral species and microalgae are found on the western side of the bay and more sensitive hard corals predominate towards the east.

Rod's team sampled 10 sites across Moreton Bay 8-10 weeks after the flood and compared it with a survey prior to the flood. They found that between 2-10% of coral had bleached due to the flooding event (close to zero prior to flood). They found that fouling algae increased by 50% post-flood. Corals in Moreton Bay have suffered something of a long slow decline from the 1850's, but were particularly hard hit by the 1974 flood, which caused a high level of coral mortality. Since then there has been a slow but steady recovery until the 2011 floods. It is too early to make conclusions about the long term effects of this flooding event on corals.

In relation to seagrass there was initial die back of in localised areas. It is believed that seagrass may show a delay in being affected until late winter into spring when they need stored reserves. If contaminants in the water or extended periods of reduced light reaching the bottom have affected their ability to store carbohydrate it is believed we may see a higher rate of seagrass mortality. This is concerning as once seagrass dies it is hard to re-establish. In lab simulated 'flood events' scientists found that when seagrass dies it leaves bare mud which is ultimately populated by a macroalgae called Caulerpa (feather algae). Caulerpa was found to have very high mortality directly following the flood, but due to it being able to grow from fragments it quickly recovered and has the ability to replace seagrass beds. The extent will not be fully known until we have had a full seasonal cycle. It has highlighted the need for more extensive testing to understand the longer term effects of the flood.

If there is a significant reduction in seagrass beds in South East Queensland it has the potential to affect animals that rely on it for food or shelter; turtles and dugong populations may suffer, as has been seen in North Queensland. At this point, monitoring and sampling will continue to predict how the ecosystem will react, and how to minimise the effects as quickly as possible to retain the critical ecological functions of Moreton Bay.