

HOW DO BUSHFIRES AND FLOODS IMPACT OUR WATERWAYS?

Drought, fire and flooding are all an intrinsic part of Australia's environment and natural ecosystems have evolved to respond to these conditions. Fire is particularly important with many plant species dependent on fire to regenerate and ecological burns are now an integral part of ecosystem management. However extreme climatic events can have a significant impact on water quality.

The sampling period for the Waterway and Catchment Report Card 2020 saw a variety of climatic conditions including drought, bushfires and flooding rains. Bushfires that took place in the MidCoast were extreme and had devastating impacts on our community, wildlife and environment.

The majority of the fires occurred in November and December 2019 and mainly affected the Khappinghat, Wallamba River and Manning River catchments.

Intense fires can affect our waterways by removing vegetation cover and thus exposing land to erosion, increasing sediments in our waterways, reducing water clarity and bringing with it nutrients that can cause algal blooms. Fires affect living plant material in many ways, from complete combustion to ash or charcoal, or partially charring leaves and branches. Completely combusted plant material becomes inert, but partially burnt material is readily broken down. If this material enters a waterway following heavy rain in a fire affected area it can reduce oxygen in the waterway as it begins to decompose. Due to the moderate and then heavy rainfall that followed the fires in January and February it is difficult to differentiate the response of the MidCoast estuaries to the bushfires from the response to the flooding.

From the samples that were taken by the Department of Planning, Industry and Environment as part of the Waterway and Catchment Report Card there were no indications of impacts on algae or water clarity in burnt catchments until the period after the floods, when it is likely that nutrients and partially burnt organic matter from the fire debris entered the waterways with rainfall runoff. The breakdown of the partially burnt material likely contributed more nutrients to the waterway, fuelling more algae to grow. The strong post rainfall turbidity response in Manning River and Khappinghat Estuaries may also

have been partially a result of fire debris, however given the large freshwater flows entering the waterways; it's difficult to determine if this was caused by fire debris, or what is expected following a flood.

The Report Card results show that climatic conditions can play a significant role in the health of our waterways. Further research is needed to investigate the short and long term effects of intense fires on estuary health.

MidCoast Council have been working to help our environment recover from the effects of the fires. An ongoing program to protect vegetation, wildlife and water quality will include projects such as:



Post-fire audits and action planning in all fire affected areas



Bush regeneration and removal of environmental weeds to facilitate natural recovery



Planting of local native plant species including preferred koala food trees



Installation of nesting boxes for displaced and affected fauna



Monitoring of vegetation recovery and fauna usage in Council reserves to assist regeneration



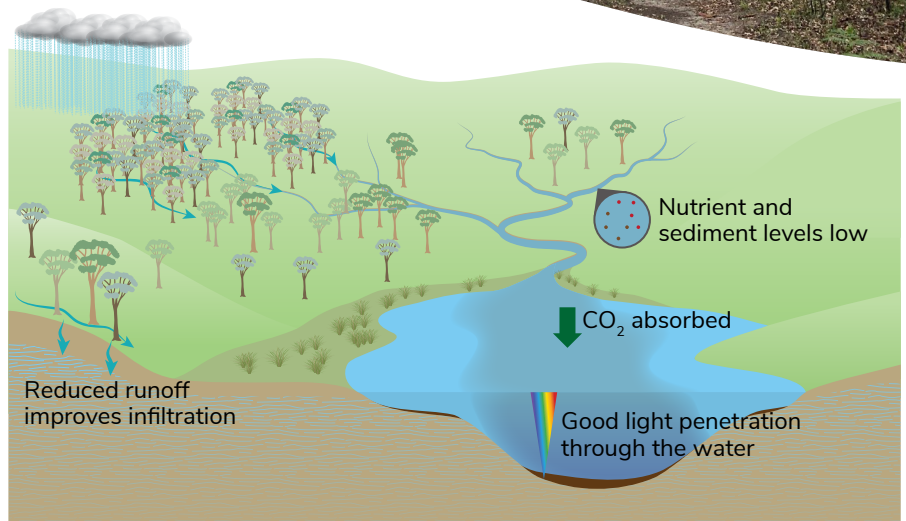
Before, during and after a fire in the catchment

Data from existing monitoring programs, case studies in fire-affected catchments and a review of the current research has been used to summarise the processes occurring in catchments.

Pre-fire

Intact vegetation and groundcover reduces volume and velocity of runoff and reduces the level of nutrients, sediments and organic carbon entering the waterway during a rain event.

Water quality and aquatic ecosystem health is generally good and is largely dependent on the quality of catchment runoff.

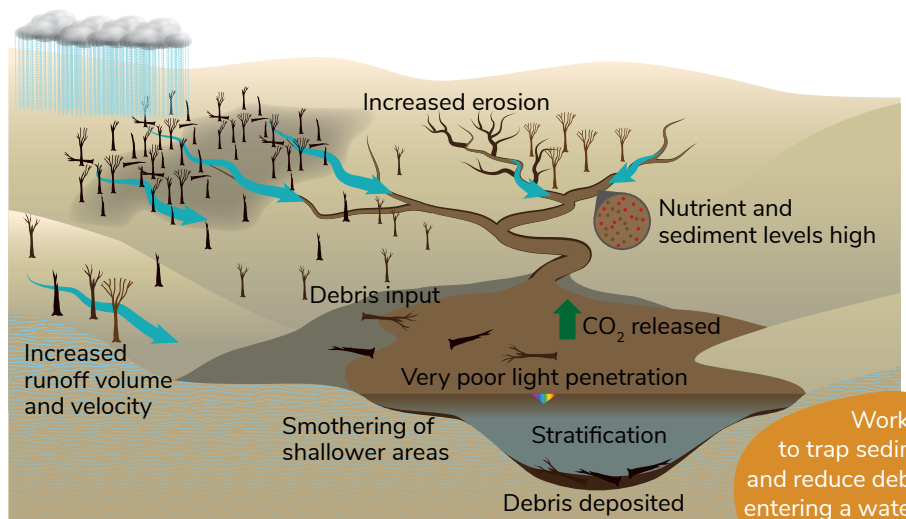


Immediately post-fire following a rain event

Loss of vegetation and groundcover increases volume and velocity of runoff which intensifies erosion.

Increased debris, organic matter, sediment and nutrients enter the waterway, reducing oxygen levels.

Water quality and aquatic ecosystem health is severely impaired, but the severity of impact may be brief.



Recovering catchment following a rain event

Regrowth of vegetation and groundcover decreases velocity and volume of runoff which reduces the risk of erosion.

Sediment levels entering the waterway decrease improving water clarity, however with high nutrient levels, algal blooms occur. Processes in the sediment and water fuel further algal blooms.

Water quality and aquatic ecosystem health is impaired.

