

# Foam & chemical contamination in waterways

It is common to find foam in waterways. Foams can be naturally occurring but they may also be an indicator of synthetic chemicals. Natural and synthetic foams look different but they can both collect and concentrate chemicals from the surrounding water, including chemical contaminants. Due to this behaviour, chemical levels in foam can be significantly higher than in the surrounding water.

## Cause of foam in waterways

It is not unusual to find foam in water bodies. Foam is produced by 'surfactant' chemicals that produce a thin film floating on the water surface. When this film is agitated by waves, strong currents or wind, the surfactant molecules trap small bubbles, producing foam.

Surfactant chemicals can be natural or synthetic.

Naturally occurring surfactants are a by-product of the breakdown of decaying natural material such as leaves and algae. The foam that occurs as a result of these natural surfactants can start off white in colour but then becomes brown or tan coloured as it collects sediment and organic matter. These natural foams are often seen on windy days or following heavy rain and can persist for some time, gradually disintegrating and disseminating in the surrounding waterway.

Not all foams are naturally occurring. Synthetic surfactants such as

detergents, shampoos and weed killer can be introduced to water bodies by accident or by pollution incident.

Synthetic foams will generally stay bright white in colour. They will often break down faster in the water than natural foam and are likely to appear close to the original source.

Natural foams are typically harmless but synthetic foams can be harmful to aquatic life.

## Foam as a concentrating agent

Foams in water can collect and concentrate chemicals from the surrounding environment to much higher levels. This includes chemical contaminants.

One scientific study showed that viruses deliberately injected into sea surf were taken up by bubbles and found at concentrations 200 times higher than in the aerosol droplets created when the bubbles burst.<sup>1</sup>

This indicates that as the foam collapses the chemicals trapped in the

bubbles re-enter the surrounding water and become diluted.

Given this known ability for foam to concentrate surrounding chemicals, foams have been used for water purification of a range of contaminants, and are sometimes considered as a clean-up option for contamination incidents in waterways.

## Investigating foam in waterways

NSW EPA investigations into pollution incidents may involve the analysis of foam present in a waterway, to determine if it is naturally or chemically occurring foam.

Considerations include the characteristics of the foam such as colour and the period of time in which the foam stays in the waterway.

Chemical contamination in a foam does not necessarily mean that the foam itself is synthetic. EPA analysis of the type of foam (natural or synthetic) considers the known ability for both natural and synthetic foams to concentrate chemicals.

High levels of a chemical in a foam are also not considered to be an indication of the level of contamination in the surrounding environment, due to this known behaviour.

Higher levels of a chemical contaminant in a foam compared to the level in the surrounding water, does not necessarily result in additional risk to human health, if contact is avoided.

## Reporting foam pollution

The community plays an important part in protecting the environment. If you see what you believe to be synthetic foam in a waterway, it is important that you inform the EPA Environment Line on 131 555 as soon as possible.



Photo 1. Naturally occurring foam at Nelson Bay Road drain, Williamtown. Photo: NSW EPA.



Photo 2. Synthetic foam found in a canal. Photo: [The Journal](#)

## References:

1. Appel, C., Baylor, ER, Baylor, MB, Blanchard, DC and Syzdek, LD (1977) 'Virus transfer from surf to wind'. *Science* 11 Nov 1977: Vol. 198, Issue 4317, pp. 575-580.