

Blue Green Algae in the Lake District

Blue-green algae certainly made a name for itself in the last few years, to the extent that it hits the headlines and trips off the tongue of many locals and visitors to the Cumbrian Lake District throughout year and continues to make a nuisance of itself.



Blue Green algae in Derwentwater

Naturally occurring in most water environments

To be technical, also known as Cyanobacteria, blue green algae are a naturally occurring photosynthetic organism that range from unicellular and filamentous forms to colony forming species. Some species have the ability to utilise nitrogen from air and water for photosynthesis (to create food), and can be found in most terrestrial and aquatic environments. Although they can utilise low levels of both phosphorus and nitrogen meaning that they can out-compete other algae, their growth rate is usually much slower than others. However, the growth of blue-green algae is exacerbated by nutrient pollution from various sources such as diffuse agricultural enrichment and from outfalls/discharges of sewage treatment which find their way into the lakes and other stillwater bodies, which, in the right conditions, enables blooms to form.

Water bodies affected by blue green algae, or algal blooms may be green, blue-green or greenish brown and can produce musty, earthy or grassy odours. Blooms can also cause foaming on the shoreline, which can sometimes be confused with sewage pollution. During a bloom, the water also becomes less clear, blocking sunlight and can slow down plant growth in water.

Blue-green algal blooms are nothing new, as reports date back to the 12th Century. However, in the Lake District, lakes such as Derwentwater and Ullswater have not had reported blooms for several years, in fact, prior to 2018, a bloom hadn't been confirmed on Ullswater since 1999!

The most notable blooms have appeared on Derwentwater in recent years with numerous reports and public concerns - especially as all blue-green algal blooms are potentially toxic to human and animal health.

Appearing in the sunshine

Their ability to control their own buoyancy means that during bright sunny weather, the algae migrate to the surface layer of lakes and stillwaters. During long periods of settled, sunny and warm weather with little or no wind, blue green algae can multiply to such an extent that 'blooms' can form.

In deeper water, under such conditions, the lake will form layers (stratify) with the warmer, less dense water lying above the cooler water. Gentle breezes can then move the blue-green algae into bays downwind where the algal bloom is much more visible when it approaches the shoreline.

Once algal numbers are high, the bloom is likely to persist throughout the season, declining only on the onset of winter conditions.

Blooms can also move with the wind, so a bloom can start in one location, but then move to a new location the next day. In soft breezes, the energy is too light to break the surface so the scum drifts downwind and is deposited in bays and on the shoreline. It does not survive this for long, cells become stressed releasing their contents and blue green pigment into the water and eventually die, leaving the unsavoury, un-aesthetic appearance on the shore. Then if these periods persist, it will take longer to wash away from the shore.

Affected by winter conditions

It is unusual for blue-green algal blooms to persist into the winter, especially in the Cumbrian lakes. The disturbance caused by winter storms, lower temperatures and faster flushing rates mean that this slow growing organism cannot grow to such densities until the conditions become more conducive for growth in late spring/early summer.

Previous winters have not been typical as far as Lake District winters go. Milder than average temperatures, the lack of significant storms or rainfall, and much lower lake levels following hot dry summers, have allowed the naturally occurring algae to persist in the deeper areas of lakes.

As the lakes refill through autumn and early winter, algae can persist without being flushed from the system in drier winters, so that on bright, sunny, still days, reports were still submitted to the Environment Agency.

The onset of storms flushes much of the algae from the system and caused the remaining algae to subside into deeper water.

The more settled and sunny weather during the spring months, causes the algae to migrate to the surface of the lake again and form a bloom.



St Herberts Island on Derwentwater

Is it safe to swim or let my dog swim?

Bloom and scum forming blue-green algae can produce toxins. Toxin producing blooms are called Harmful Algal Blooms. These toxins can be harmful to wild animals, farm livestock and domestic pets. In humans, they have been known to cause rashes after skin contact and illnesses if swallowed. Not all blue-green algae blooms and scums are toxic, but you can't tell just by looking at them, so it's best to assume they are. People (and pets), therefore should enter the water at their own discretion.

What's the Environment Agency's role?

The Environment Agency collects samples when reports are submitted of the presence of blue-green algae on lakes and other waterbodies, and analyses them to confirm its presence.

Notifications of confirmed blooms are then sent to the landowners and other statutory bodies so that signs can be displayed to warn lake users of the presence of potentially toxic blue-green algae.

Once we have a confirmed bloom in a particular location, Environment Agency officers sample every week until we've had two clear samples in a row.

Can anything be done to prevent it?

As algal blooms are naturally occurring and require the right conditions to form, there are no quick and easy solutions for reducing their occurrence.

The Environment Agency issues and monitors discharge permits throughout the country which contain strict limits on phosphorus concentrations discharged to the environment. We also work with water companies to ensure that their activities are compliant with their discharge permits as well as advising them on any improvements that they may wish to make.

Over the last twenty years there's been huge progress in enhancing the water environment thanks to tougher regulation and years of hard work, and there is ongoing work to maintain water quality and improve it even further.

Is there anything I can do?

There are many things which residents and users around the lakes can do to reduce the persistence of blooms in lakes, including:

- Regular checking and emptying of holding tanks on boats to prevent pollution,
- Reducing detergent use (and using phosphate-free),
- Reducing fertiliser on lawns, gardens and farmland that can ultimately end up in the lake,
- Checking the condition of septic tank systems to reduce discharge.

We always encourage people to reduce phosphate use as this helps improve water quality. You can buy phosphate-free washing detergent and cleaning products from your local supermarket.

It's important to note though, that although increased phosphorus and elevated nutrients can impact the amount of algae present, it's not the whole picture. Algae isn't completely reliant on phosphorus and can utilise low levels of both phosphorus and nitrogen. It's adept at utilising it from dirty water such as from general land erosion.

As always, it's important that people remember to report environmental incidents, such as potential blue green algae blooms or pollution, to the Environment Agency incident line on 0800 80 70 60 open 24/7, so we can investigate and take appropriate action to protect people and the environment.

When it comes to protecting our iconic Lake District, we also always encourage people to 'Check, Clean, Dry' every time we leave a lake, stream or pond, to help stop the spread of invasive plants and animals in our waters. Freshwater invasive non-native species are able to 'hitchhike' on our equipment, footwear, clothing and boats and if they become established in a new waterbody, can often have devastating effects.

This is especially important for those using equipment on our lakes, such as boats, kayaks/canoes or paddle boards, as well as anglers, however, it's also important for those open water swimming – such as open water swims as part of the Keswick Mountain Festival or triathlons such as the Lakesman.

To protect the health of yourself and your pets from blue green algae, check for signs at all popular access points to your lake/waterbody, check the

@EnvAgencyNW Twitter feed for confirmed reports and contact the Lake District National Park or National Trust.