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For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

ENVIRONMENT AGENCY  
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The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

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# Blue-Green Algae

# EA- WATER QUALITY

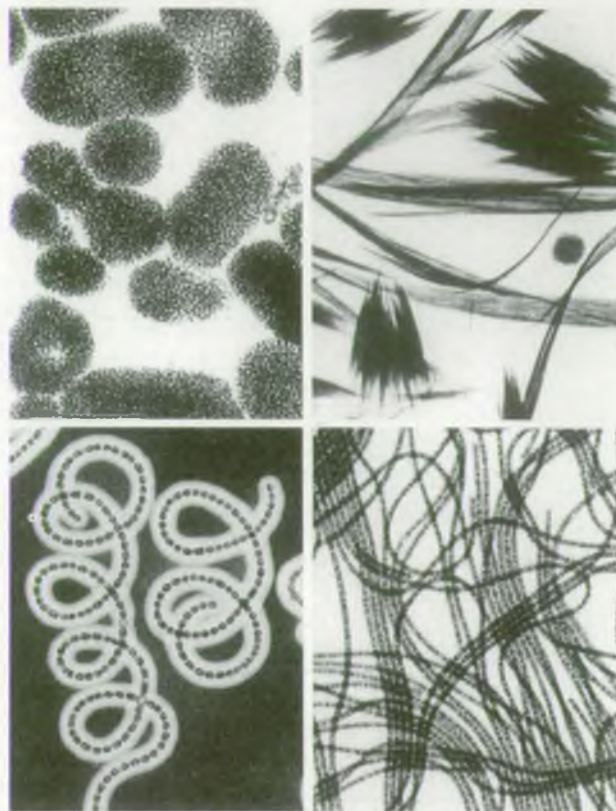


## WHAT ARE BLUE-GREEN ALGAE?

Blue-green algae are natural inhabitants of many inland waters, estuaries and the sea. In fresh waters, they are found in suspension and attached to rocks and other surfaces at the bottom of shallow waterbodies and along the edges of lakes and rivers.

The range of blue-green algae in waters in this country is wide and includes single-celled species and others whose cells are arranged in colonies and chains (filaments). Although the single cells, colonies and filaments are not visible to the naked eye, it is possible to see some species when they are concentrated into clumps in the water. Single-celled species form clumps, and the filaments of other species come together into bundles or balls. These forms can appear like greenish flocs, flakes of green sawdust, or like brownish pinheads.

When the numbers of blue-green algae are not excessive they, together with other algal groups, are important contributors to the aquatic biology of natural waters. They convert energy from sunlight into chemically useful forms, liberate oxygen into the water, take up minerals and produce substances which enter and support food chains.



*Types of blue-green algae under the microscope*

## BLOOMS AND SCUMS

Like other floating plants, blue-green algae need nutrients to grow, particularly nitrogen and phosphorus. These substances exist in various forms in the water and can be utilised directly by the algae.

If the water is enriched with nitrogen and phosphorus, and other requirements for growth are met—for example adequate sunlight, mixing, flow and temperature in the waterbody—then the numbers of blue-green algae can become excessive. Such extensive growths are sometimes referred to as BLOOMS.

Where blue-green algal blooms develop and persist, they can adversely affect the appearance, quality and use of the waterbodies. The water may be discoloured green, blue-green or greenish brown and several species can produce musty, earthy or grassy odours. Such algal blooms sometimes cause foaming on the shore-line. When blue-green algal blooms die and decay, they use up oxygen in water which can cause problems for other aquatic life including fish.

During calm weather, several blue-green algal bloom-forming species can rise to the water surface to form a SCUM. This may look like paint, jelly or floc. The colour of blue-green algal scums varies widely because the pigments they produce differ between species, and even within a single species, depending on the nutrient supply, light intensity and the age of the bloom. Consequently, scums may be blue-green, grey-green, greenish-brown or occasionally reddish-brown.

All blue-green algae contain blue pigment in addition to green chlorophyll pigment, although the blue colouration cannot normally be seen in the living cells. However, when blooms and scums decay, the pigments are released and a bright blue appearance may persist for days or weeks.



Courtesy of B. Brienley

Blue-green algal scums can form quickly on calm days, but can be dispersed rapidly if wind and wave action increases. If the direction of the wind changes, the scums can move from one shore-line to another in a waterbody in a relatively short time. The persistence of scums also depends upon the particular blue-green algal species within the scum. These species can vary considerably in their size and shape, as shown in the black and white photographs in the leaflet.



## HEALTH HAZARDS OF BLUE-GREEN ALGAE

For reasons which are not yet fully understood, bloom and scum forming blue-green algae in freshwaters, brackish water and seawater are capable of producing TOXINS.

These toxins have caused the death of wild animals, farm livestock and domestic pets in many countries, including the deaths of farm animals and dogs in the U.K. in 1989. In humans, rashes have occurred following skin contact, and illnesses have occurred when blue-green algae have been swallowed.

Blue-green algal blooms and scums are not always toxic. It is not possible to tell from its appearance whether or not a bloom or scum is harmful.



Research commissioned by the Agency has confirmed that there is a 1 in 2 chance of an individual bloom or scum being toxic. All blue-green algal blooms and scums should be assumed to be toxic.

## WHAT CAN BE DONE?

Blue-green algal blooms and scums have been natural annual features of some waterbodies for many years and are likely to remain so. In many cases a change in the way waters are managed may be effective in controlling the algae, because water circulation is an important factor in creating bloom conditions. In other cases, however, a reduction in nutrient input, or indeed the removal of nutrients, may be necessary.

The Agency is developing a number of research initiatives and action plans in order to understand better and minimise the problem in the longer-term.

Nevertheless, public awareness of the hazards of toxic blue-green algae needs to be increased and maintained. Water-users, particularly children, farmers and pet-owners should treat all blue-green algal blooms and scums with caution. If this is done then, as with other biological hazards such as poisonous toadstools or adders, the likelihood of poisoning incidents and illnesses due to blue-green algal toxins will be reduced.

*A Water Quality series report on toxic blue-green algae has been produced. The research findings are presented in R & D Report 29, The Occurrence and Fate of Blue-Green Algal Toxins in Freshwaters.*

*Copies of both reports can be obtained from HMSO, priced at £15 each, including postage and packing.*

## WARNING

The Department of Health has stated:

Illnesses including skin rashes, eye irritation, vomiting, diarrhoea, fever, pains in muscles and joints have occurred in some recreational users of water who swallowed or swam through algal scum. There have been no reports of long term effects or deaths in humans, but in some cases the illnesses were severe. **ALTHOUGH ALGAL SCUM IS NOT ALWAYS HARMFUL, IT IS A SENSIBLE PRECAUTION TO AVOID CONTACT WITH THE SCUM AND THE WATER CLOSE TO IT."**

In contrast to humans, animals may eat or swallow large quantities of algal scum. The Chief Veterinary Officer of the Ministry of Agriculture Fisheries and Food has stated:

**"The toxins which may be produced by algae, are also poisonous to animals and can cause severe illness and death. FARMERS AND PET OWNERS SHOULD THEREFORE ENSURE THAT THEIR ANIMALS DO NOT HAVE ACCESS TO AFFECTED WATER."**

For further information on Blue-Green Algae contact: The National Centre for Toxic and Persistent Substances (TAPS). Tel: 01733 371811