Northern Territory Environment Protection Authority

FACT SHEET

Blue-green Algal Slicks In Marine Waters

Background

From time to time oily, frothy or jelly-like ‘slicks’ can be seen in Northern Territory coastal waters or washed up on shores along the coastline.

One cause of these slicks is the “blooming” of certain species of algae, particularly blue-green algae.

Blue-green algal slicks can be mistaken as an oil spill or other pollution due to their murky, sludge-like appearance floating on the surface of waters and washing onto beaches and shorelines.

Some blue-green algae can be toxic and have the potential to impact aquatic organisms, other animals and humans.

Algal blooms have been observed to occur on an almost yearly basis and in a variety of localities around the coast and are most commonly observed in Northern Territory waters, during the September to November weather transition period.

Introduction

The Northern Territory Environment Protection Authority (NT EPA) is aware of public interest regarding blue-green algal blooms in Northern Territory marine waters and along shorelines.

During the latter part of the 2013 Dry season, there was a number of public reports to the NT EPA of oil spills. These were in fact reports of blue-green algal blooms in the form of slicks and mats.

The algae most commonly involved in the blooms are filamentous blue-green algae of the genus *Trichodesmium.* Blue-green algae of the genus *Lyngbya* is also known to exist in the NT. The Timor and Arafura seas are considered ‘hot spots’ for blooms of these algae.

This factsheet provides general advice on the occurrence of blue-green algal blooms and the slicks and dense mats they produce in marine waters.

The NT EPA acknowledges that algal blooms may occur in freshwater, including Manton Dam and Darwin River Reservoir. These also have the potential to cause environmental or human harm. Freshwater algal blooms are not discussed in this factsheet.

What is a blue - green algae?

Blue-green algae are simple, single-celled aquatic organisms that occur naturally in habitats such as marine and freshwater environments, as well as moist terrestrial environments and in symbiotic relations with some plants. They function like a plant, but have characteristics like bacteria. These algae are sometimes referred to as cyanobacteria

Blue-green algae are very small organisms and can be seen under the microscope as a single cell or large accumulations of cells (colonies) or strings of cells. Some accumulations may be so large that they are easily seen with the naked eye.

What is a blue-green algal bloom?

A blue-green algal bloom is a common term used to describe an increase in the number of algal cells to a point where they can seriously reduce water quality.

Blue-green algal blooms can discolour water, form surface scums and slicks, produce unpleasant tastes and odours and create problems for aquatic life and water users.

Blue-green algal blooms vary in colour from green to blue, red, brown, dark green or black. Some can be easily seen as scum on the surface while others may be evenly spread through the water or concentrated at depth.

What causes blue-green algal blooms?

Species of blue-green algae may dominate and increase excessively in water when the:

- water is still and turbulence is minimal;
- the weather pattern is stable for a long time;
- weather is warm; and
- nutrient levels, particularly phosphorous and nitrogen are elevated.

Nutrients are naturally present in sediments and are washed into water systems from natural, urban and industrial areas.

Blooms can persist for several weeks or sometimes months depending on the climatic conditions and location.

What to look for?

Some “tell-tale” signs which indicate that the water may be polluted with a blue-green algal bloom include:

- Brightly coloured water;
- Blue-green scums on the water surface;
- Strong “fishy” odour;
- Brown discoloured water; and
- Oily films on the water surface.

Are blue-green algal blooms toxic?

Some blue-green algal species have the potential to produce toxins.

As a bloom ages or begins to die, concentrations of toxins may increase. Some toxins may persist for a number of months before they are degraded by sunlight and microbial activity.

Some toxins may continue to exist in the crust of dead dry algae. The dry crust can continue to be toxic for months.

Human contact

Water contaminated by blue-green algae may constitute a health risk to water users.

The table below indicates the level of risk for some water activities:

RISK	ACTIVITY
High	Swimming, diving, sail-boarding, water-skiing, paddling
Medium	Canoeing, sailing, rowing (assumes avoidance of algal material when launching and landing and no rollovers or capsizing)
Low	Fishing, pleasure cruising, passive shoreline recreation (picnicking, walking etc.)

Skin contact

Contact with blue-green algae (toxic and non-toxic forms) during water based activities can cause skin, eye and respiratory symptoms.

Eating seafood from algae-affected waters

Some blue-green algae toxins have been identified to occur in some seafood, which can be harmful to people if consumed.

Seafood including fish, mussels and other shellfish caught in algae infested waters should not be consumed.

Other areas of concern

Aesthetic effects

Blooms may discolour water and form unsightly and sometimes smelly scums on the water surface and along shorelines. Some blue-green algae and other organisms can produce substances that may cause a pungent earthy taste and odour to the water.

Animal health

Pets can be affected. Dogs are particularly susceptible as they tend to lick their coats after swimming. Consumption of toxic algae by animals may cause illness or even death.

Ecological effects

Blue-green algae have been implicated in the poisoning of fish, pelicans and zooplankton.

Nitrogen-fixing blooms provide a valuable source of nitrogen in tropical water bodies. In some areas, a large diversity of microscopic animals (including rare forms) only exist during the blooms.

What blue-green algae occur in Northern Territory marine waters?

Blue-green algal blooms in Northern Territory marine waters are likely to be one of the following:

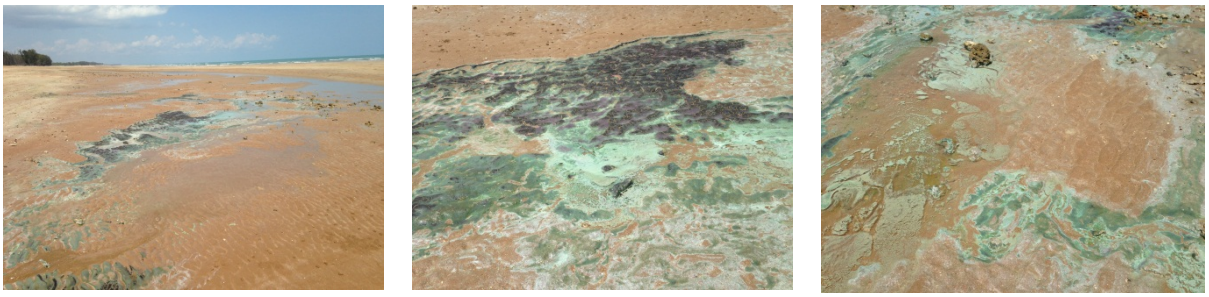
Trichodesmium species

Trichodesmium occurs naturally in tropical and sub-tropical ocean waters and plays an important role in the aquatic food chain.

Calm conditions and warm water temperatures can increase growth and even discolour water.

The blooms are commonly known as “red tides” or “sea sawdust”, though the colour of them may vary from red to brown, green or creamy yellow. They can be mistaken for oil slicks when dark in colour and particularly when slicks wash up on beaches and begin to darken with decay.

Trichodesmium blooms give off an unpleasant ‘fishy’ smell and may have a slightly oily appearance. Trichodesmium can release a clear toxin which is generally not of a high enough concentration to be harmful to human health in a natural system.



Trichodesmium washed up on Darwin beaches

Further information on Trichodesmium can be found at:

http://www.goldcoast.qld.gov.au/documents/bf/trichodesmium-final.pdf

Lynbgya species

Lynbgya is a naturally occurring blue - green algae that may occur in bloom proportions in tropical marine waters. The bloom floats as mats across the surface of the ocean and can sometime wash onto surrounding beaches.

Lyngbya grows attached to seagrass, corals and other shallow substrates and is potentially toxic to the environment and human health. Lyngbya is a contact irritant that can produce skin and eye irritation following direct contact. People should avoid swimming or wading in areas where Lyngbya is glowing or floating in the water and should not have direct contact with material washed onto the beach.





Lyngbya washed up on Darwin beaches

Further information on Lyngbya can be found at:
http://www.ehp.qld.gov.au/coastal/ecology/lyngbya-updates/

What is being done?

Blue-green algal blooms in marine pristine environments are part of the natural environment. It is unlikely that any management measures are required to address these blooms. Some blooms result from increased catchment loads of phosphorous, iron and dissolved organic carbon in stormwater discharges associated with agriculture, horticulture and urbanisation. Releases of effluent and toxicants from point sources to Northern Territory coastal waters are regulated by the NT EPA under the *Water Act*, limiting potential for the occurrence of algal blooms.

The NT EPA's draft "Stormwater Strategy for Darwin Harbour" (in preparation) will provide a proposed approach to managing stormwater impacts on water quality in Darwin Harbour.

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