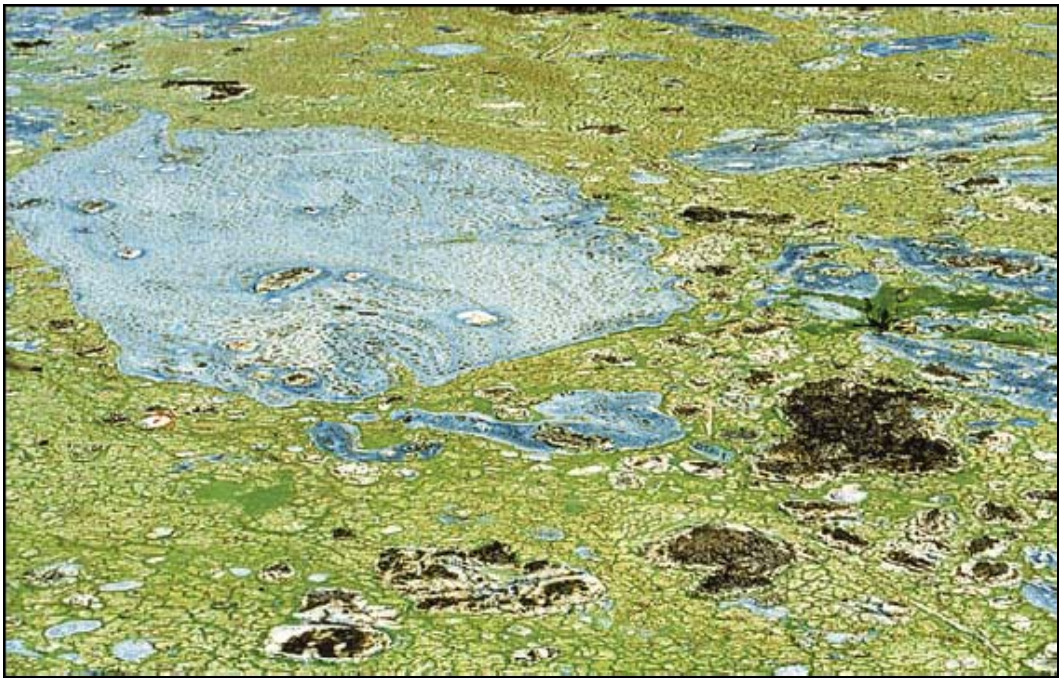
TOXIC ALGAE
(Cyanobacteria)



(blue green algal scum)

ALGAL SCUMS CAN BE DANGEROUS
BEWARE!

WHAT IS THE PROBLEM?

Due to rapid urban development and industrial growth in the Hartbeespoort Dam catchment area, the volumes of water loaded with plant nutrients (phosphates and nitrates) reaching the dam have increased.

These plant nutrients entering the Hartbeespoort Dam are found in -

- detergents
- washing powders
- fertilisers
- sewage effluent

- and cause excessive growth of algae and waterweeds - such as hyacinth.

This results in the deterioration of the water quality due to the loss of oxygen and biodiversity.

This excessive fertilization condition is called eutrophication, which is a global phenomenon and problem.

The Hartbeespoort Dam acts as a nutrient trap in the presence of other environmental factors such as low rainfall and hot, windless weather.

Under these conditions (excessive nutrient loads, weather conditions and excessive growth of algae) the potentially toxic blue-green algae occur.

Not only are the plant nutrients trapped by the sediment in the dam, they are also regularly released into the water for instance by bottom feeding fish like carp.

High volumes of water flowing into the dam improve the situation as some of the nutrients then wash away.

Eutrophication spoils the aesthetic appearance of the dam and negatively affects recreational activities such as water-sports and angling.

A further consequence is the unpleasant odours and these in turn may also influence the taste of domestic water.
Depending on the maintenance and upkeep of the domestic water supply, the toxins could collect in the system and therefore be released into the domestic water.

The Hartbeespoort Dam water is used for irrigation purposes downstream and the Hartbeespoort Dam Remediation Project will include monitoring to ascertain if the toxins are present in the water used to irrigate the crops.

(algae looking like “green pea soup”)

To be safe, avoid contact with the scums and the water close to it. Farmers - prevent livestock from having access to algal scums.

WHAT ARE BLUE-GREEN ALGAE?

Blue-green algae are organisms with some characteristics of bacteria and some of algae.
They are similar to algae in size and unlike other bacteria, in that they contain chlorophyll *a* and can perform photosynthesis.

They are natural inhabitants of many inland water, estuaries and the sea.

They have the distinction of being the oldest known fossils, more than 3.5 billion years old!
In still water such as lakes, ponds and reservoirs, these algae may multiply sufficiently in summer months to discolour the water, so that it appears as “green pea soup” (as shown in the picture above).

Algae on the surface are blown by the wind to form high concentrations called algal blooms. These float to the shoreline where they can accumulate and die off and form thick dry crusts, called scums. This is often mistaken for raw sewage due to the noxious odours which are produced, but is the natural brake down of organic matter by natural occurring bacteria.

Blue-green algae scums undergo a series of colour changes from green, including blue-green, white-blue-green or greenish brown.

ARE THEY HARMFUL?

Sometimes these algae produce toxins which can be harmful to humans and animals.

WHO IS AT RISK?

Recreational water users, livestock farmers and anyone else coming into direct contact with infected water. Waterfowl at Hartbeespoort Dam were poisoned by the toxic algae and rescued by the FreeMe Wildlife Rehabilitation Centre in 2001/2002.

WHAT ARE THE HUMAN SYMPTOMS OF TOXIC BLUE-GREEN ALGAE?

Blue-green algae toxins may cause:

1. Skin rashes
2. Eye irritation
3. Vomiting
4. Nausea
5. Fever
6. Muscle and joint pain
7. Possible long-term liver damage with prolonged exposure

Do not eat the skin & intestines of contaminated fish.

WHAT IS IMPORTANT TO KNOW ABOUT BLUE-GREEN ALGAE?

- Blooms flourish in warm summer water and in many areas die down during autumn.
- Plant nutrients promote algal growth.
- Toxins produced can survive high temperatures.
- Toxicity fluctuates constantly because of the shift of the algae due to wind action.

HOW DO I MINIMIZE THE RISK?

Emergency treatment for drinking water

- Filter the water
- Treat water with activated carbon or charcoal
- Use peroxide as disinfectant when working in "high" exposure areas

Wear protective gear

- Waders
- Gloves
- Face mask
- Goggles
- Hat
- Long sleeve top
- Life jacket

Employers of personnel & those at risk of frequent exposure:

- Provide protective gear.
- Wash protective gear **once a day** as it acts as a filter, but once saturation is reached it will release toxins back to the wearer.
- Provide at least **5lt fresh drinking water** per person per day.
- Provide pro-active liver boosters e.g.
  - Prohep
  - Sweden bitters
  - Sutherlandia
  - Olive leaf extract
- Provide education & awareness of potential toxicity (in a language which is understood by all) to the personnel.

(NB Boiling the water and adding chlorine does not remove the toxin!) The best method of purifying and removing the toxins is through activated carbon or even normal charcoal.

WHAT MUST I DO IF I COME INTO CONTACT WITH BLUE-GREEN ALGAE?

- Wash immediately with clean water.
- Wash and dry all clothing and equipment with clean water.
- If symptoms (mentioned above) persist, consult your doctor.
- Report the incident to the authorities in your region.

FIRST AID TREATMENT

After exposure:

- Drink plenty of clean drinking water to flush your liver.
- Drink activated carbon charcoal tablets.
- Treat symptomatically.

HISTORY OF TOXIC ALGAE IN SOUTH AFRICA

The existence of toxic algae is neither new or localized or restricted to South Africa.
The first known case of livestock poisoning in South Africa dates back to the 1920's and since then incidents have occurred at Vaal Dam, Witbank Dam, Bospoort Dam, Erfenis Dam, Hartbeespoort Dam, Klipvoor Dam, Rietvlei Dam and Roodeplaat Dam.
Small dams on some farms also have had incidents of toxic algae.

WHAT CAN I DO TO CONTRIBUTE?

- Purchase a "NO PHOSPHATE" eco-friendly washing powder.
- Bulldoze or shovel the solid algae crust away from the shoreline and dispose of it via a company such as Waste Tech.
- Prevent fertilisers (golf courses and farmers) from leaching into the dam.
- Ask your Home Owners Association (HOA) what mitigation measures and monitoring processors they have put in place.
- Pass the message on e.g. in HOA newsletters.
- If you find an animal in the water in distress, contact the Free Me Wildlife Rehabilitation Centre, they will rescue, rehabilitate and release wild animals.
- "I" would like developments to take responsibility for their shoreline.
- Preserve your indigenous shoreline & riparian vegetation – it acts as a nutrient filter.
- Look at installing directional water pressure nozzles in the bays which have been created by certain developments. A company called "Aquatech" has successfully installed systems at certain developments.
- Engage and assist Working for Water to remove the alien invader plant species from your shoreline.

- Remediate your shoreline with the correct plants. The Hartbeespoort Dam Remediation Project will supply a list of these plants shortly.
- Insist on seeing information and warning signboards at public access points – it is to the benefit of all.
- For your own safety regard all blue-green algal blooms in South Africa as potentially toxic.
- Report incidences of algal scums to DWAF.

WHAT IS BEING DONE IN SA TO MANAGE THE SITUATION?

- The Dept of Water Affairs (DWAF) is monitoring as part of the National Eutrophication Monitoring Program (NEMP), the status of the Hartbeespoort Dam. (http://www.dwaf.gov.za/IWQS/eutrophication/NEMP/default.htm).

- DWAF and the North West Dept Agriculture, Conservation, Environment and Tourism (DACET) commissioned a study and developed a "Remediation Action Plan" called "North West Environmental Management Series 5 - Hartbeespoort Dam – Dam Remediation" which was published in 2005.

- The Hartbeespoort Dam Remediation Project is underway with the appointment of the implementing agents, Rand Water by DWAF in 2006, to execute the "Harties Metsiame Remediation Project" as it is now called.

- The activities in the Draft Business plan for the Harties Metsiame Remediation Project include:
    - Fish Manipulation and commercial harvesting.
    - Floating wetlands (mesocosms) & Shoreline vegetation.
    - Control of recreational activities.
    - Integrated Monitoring Program -
        - Shoreline pollution
        - Nutrient balance
        - Establish volunteer river and dam monitoring groups
        - Integration of all monitoring programmes
    - Pre-impoundment and sediment removal.
    - Wetlands upstream – natural and artificial.
    - Phosphate reduction -
        - effluent from upstream sources
        - production of washing powders and detergents
    - Awareness and Communication.
    - Development of a Resource Management Plan (RMP), including all of the above mentioned items.
    - Establishment of a Water Users Association (WUA).

    - Algal removal with “noodles”, pump stations and composting until the Dam is ecologically stable.

- Authorities (developments) controlling public access at dams are requested by DWAF to put up signboards cautioning the public against contact with algal scum.

- DWAF has instituted measures to limit the discharge of plant nutrients to surface water e.g. special phosphate standards on effluents were introduced in 1980 and enforced since 1985.

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- DWAF
- WHO
- WRC
- HWAG

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