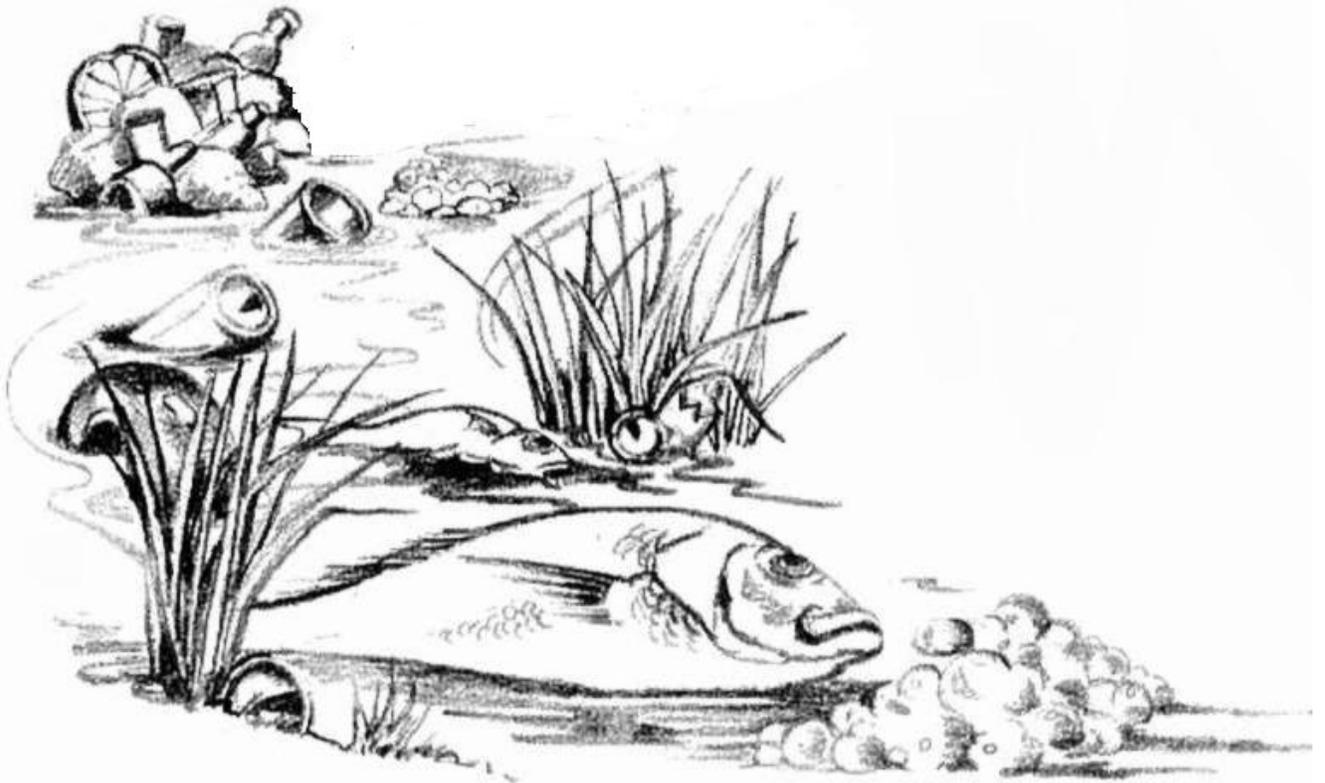


*The mighty Orange-Senqu River*



# Finding Out More

## Enviro Fact: Eutrophication



In many rivers, dams and aquifers of the Orange-Senqu River basin, eutrophication (excessive richness of nutrients, particularly nitrates and phosphates, in a dam or river, often due to runoff from the land, which stimulates excessive plant growth) is increasing.

These substances pollute both rivers and reservoirs, especially in areas like the Vaal River basin where there are many industries, agriculture as well as settlements. This can have dramatic consequences.

### **Common substances**

Nitrates and phosphates are in common use. Many meat products are preserved with nitrates; phosphates are found in milk and cheese products; and in South Africa, unlike the European Union, phosphates are still approved as active ingredients in detergents. Moreover, the two substances are found naturally in a number of different soils and count among the most important components of agricultural fertiliser products. Natural sources of both substances are in the excrement of animals and humans.

The main factors contributing to eutrophication are:

- Silt from soil erosion in the upper reaches of the rivers;
- Agricultural return flow (water that is sprayed onto crops by farmers but not used by plants and that eventually returns back to the river), especially along the lower reaches of the Vaal and Orange;
- Malfunctioning water treatment plants and sewage/organic waste getting directly into waterbodies;
- Excrement of millions of cattle and other livestock across the basin.

### **Nutrient concentrations in the River basin**

Nutrient concentrations throughout most of the basin are sufficiently high to cause algal blooms. However, concentrations in the middle and lower parts of the Vaal and Riet Rivers are higher than those typical of the rest of the basin. Major algal blooms have been noted along this entire stretch.

Nutrient concentrations further upstream in the Vaal and Wilge Rivers are much lower, suggesting that urban pollution

from the southern Gauteng area is a major source of increased nutrient concentrations.

Total phosphorus concentrations in rivers in the Lesotho Highlands are typically lower.

### **Immediate dangers**

High levels of nitrates in water are very dangerous for cattle drinking the water. Many cattle are kept near water holes that are already rich in nitrates, and their excrement raises the levels even further. When the cattle drink the water, bacteria from their digestion process convert the nitrate into highly toxic nitrite, which lowers their blood's ability to absorb oxygen.

The cattle literally suffocate from the inside – a phenomenon experienced by numbers of farmers in South Africa, Namibia and Botswana. This nitrite poisoning can also have deadly effects on human babies where it is called *methemoglobinemia*, or 'blue baby syndrome'.