

## PHOSPHORUS FACT SHEET

**Definition:** An essential nutrient that is fundamental to the development of nucleic acids and cell membranes of plants and animals.

### Background:

- Phosphorus occurs in several forms:
  - *organic phosphates* from plant-animal matter, waste
  - *inorganic (also called orthophosphate, free phosphates, reactive phosphates)* naturally occur and bind to soil particles.
- It is often a limiting nutrient for freshwater phytoplankton & plants.
- It naturally enters surface waters from organic decay & soil weathering.

### Environmental Impacts:

- Excess Phosphorus comes from sewage treatment plants, fertilizer runoff, farm manure piles, detergents and phosphoric acid industrial cleaners.

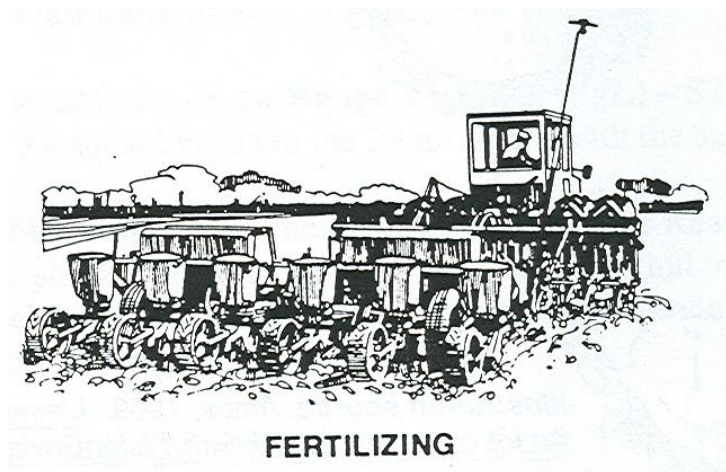


Fig. 1: One of the major contributors to high levels of phosphates in waterways today is from fertilizers. Rainfall carries fertilizers into nearby creeks and lakes, therefore unnaturally increasing nutrient levels. Too much phosphate can help cause algal blooms and other excessive plant growth.

- Excessive phosphate levels cause an overabundance of plant growth – algae and aquatic weeds (macrophytes).
- When resulting algal blooms die, their decomposition from aerobic bacteria removes dissolved oxygen from water (process known as **eutrophication**).
- Lack of oxygen can hurt aquatic life, causing fish kills.
- Algal blooms also choke out rooted vegetation by blocking light penetration.
- The majority of algal blooms are the result of human interference, although algal blooms do occur naturally, their occurrence is insignificant in comparison to human produced algal blooms.
- Phosphorus in lakes can be stored in sediment and resuspended in water columns with spring and fall overturns.

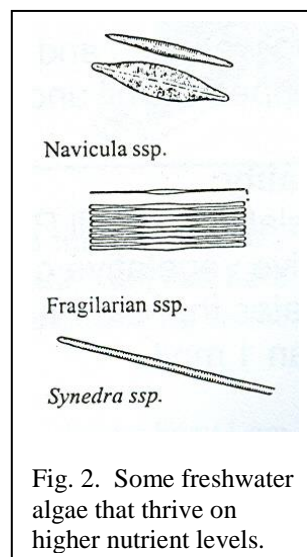
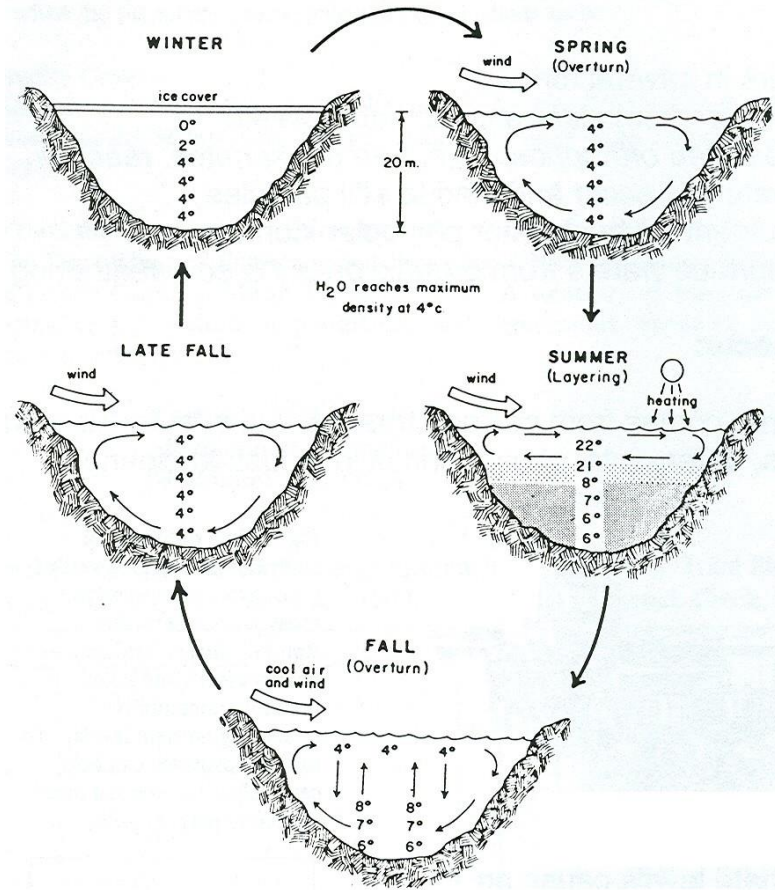


Fig. 2. Some freshwater algae that thrive on higher nutrient levels.



*Illustration source: Amos, 1969. Limnology: An Introduction to the Fresh Water Environment*

- Draining wetlands and clearing vegetation can liberate phosphorus that was trapped in soil and organic matter.

### Water Quality:

- Even relatively small Phosphorus inputs, (<0.03mg/L), can stimulate excessive vegetative growth.
- The EPA states that the Phosphorus concentration in sewage waste should be less than 1 mg/L.

### Links:

- Phosphates~General overview on phosphates  
<http://www.state.ky.us/nrepc/water/wcftp.htm>  
<http://www.water-research.net/phosphate.htm>
- PO<sub>4</sub>~More background information  
<http://www.epa.gov/volunteer/stream/vms56.html>