

**Conservation 1404 Chapter 21**  
**“WATER POLLUTION” Pages 493 - 513**

*The Least You Should Know*

**VOCABULARY**

Water pollution, point sources, nonpoint sources  
World Health Organization (WHO), within the UN  
Pathogens  
Fecal coliform bacteria, E. coli.  
DO, Dissolved Oxygen  
Oxygen sag curve  
Eutrophication, cultural eutrophication  
    Oligotrophic  
Plume (of contaminated water)  
Degradable wastes  
MBTE  
Nitrate ions  
HAB's – harmful algae blooms  
Dead zones  
Exxon Valdez  
Septic tank  
Primary, secondary and advanced sewage treatments  
    Bleaching  
    Disinfecting  
    Chlorinated hydrocarbons  
    Sludge  
    Biosolids  
Composting toilet systems  
Clean Water Act  
US Safe Water Act of 1974  
Biological Magnification (fig 11.5)  
Eutrophication, Cultural Eutrophication

**CONCEPTS**

The major sources of water pollution are (in order) agriculture, industry & mining.

Agriculture is by far the leading polluter: sediment is the leading pollutant followed by fertilizers, pesticides, bacteria from feedstock operations & salt from irrigation.

Surface mining creates runoff of toxic chemicals.

The UN has figured it would cost \$19/year to provide each person in developing countries with safe water, and know how these figures are exaggerated.

Coliform standards – zero for drinking water, 200 per 100 ml for swimming water. Know the ranges of DO for different qualities of water (fig 496) and for common aquatic organisms (fig 21.4)

Flowing waters can recover rapidly from degradable wastes if there is enough streamflow and not too much pollutant, fig. 21.4.

Know the Cuyahoga River story.

Most cities in developing countries discharge 80 to 90% of untreated sewage directly into running waterways..

Industrial wastes & sewage pollute 2/3 of India's water sources.

Only about 10% of sewage in Chinese cities is treated.

Know about the Ganges River in India.

Dilution of pollutants in lakes is not as effective as in flowing waters for two reasons – stratification and little flow. Also, concentrations of some chemicals can be biologically magnified.

Algae Blooms, what they are, how they occur and how they cause problems.

Cleaning up lakes and rivers can be done and has been done (know some examples) but it is very expensive. It is much more efficient and cheaper to prevent it in the first place.

Know the story of Lake Washington and Puget Sound in Seattle. It showed that eutrophication could be caused by phosphates, that the problem can be reversed, and that it requires money and strong citizen action.

Most rural Americans get their drinking water from groundwater. Groundwater is often polluted by fertilizers (nitrates), pesticides and VOC's.

Leaking storage tanks are a big and expensive problem for a number of reasons  
a) groundwater flows so slowly (know how slow) that contaminants are not dispersed  
b) not much DO to decompose pollutants  
c) cold temperatures slow down decomposing reactions. So, it can take thousands of years to cleanse an aquifer of degradable wastes, decades for slowly degradable wastes.

Cleanup costs from a leaking tank run from \$10,000 to \$250,000 and the testing is equally expensive.

Know about MTBE and about nitrate ions

The reason dumping sludge into the bottom of the ocean is not better than leaky landfills is that we know more about the surface of the Moon than about the bottom of the ocean!

Know what “dead zones” are, how they work, and about the big one in the Gulf of Mexico.

Know a little about the Chesapeake Bay story.

Know a little about the Exxon Valdez story – but – the largest source of ocean oil pollution is urban and industrial runoff from the land. Every 8 months an amount of oil equal to the Exxon Valdez drains from the land into the oceans.

Marine life can recover from a crude oil spill in a few years, but exposure to refined oil can take decades.

Preventing oil spills into the oceans more effective and cheaper than cleanup.

Know all about sewage treatment plants and how they work and what happens in each stage.

