

Water Quality in NC

Types of Pollution	
<u>Sediments</u>	<u>erosion, soil</u>
Oxygen Demanding Agents	organic waste and manure
Toxic Metals	acids, toxic metals
Inorganic Plant Nutrients	nitrogen and phosphorus
Organic Chemicals	oil, detergents, pesticides

Biological Oxygen Demanding (BOD) Agents (I NEED AIR)

- BOD: Oxygen is removed from water by bacteria
- Fish can't live in streams without oxygen
- Where to find BOD at its highest?
 - <u>Swamps</u>
 - <u>Runoff from agriculture</u>





U.S. Fish and Wildlife Service

BOD Effects on Water Quality

All streams have some ability to breakdown organic waste. P<u>roblems</u> <u>occur when a stream is overloaded with</u> <u>organic waste</u>.

<u>High Pollution: High BOD</u> <u>Low Dissolved Oxygen</u>

Low Pollution: Low BOD High Dissolved Oxygen

Toxic Metals

- Toxic metals that can be absorbed by plants or animal tissues
- Bioaccumulation: toxins increase in amounts as you move up the trophic levels.
- Examples
 - Arsenic
 - Lead
 - Mercury
 - Cadmium



Case Study: Arsenic in Groundwater - a Natural Threat

- Toxic Arsenic (As) can <u>naturally occur at high</u> <u>levels in soil and</u> <u>rocks.</u>
- Drilling into aquifers can release Arsenic into drinking water supplies.



Inorganic Plant Nutrients: Nitrogen and Phosphorus

- Sources:
 - <u>Human, animal (e.g., Hog</u> <u>Farms), and industrial</u> <u>waste</u>
 - <u>Storm water</u>
 - <u>Soil erosion</u>
 - Excessive use of fertilizers for crops, lawns, and home



Eutrophication Eutrophication is a growth of algae bloom in water and is an accelerated results with human input of nutrients to a lake

Discharge of untreated municipal sewage (nitrates and phosphates) Nitrogen compounds produced by cars and factories

Discharge of detergents (phosphates)

Natural runoff (nitrates and phosphates)

Discharge of treated municipal sewage (primary and secondary treatment: nitrates and phosphates)

Manure runof from feedlots (nitrates, phosphates ammonia)

> **Runoff from streets**, lawns, and construction lots (nitrates and phosphates)

Runoff and erosion (from cultivation, mining, construction, and poor land use)

Lake ecosystem nutrient overload and breakdown of chemical cycling

Dissolving of nitrogen oxides (from internal combustion engines and furnaces)

morganic fer tilizer runoff (nitrates and phosphates) Organic Chemicals
 Concentrations

 increase at
 increasing levels
 in the food chain
 - PCBs, DDT, etc.

Biomagnification



Sediments

 Sediment (clay, silt) is the #1 source of water pollution. • Clouds the water Blocks sunlight for the aquatic plants causing them to die



Drinking Water Quality •Drinking water (Potable Water) is purified by

- <u>storage in reservoir</u>
 <u>(suspended matter settles)</u>
- treated by sand filters
- <u>activated charcoal</u>
- addition of chlorine



© Brooks/Cole Publishing Company / ITP Water Resources and Water Pollution by Paul Rich Water Treatment Stages Sequence of stages in treating our drinking water:

- 1. Screening
- 2. Aeration
- 3. pH correction
- 4. Flocculation

- 5. Sedimentation
- 6. Pre-chlorination
- 7. Filtration
- 8. Disinfection
- 9. pH adjustment

Municipal Water Purification Plant



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Home Septic Systems

- No Chlorine used
- Uses a settling tank to settle the solids
- <u>Lets waste water percolate into the soil</u> <u>to decompose</u>



Water Conservation Methods

- Repair leaking faucets and underground pipes
- Landscape year with plants that use little water
- Use drip irrigation in your yard and crops



Water Conservation Methods

- Use water saving toilets, showerheads, dish washers
- Purify and reuse water for houses and gardens
 Rain Barrels



ENERGY STAR

