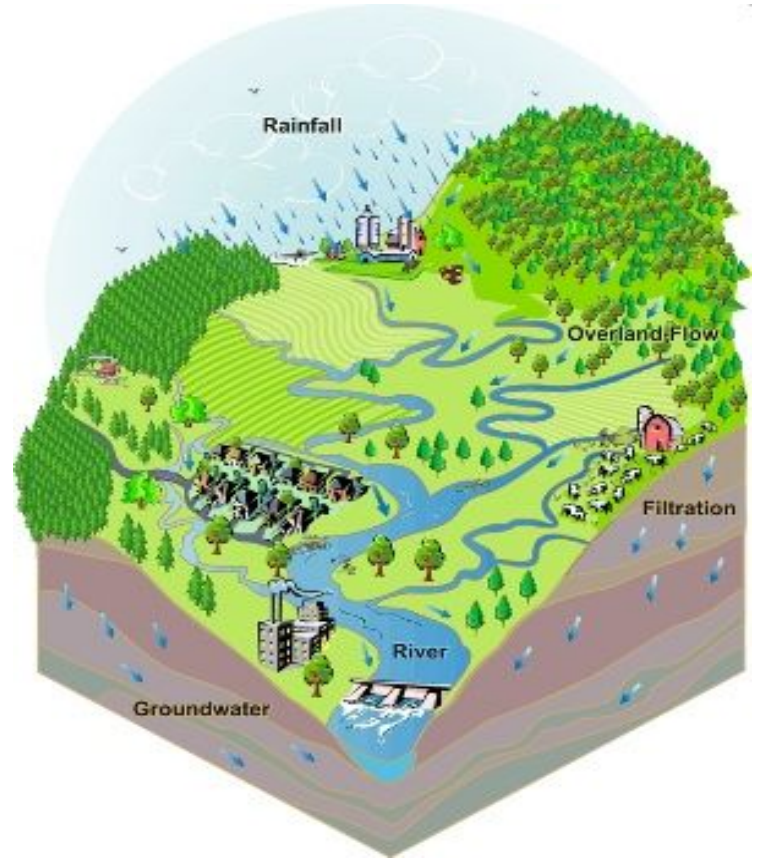


Topic 2

Bioaccumulation

- The water cycle can carry harmful chemicals from external sources into our drinking water
- Pesticides, herbicides, and insecticides may travel large distances to accumulate in a single location



Pesticides

- Pesticides are any chemical which is used to control, repel, or kill an organism
- Herbicides - plants - Roundup
- Insecticides - insects - DDT
- Fungicides - fungus - Tea tree oil



Persistent Waste

- Many types of pollution do not break down in the environment and are known as persistent wastes
- If the environment is able to break down a material/chemical quickly it is known as a non-persistent waste
- Plastics are a large source of persistent waste and may not be broken down for thousands of years



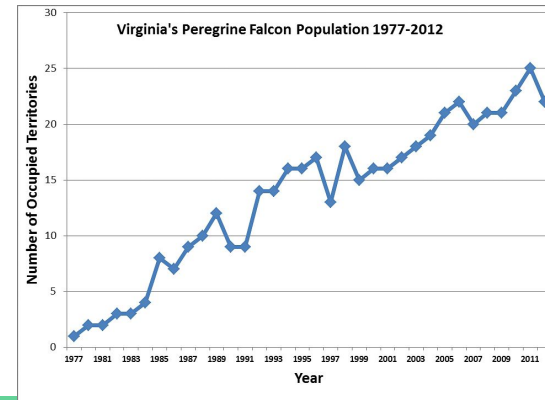
Case Study - DDT

- DDT is a chemical used to fight the war against insects, specifically mosquitoes and lice, to combat growing rates of malaria and typhus during WW2
- In African countries the use of DDT dropped malaria rates from 70% to 5% in 6 years
- DDT accumulated in top consumers in food chains due to its long half life and to being fat soluble
- DDT was ingested, inhaled, and absorbed by many consumers in the food webs



DDT Consequences

- DDT reduced the amount of calcium in peregrine falcon eggs, causing fewer eggs to develop properly
- The brittle eggs often broken before the chicks were fully developed, causing the peregrine falcon population to nearly go extinct
- Since the implementation of conservation programs and the awareness of pesticide use, peregrine falcon populations have recovered



Bioaccumulation (Biomagnification)

DDT concentration:
increase of
10 million times

DDT in
fish-eating birds
25 ppm

DDT in
large fish
2 ppm

DDT in
small fish
0.5 ppm

DDT in
zooplankton
0.04 ppm

DDT in water
0.000003 ppm

As DDT moves up the food chain. More of it collects in the fat stores of animals.

This is biomagnification

As you move up to each new trophic level (aka food chain levels). Each animal needs to eat more and more of the animal below it so it collects more DDT in its tissues.

Definitions

- BIOMAGNIFICATION: Build up of substances, such as pesticides, in an organism. It is being “biologically magnified” as it moves up the food chain.
-
- The substance is being absorbed faster than the substance is lost.
- TROPHIC LEVEL: position of an organism in the food chain