Chapter 22 Notes

The substances that have a harmful effect are called pollutants.

Early humans lived along rivers and the coasts. There they had access to water, food resources, and/or trade.

Bodies of water have always been convenient places for people to dispose of wastes. In pre-industrial times, the water could dilute and wash away most of the wastes that were dumped into it.

As human populations along the world's coasts increased, there is a greater concentration of wastes along the coasts, and these wastes may be dumped into the sea.

In the United States, about three-fourths of the population lives within 50 miles of a coast.

The quantity and type of these wastes have, in most instances, exceed the ocean's capacity to store or dispose of them without being damaged.

Sewage

Sewage is made up of the human intestinal (fecal) wastes that are discharged into our waterways.

Water that is contaminated with sewage poses a serious public health problem. Water may contain a variety of harmful microorganisms or pathogens, that can cause life-threatening diseases such as typhoid fever, cholera, dysentery, hepatitis and others.

Public health scientists routinely test water samples for fecal coliform bacteria.

Fecal coliform bacteria, which are present in the large intestine of humans and normally do not cause disease, are used as indicators of sewage pollution.

If coliform bacteria are present, there is a good chance that disease-causing bacteria are also present.

Contamination of water by sewage can be reduced or even eliminated by sewage treatment, a process that helps kill bacteria and other harmful microorganisms.

Toxic Chemicals

The toxic chemical DDT (dichlorodiphenyltrichlorethane) is an insecticide. For more than 20 years in the United States, it was sprayed on farms, in swamps, and in coastal areas to kill areas such as mosquitoes.

The California brown pelican, almost became extinct in the mid-1960's as a result of DDT spraying. Scientists discovered that DDT interfered with the birds' use of calcium, an important element in eggshells.

DDT had similarly harmed other predatory birds, such as the ~~bald~~ bald eagle, peregrine falcon, and osprey.

In 1971 the U.S. government banned the use of DDT, and in recent years we have seen a gradual increase in the populations of brown pelicans, ospreys, peregrine falcons, and eagles

PCBs

From 1950 to 1975, a company located along the Hudson River in upstate New York dumped hundreds of thousands of kilograms of another type of chorinated hydrocarbon called PCBs (polychlorinated biphenyls), into the river.

PCBs are used in a variety of consumer products, including paints and electrical components.

PCBs were found to cause cancer in laboratory animals and are suspected of causing cancer and birth defects in humans.

After being discharged into the Hudson River, the PCBs sank to the bottom, where they remained in the sediment for a long time. Here they contaminated bottom-dwelling invertebrates. When fish ate these animals, the PCBs in them entered the food chain.

As the PCBs moved up the food chain, their concentration increased. The increase in concentration of a chemical substance as it moves up a food chain is called biological magnification or biomagnification for short.

In 1976, the Environmental Protection Agency (EPA) tested the Hudson's striped bass for PCBs, and found the concentration to be 5 parts per million (ppm)—more than twice

the permissible limit. As a result, the commercial fishing of striped bass in the Hudson River was stopped.

PCBs are no longer being dumped into the Hudson River. As a result, PCB levels in striped bass have dropped to less than 2 ppm. Second, now that the level of contamination has dropped, the striped bass fishing industry can start again in New York.

Mercury

In Minimata Bay, Japan, from the early 1950's to 1960's, more than 100 people developed tremors, fell into comas, and died. Many more were stricken with a variety of nervous system ailments that included blindness, loss of hearing, insanity, and parlysis. Doctors discovered that all victims had consumed large amounts of local fish and shellfish, they suspected that the seafood was contaminated.

When the seafood was examined, high levels of mercury were found. The mercury was traced to a nearby industrial plant that manufactured plastics and chemicals. The factory's liquid wastes, which contained mercury, were being discharged into the bay.

In the 1970's, the chemical plant in Minamata finally stopped discharging mercury. Unlike, the Hudson River PCB's, the sediments in Minamata Bay were still contaminated with mercury.

This spawned a global investigation into mercury in the food chain.

In 1972, Congress passed the Clean Water Act, which required industrial plants to install equipment that prevents mercury from being released directly into the water.

The U.S. government's Food and Drug Administration (FDA) set a limit of no more than 0.5 ppm of mercury in fish.

Oil Pollution

On occasion large oil tankers run aground and spill crude or fuel oil into the ocean. Marine animals are covered in crude oil.

Birds will freeze to death, drown, or are poisoned by the oil as they try to clean themselves. Fish, too, are covered with oil, which coats their gills and causes the fish to suffocate. Countless microscopic plankton, on which all other marine life depends are killed by the oil.

As devastating as these oil spills are to the environment, they account for only about 20 % of all oceanic oil pollution.

Nonpoint Source **pollution** is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters.

For example, the discharge of consumer products that contain oil into sewer systems from homes, businesses, and motor vehicles is a major form of nonpoint source oil pollution.

Litter in the Ocean

Litter is solid waste or garbage. Most litter consists of plastic, glass, and metal—materials that do not undergo natural decay.

A nonbiodegradable waste such as plastic may remain in the environment for hundreds of years.

Some animals, particularly sea turtles that eat jellyfish, mistake plastic bags for food. The turtles then die—either of starvation (with plastic bags filling their stomachs) or of suffocation (after choking on the plastic bags)

Plastic rings from beverage six-packs trap and choke fish, birds, and other marine life when the animals swim, or put their heads in, through the rings and are unable to get them off their bodies.

And each year, thousands of fish, seabirds, turtles, and marine mammals die when they become entangled in plastic gill nets, fishing line, and huge drift nets that are discarded or lost at sea by fishing vessels

The United States throws away more trash than any other nation in the world. More than 150 million tons of solid wastes, or refuse, are thrown out each year—nearly 10 million tons of it into offshore waters.

Among this are millions of pieces of glass, metal, paper, plastic, and plastic foam items are thrown into the ocean each year.

Solutions to Pollution

One method is incineration the disposal of solid wastes by combustion.

There are some 200 large incinerators now operating in the United States.

Although the burning of wastes can be used to generate energy, it is not a perfect solution to waste disposal. Many towns cannot afford to build an incinerator Also, incineration of garbage can produce air pollutants

The most ecologically sound method of handling solid wastes is recycling, reusing, and reducing our waste.

What you can do:

1. Use a reusable water bottle and coffee mug!!!
2. Try to recycle everything you can and do so properly (containers washed, boxes broken down).
3. Compost all vegetable scraps. Making a compost is easier than you think.
4. Buy reusable bags for groceries. Buy durable reusable containers for leftovers food or packing lunch to go.
5. Find biodegradable/compostable snack bags
6. Support private industry, nonprofit research groups, environmental groups, and government groups that are all working to find ways to prevent, reduce, and cleanup debris in the marine environment.