The name of this module is

toxicants in hydrosphere,

detergents, silt an oil.

In this module you will learn

about detergents, their sources and

effects on public health ,

silt its sources and effects on public health,

oil its sources and effects on public health.

Upon completion of this module you will

achieve the following learning outcomes.

You will be able to list

the sources of detergents,
silt and oil in the hydrosphere,
describethe effects of toxicants on the environment,

and public health.

So hydrosphere refers to the layer of

water on the surface of the earth in

the form of oceans, lakes and rivers.

Water pollution by chemicals

raises serious concerns.

These chemicals could be detergents,

fertilizers,

or other toxicants like silt and oil which

can delete the health of the water body.

So let's look at the first

toxicant in this model.

That is, detergents.

Detergents are made up of chemicals

which are used as cleaning agents.

They are derived from surfactants,

builders, etc.

So Surfactant is a surface active agent.

It has a dual nature, that is,

it has a hydrocarbon and a polar character.

So that means it can dissolve in

both water and organic solvents,

and they're very toxic.

Builder is a sequestering agent,

which usually is a sodium phosphate.

Now,

household detergents contain surface

active agents and they contribute to

conatins phosphates of sodium,

sodium silicate,

sodium sulftaes,

which would be present in water

now because of the amount of phosphorous

that is present in detergents,

it could cause eutrophication.

The different sources of

detergents are petroleum.

Was the earliest source of detergent.

Later chemical detergents or made

from petroleum and oleochemicals

The point sources of detergents

are they can enter the surface

water through sewage and drainage.

Next is nonpoint sources,

especially in the rural areas.

Detergents can enter water through

various anthropogenic activities,

like when people wash clothes

in rivers or lakes,

or wash their vehicles or animals.

Now,

what is the effect on environment
phosphorous promotes growth of algal

blooms so if there is increased

concentration of phosphate it

can increase the growth of algae.

So this can cause eutrophication

which reduces the level of oxygen

in the aquatic ecosystem.

Detergents can destroy the external mucus.

layer of Fish and cause damage to their gills.

The amount of detergents that are

deposited in the water body can

increase the turbidity which reduces the

respiratory function of aquatic Organism.

Since it causes stress to them,

it can increase their vulnerability to

pathogens by depleting their immune system.

So factors like ethylene glycol can disrupt

hormone functioning of aquatic life.

Exposure to alcohol benzene

sulfonate kills may Fly nymphs.

Also,

because of algal blooms the

algae produce a lot of toxins.

These toxins get accumulated

in the aquatic ecosystem,

one of them being strychnine

causes mortality in aquatic form.

Now in this picture you can see the

Lake which is filled with algal blooms.

Next, effects on public health.

It contaminates drinking water through

surface and groundwater pollution,

so this can cause symptoms like sore throat,

the skin irritation, stomach cramps, etc.

Detergents can also have allergic effects.

Nitrotriacetate NTA, Mercury, and cadmium.

They can form complexes and

this enhances the capability to

cross the Placental barrier,

which can cause birth defects.

Most harmful among,

1-4 dioxane is used as a solvent and

acute exposure to this that are

short term exposure can cause anorexia,

which is loss of appetite,

drowsiness, headaches, etc.

Next will look at silt as a

toxicant in the hydro sphere.

Silt is basically soil or sand particles

which are suspended in aquatic ecosystem.

The size of this particles

could be due to 50 micrometers,

siltation, which is disposition.

Often results in turbidity in the

water body causing water pollution,

so it obstructs free movement

of aquatic organisms.

Growth of

The fishes and their productivity.

Heavy metals and other toxicants

can get accumulated in the silt.

Silt nonpoint sources.

This could be from construction,

runoff.

Soil erosion that is soil and

bacteria waste from animal husbandry

units and floods can carry a large

amount of salt into water bodies.

Point sources are streams that

carries sediment into the large rivers

from industrial drainage systems.

Also particles carried by wind and

agricultural runoff get settled in stream,

which are then deposited in

larger water bodies.

Effect on the environment.

So Siltation causes turbidity,

which decreases the visibility

of pelagic food,

also causes a reduction in light

penetration which affect aquatic life.

And increases the availability

of benthic food and clogs

The gills and Gill rakers on filaments.

It also decreases the rate of

photosynthesis of aquatic flora.

Effects on public health pollutants

found in sediments accumulate in fish.

It can cause various diseases after

consumption of contaminated fish.

Pesticides like dioxin can get

accumulated in sentiments which

can disrupt reproductive function.

The next toxicant is oil.
It is one of the sources of pollution in the sea so tons of oil is added

in every coastal waters.

It can cause maritime accident

that is accidental spillages which

then contributes to the amount

of oil in the water.

So 12% of oil in the oceans

is because of oil spillage.

Sources of oil Point sources,

ship accidents,

loading and discharge of oil at the harbors.

Also oil production and oil refineries,

so the waste material from these

refineries when discharged into the water,

contributes to the amount of oil.

Also,

accidental spillages oil pipelines

which carry oil can get corroded

over time and cause oil leakages.

Nonpoint sources,

natural seepages of oil from earth

surface occurs when oil seeps from

highly pressurized columns also

land run off from various sources.

Next effect on the environment.

So because of oil spillage,

the oil forms a film over the

surface water, so this can

reduce the rate of oxygen uptake.

Reduces light intensity also

can kill lichens, an algae.

The oil can clog gills of fishes and causing

mortality of aquatic fauna.

Emulsified oil at the water.

That is the oil that is mixed with

water can destroy the deep sea flora

and fauna hydrocarbons from oil can

get incorporated in body tissues.

Also, birds lose insulation

as the oil spillage destroys.

Their naturally insulating oils and waxes,

which are found on the feathers of birds.

Effects on public health
Harmful components like aromatic tiles means

and benzothiophenes damaged essential

organs like liver and kidney
carbonyl sulphide is found in crude oil.

It produces hydrogen sulphide,

which causes respiratory paralysis.

Also causes accumulation of Mercury

in petroleum refineries in workers.

Also, people working in these

refineries and other industries

using oil can have skin irritation

because of direct contact.

So these are the references.