PERMISSIBLE LIMITS OF WATER POLLUTANTS

Water on Earth

SOURCE	QUANTITY
Oceans	97.2%
All Ice caps/Glaciers	2.0%
Ground water	0.62%
Freshwater Lakes	0.009%
Inland seas/Salt Lakes	0.008%
Atmosphere	0.001%
All Rivers	0.0001%

Freshwater potentially available for human use: Groundwater, freshwater lakes, rivers=**0.629%**

Water Contamination

- Point Source pollution:-

Domestic and industrial waste, local phenomenon.

- Non Point Source pollution:-

Agriculture runoff and infiltration, garbage or faeces which is taken into the water source through rainwater runoff, this also leads to Groundwater contamination as the rain water will seep into the ground.

pH

- **PERMISSIBLE LIMIT** 6.5-8.5
- Neutral water-7
- Highly acidic-below 6
- Highly alkaline-above 8
- The abundance of hydrogen ions determines the acidic and alkaline of water.

Effects

- When the pH value is above 11 can cause skin, eye and mucous membrane irritation.
- When the pH value is below 4 can worsen existing skin condition.

REASON

- Industrial waste entering into the water source
- Use of fertilizers in agricultural lands
- Minerals present in water, if soil contains salt it becomes highly alkaline

Dissolved Oxygen

- **Permissible Limit** 5mg/l.
- Refers to the level of free, on-compound oxygen present in water.
- Increases capacity for marine life.
- In slow moving or stagnant water there is usually less oxygen.

Reason

- Adding of domestic waste into sewage to the water causes lower oxygen content

Effects

- Low oxygen levels will effect all the aquatic life in the water.

Residual Chloride

- **Permissible amount**-0.2mg/liter
- Chlorine added to water forms hypochlorous and hydrochloric acid.
- Appears in surface and ground water as a result of disinfection of domestic sewage.
- Industrial processes that use chlorine for bleaching to control organisms that grow in water.

Effects

- The presence of excess chlorine intensifies the taste and odour of many other compounds.
- It may be harmful to many aquatic organisms in combination with ammonia.

If residual chlorine is high, leave the water exposed to air for two hours. The chlorine should evaporate making the water safe to drink.

Phosphorus

- **The natural levels** is 0.03mg/L.
- Many freshwater sources are experiencing increase in phosphorous

  levels from outside sources.

REASONS

- Human and animal waste, agriculture runoff, detergents and domestic sewage

Effects

- In excess of critical concentration phosphorus simulates algae and plant growth.

Turbidity

Permissible limit 5-10 NTU

- It’s the result of fine solids in water.

Reason

- Caused by suspended matter

Effects

- High level of turbidity can restrict light penetration for photosynthesis
- Reduction in turbidity is associated with reduction in suspended matter and microbial growth.

Chloride

Permissible Limit 250-1000 mg/l

- Chloride is one of the major inorganic anion in natural water and wastewater.

Reasons

- Discharge of effluents from chemical industries, sewage, irrigation.

Effects

- High chloride content has harmful effects on metallic pipes, structures and agricultural crops.

Nitrate

Permissible Limit-45mg/l

- Nitrate is the most highly oxidized form of nitrogen.

Sewage dump in the stream

Reason

- Domestic Sewage
- Runoff agricultural fields
- Decayed vegetables and animal matter

Effects

- Nitrate above 40mg/l causes blue baby disease
- Causes deaths in pigs and calves
- Abortion in brood animals

Fluoride

Permissible Limits 1-1.5

- The fluoride presence in groundwater is wide spread about 199 districts in India.

Reasons

- Naturally by rocks and minerals
- Tobacco, tooth paste, tea, preservatives, medicines, dying and printing, aluminum industries effluents

Effects

- Dental fluorosis
- Skeletal fluorosis

Fluoride can be controlled by defluoridation,mixing fluoride free water and intake of vitamin C, D, calcium and antioxidants.

Iron

Permissible Limits 0.3-1.0

- Of the elements that make up the earth crust, iron is the fourth most abundant by weight.

Reasons

- Natural sources, iron ore mines
- Corrosion of pipes, pumps

Effects

- Causes staining of clothes and utensils.
- High concentration of iron is not suitable for processing of food.

Hardness

Permissible Limits 300-600mg/l

Soft	0-75 mg/l
Medium	75-150 mg/l
Hard	150-300 mg/l
Very hard	>300mg/l

- Capacity of water for reducing and destroying the lather of soaps.

Source

- Dissolving limestone by rainwater
- Chemical industry waste
- Discharge from operating and abandoned mines.

Effects

- Indicates role in heart disease
- Difficult to drink

Ammonia

Permissible Limits 1.5mg/l

- The toxicity of ammonia increases with pH-remains in gaseous form
- The decrease in pH decreases its toxicity

Sewage inflow and industrial pollution from biotechnology plants pose a major threat to Pykara Lake.

Reason

- Discharges from sewage, industries, decay of plant, animal litter, runoff from agricultural fields

Effects

- Higher concentration is harmful to fish and human beings.

Faecal Pollution

- Faecal pollution must be absent in water.
- It may serve as a vehicle of transmission of waterborne diseases.

Reason

- Human and animal waste
- Sewage

Effects

- Waterborne diseases
- Typhoid
- Diarrhea etc.

Alkalinity

- **Permissible Limit** <200-600mg/l
- Alkalinity=hardness, Ca and Mg salts
- Alkalinity>hardness-presence of basic salts,Na,K along with Ca and Mg
- Alkalinity<hardness-neutral salts of Ca & Mg present.

When we look for other planets to colonize, we first look for water because it's the only life giving source.

Protect your water resources!! It's our individual responsibility!!

THANK YOU.