1 Definition of Wastewater

Wastewater is human polluted water from home and industries. This includes water from:

- Flushing toilets and urinals - blackwater.
- Bathing, showering, and washing clothes and dishes - greywater.
- Commercial and industrial activities.
- ...and often included as wastewater is the storm water which contain pollutants washed off inhabited areas - roads, parking lots, and rooftops.

2 Why Treat Wastewater

Although nature has an inherent capability to degrade pollutants, given the quantity of wastewater generated from human activities, centralized wastewater treatment plants are required to treat the wastewater and safely return the treated wastewater back to the environment. Sewers collect the wastewater from homes, businesses, and industries and deliver it to wastewater treatment facilities before it is released back to the environment through its discharge to a water body like a lake, river or ocean, or land, or reused. Wastewater treatment is designed to remove:

- organic matter
- inorganic pollutants including plant nutrients - nitrogen and phosphorous
- pathogenic (disease causing) organisms

3 Benefits of Treating Wastewater

Wastewater treatment protects:

- The environment
- Human health

Specifically wastewater treatment allows for the following:

1. **Mitigates deterioration of the receiving waters' ecosystem**

   In the receiving waters, inadequately treated wastewater discharge depletes dissolved oxygen levels due to:

   - Nitrogen and phosphorus are essential for plant growth and are common ingredients in fertilizers. However, nutrient-rich wastewater entering a water body such as a lake or river will promote plant and algae growth which will seriously impact its normal aquatic life including fish through a process similar to the following:
     - Nutrient promote algae bloom
     - Algae bloom prevent sunlight to the native plant spieces below the water's surface causing native plants to die
     - The organic material from the dead plants and algae promote growth of aerobic bacteria which will consume the dissolved oxygen in the water resulting in oxygen depletion.
     - The natural aquatic life including fish, frogs, and turtles will not be able to survive under oxygen depleted conditions and will die or leave that zone.
   - Other organic material in present in wastewater, will similarly promote growth of aerobic bacteria intensifying the eutrophication of the receiving waters.

2. **Removal of other harmful pollutants**

   Organic and inorganic pollutants including metals, such as mercury, lead, cadmium, chromium and arsenic can have acute and chronic toxic effects on aquatic species and wildlife including migratory birds, are removed during the wastewater treatment process.

3. **Removal of pathogens**

   Wastewater treatment removes parasites and disease-causing pathogens including bacteria and viruses which allow for:

- People to continue enjoying recreational activities in the receiving bodies of waters such as lakes and rivers
- Preventing the contamination of fish and other consumable products obtained from the waters
- Allow the water body to remain as the source of potable water

Thus, treating wastewater prevents eutrophication which is the process by which a body of water becomes enriched in dissolved nutrients (such as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen resulting in a progressive destruction of its normal aquatic lifeforms.

4. **Reclaim water for recycle or reuse**

   Besides protecting human health and the environment, wastewater treatment paves way for establishing the reuse or recycle of treated wastewater. This benefit is particularly important for densely populated areas with limited access to fresh water supplies.