NUTRIENT REMOVAL

Nutrient Removal

- Nutrients (Nitrogen and Phosphorous) in discharge to water bodies stimulate excessive plant growth
- Decomposition of this organic matter reduces oxygen in the water, resulting in death of other organisms
- It is desirable to reduce nutrient levels in treated wastewater discharge

Nitrogen Removal

- Nitrogen exists in different forms, depending on its oxidative state
- For treatment, consider:
  - Nitrogen is present in particulate and soluble fractions
  - Most common forms are: organic, ammonium, nitrite and nitrate
  - Residual, non-degradable, non-reactive soluble organic
    - Least desirable form
    - Can not be removed via biological or chemical / physical processes
- Processes for nitrogen removal:
  - AquaSBR®, AquaPASS®, Aqua MSBR®, AquaMB Process®, Aqua-Aerobic® MBR, Aqua MixAir®
    - Anaerobic and anoxic conditions are required to facilitate nitrification and denitrification
- Biological treatment processes
  - Assimilation (nutrient take-up into the biomass)
  - Nitrification (NH_3-N to NO_3-N)
    - Ammonia nitrogen is converted to nitrate
      - » Performed in two steps by autotrophic species, Nitrosomonas and Nitrobacter
      - » Oxygen is required