AMMONIA: Narrative for simple conceptual diagram

Many human activities and associated sources can contribute to high ammonia concentrations in aquatic systems, which can lead to lethal and sub-lethal effects on aquatic organisms. Channel alteration can result in decreased nitrogen uptake within the stream, while decreases in riparian and watershed vegetation associated with agriculture and urbanization can reduce nitrogen uptake in the surrounding landscape. Channel alteration and water withdrawals can reduce ammonia volatilization due to changes in water velocities and depths. Sources associated with agriculture, urbanization, industry and aquaculture also can directly increase ammonia inputs to aquatic systems via four main transport pathways (or transport-defined sources): stormwater runoff, leakage or leachate into groundwater sources, atmospheric emissions and deposition, or direct effluent discharges.

Ammonia is a key component of the nitrogen cycle in streams, where it may be dissolved in the water column or associated with sediments. At high enough concentrations, ammonia can be toxic to aquatic organisms. In general, unionized ammonia (NH_3) is the form most toxic to aquatic biota. The relative contribution of unionized versus ionized forms to total ammonia concentrations depends on certain water quality criteria, most notably pH: as pH increases, so does the proportion of ammonia in its unionized form.

Increased ammonia concentrations or fluctuations within streams can result in decreased condition, decreased growth, altered behavior, increased susceptibility to other stressors, increased mortality, and decreased reproductive success in affected biota, and ultimately may alter population and community structure and ecosystem function.