

Pollutant Removal Mechanisms

Structural stormwater BMPs remove pollutants from stormwater through various physical, chemical, and biological mechanisms. [Table 7- 1](#) lists the major stormwater pollutant removal mechanisms and the affected stormwater pollutants.

Table 7- 1 Stormwater Pollutant Removal Mechanisms

| Mechanism | Pollutants Affected |
|--|---|
| Gravity settling of particulate pollutants | Solids, BOD, pathogens, particulate COD, phosphorus, nitrogen, synthetic organics, particulate metals |
| Filtration and physical straining of pollutants through a filter media or vegetation | Solids, BOD, pathogens, particulate COD, phosphorus, nitrogen, synthetic organics, particulate metals |
| Infiltration of particulate and dissolved pollutants | Solids, BOD, pathogens, particulate COD, phosphorus, nitrogen, synthetic organics, particulate metals |
| Adsorption on particulates and sediments | Dissolved phosphorus, metals, synthetic organics, petroleum hydrocarbons |
| Photodegradation | COD, petroleum hydrocarbons, synthetic organics, pathogens |
| Gas exchange and volatilization | Volatile organics, synthetic organics |
| Biological uptake and biodegradation | BOD, COD, petroleum hydrocarbons, synthetic organics, phosphorus, nitrogen, metals |
| Chemical precipitation | Dissolved phosphorus, metals |
| Ion exchange | Dissolved metals |
| Oxidation | COD, petroleum hydrocarbons, synthetic organics |
| Nitrification and denitrification | Ammonia, nitrate, nitrite |
| Density separation and removal of floatables | Petroleum hydrocarbons, trash |

BOD – Biochemical Oxygen Demand, COD – Chemical Oxygen Demand

Since many pollutants in stormwater runoff are attached to solid particles, BMPs designed to remove suspended solids from runoff will remove other pollutants as well. Exceptions to this rule include nutrients (particularly nitrogen), which are often in a dissolved form, soluble metals and organics, some deicing constituents such as chloride, and extremely fine particulates (i.e., diameter smaller than 10 microns), which can only be removed by treatment processes other than traditional separation methods.