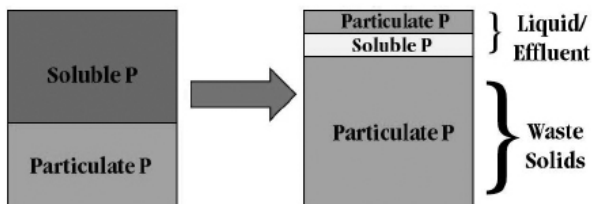


Phosphorus Removal

- For treatment, consider different forms (or speciation):
 - Present in soluble (dissolved) and insoluble (particulate) forms
 - Each form can be Reactive or Non-Reactive
 - Orthophosphates (Reactive)
 - » Most desirable form
 - » Only form that can be chemically precipitated or absorbed by the biomass
 - Condensed phosphates
 - » Acid-hydrolyzable form can be converted to Ortho-P
 - Organically-bound phosphates (Non-Reactive)
 - » Least desirable form
 - » Most difficult for biomass to convert to Reactive
- Processes for phosphorous removal
 - Biological nutrient removal (BNR)
 - AquaSBR, AquaPASS, Aqua MSBR, AquaMB Process, Aqua-Aerobic MBR
 - » Incorporate phosphorous into sludge



- » Anaerobic conditions for P release
 - » Anoxic/ aerobic conditions for P uptake
 - Chemical phosphorous removal
 - Desirable to provide for multiple points of chemical addition, even if not all are used