Relative Contribution of Phosphorus - HUC 8 Basins

Nonpoint source and urban storm water estimates - USGS SPARROW Model
Wastewater Plant - DNR from discharge monitoring reports summarized by Jim Schmidt
Annual Phosphorus Loads by HUC 8 Basin
Lake Michigan Basin

pounds per year

Nonpoint Source & Urban
WWTF Point Source

Brule Peshtigo Menominee Lake Winn Oconto Pensaukee Door-Kew Milwaukee Upper Fox Lower Fox Pike-Rock Wolf Sheb-Man
Annual Phosphorus Loads by HUC 8 Basin
Lake Michigan Basin

Pounds per year

Large Urban Storm Water (MS4)

Brule
Peshtigo
Menominee
Lake Winn
Oconto
Pensaukee
Door-Kewaunee
Milwaukee
Upper Fox
Lower Fox
Pike Root
Wolf
Sheb-Man

Nonpoint Source & Urban
WWTF Point Source
Water Quality Standards

Numeric
Narrative
Narrative

• Statement that describes conditions not protective of designated uses
  • Often used for suspended sediment (TSS) in TMDLs

• Needs interpretation to be used as goal, i.e. assigning numeric amount

• OR, simply removing impairment
Numeric

- Dissolved oxygen - not often used for nonpoint sources

- Total phosphorus
  - 5 concentrations for different types of lakes
  - Concentrations for Great Lake
  - 75 ug/L for streams (0.075 mg/L)
  - 100 ug/L for identified rivers (0.100 mg/L)

- Potential site-specific values (in future)
Determining Level of Control Needed

Using phosphorus and phosphorus water quality standards as example

Often going beyond performance standards and prohibitions and MS4 requirements
Total Maximum Daily Load (TMDL) Analyses

- Reduced load (mass) on a daily, and monthly or annual basis that will meet water quality standards

- Identifies wasteload allocations (WLA) for each point sources
  - Wastewater treatment facilities
  - CAFOs
  - Municipal Separate Storm Sewer Systems (MS4s)

- Identifies a load allocation (LA) for nonpoint sources as a group
TMDL (Continued)

- TMDLs must be approved by EPA

- Often need an implementation plan to translate load allocation into something that can be used in day-to-day implementation for agricultural nonpoint sources
Other Processes

• National initiatives
  • Gulf of Mexico Hypoxia Action Plan
    • 45% reduction for nitrogen loads - all sources combined
    • 45% reduction for phosphorus loads - all sources combined

• Lake Management Plans

• 9 Key Element Plans (often part of TMDL implementation)
TMDL WQ Models

- Range from simple to complex

- Most relate % load reduction to % reduction in concentration in lake or stream
  - Not necessarily 1:1

- Generally, the greater the % reduction in concentration needed, the greater the % reduction in load needed
Example

- *Phosphorus WQS criteria:*
  - 75 ug/L for streams
  - 100 ug/L for rivers

- If stream is currently 75 to 90 ug/L, likely a 15 to 25% load reduction is needed

- If stream is currently 150 ug/L of more, likely more than 60% load reduction needed
Linking to Today’s Discussion

- 10% to 20% load reduction P
  - Possibly achieved through implementing performance standard and prohibitions
  - MS4 base requirements

- 50% to 80% load reduction P
  - Implementing performance standards and prohibitions
  - Plus ..... 
    - Much lower P Index values
    - Lower soil test P values
    - Riparian filter strips and buffers