Stormwater BMPs

First Flush Techniques

Off-Line Detention

Containment Potential

Vegetative Measures

Infiltration Measures

Fertilizer/Pesticide Guidelines

“Local Disposal”

Septic System BMPs

Detergent Bans

Water Conservation

Maintenance Ordinance

Leaching Field Geometry

Setback Requirements

Soil Ammendments

Double Tank/Field Systems

Alternative Designs

Nutrient Allocation Plans
(Quantitative Watershed Management)

Areal Allocation of "Load"

Quantitative Land-Use Assessment

Allocation Credits for Defined BMPs

Treatment Considerations

- Prechlorination (re: PAC/GAC)
- Coagulation-Flocculation
  - Enhanced Coagulation: Required %TOC removal increases as Raw Alkalinity decreases
- Surface Water Treatment Rule
- Total Coliform Rule, ICR, (Regrowth-AOC)
- Taste, Odor, Color, Turbidity
- Contaminants (Chemical, Pathogens), CT, etc.

MODELS

- Empirically Derived TP Load Models
- Flowstage Load Models
- Land-Use Models
- Septic Load Models
- Internal Load Models....

Many models are available....

....What is the Modeling Goal?

MODELS

- Describe Ecosystem Functions
- Quantify Ecosystem Functions
- How "State" Varies as Function of Variables
  - eg. Load ➡ TP ➡ Trophic State
- "Intensive State Variables"

vs.

- "Extensive State Variables"

e.g. Concentration vs Mass

UTILITY of MODELS

- Diagnostic
- Predictive (What if...?)
- If the "Model Function" adequately describes "Ecosystem Function" it can be manipulated mathematically to reveal unknown behavior/relationships.

  e.g. "Algebraic Manipulation"

Flow-Stage Loading Model

- **Field Data; Q_{rate} Concentration**
- **Statistical Tests**

  Seasonal, Flowstage,…trends
- **“Typical Concentrations” combined with “Representative Q volumes” ➡ Load**

Improves “Resolution” with Limited Data

Internal Load Models

- **Gross Sediment Flux (var. eH)**

In-Situ Core Incubations.. Fickean Diffusion Models

- **Gross Sedimentation Flux**

Sedimentation Traps...Alloch/Auto Models

- **Net Sediment Flux**

Land-Use Models

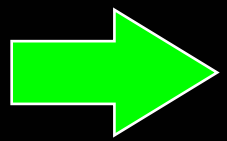
- **Areas is Agricultural, Urban, Woodland Uses**
- **Export Coefficients**
- **Estimate Loading**

Predict Effects of Land-Use Conversions

Data is Available- Photo, GIS, etc
Does "More Detail" result in "Greater Accuracy"?

Septic Loading Model

- TP input to Septic System
- Soil Attenuation Capacity
- Soil Volume (depth, setback, geometry)
- Number and Age of Systems



Estimates Septic Load

Predicts Future Load

What If: Greater Setback, Different Geometry, Atten. Site Regen., Reduced Input?

CONSIDERATIONS

- Does it Depict Nature?
- Sensitivity of Variables to Error?
- Adequate Complexity/Simplicity for Goal?
- Diagnostic-Predictive Utility?

Field Data Verification is Critical!