

Nutrient Loads and Models

**Gulf of Mexico Alliance
Nutrient Sources, Fate, & Transport
Study Design Workshop
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Estimating Nutrient Loads

- Initial Considerations
 - What loads to estimate?
 - Nitrogen
 - Phosphorus
 - Sediment
 - Others
 - Where to estimate the loads?
 - Major freshwater inflows
 - Point sources vs. nonpoint sources
 - When to estimate the loads?
 - Annual, seasonal, monthly, daily

Estimating Nutrient Loads....

- Using existing loading estimates
 - TMDLs
 - 305(b)/303(d) Reports
 - Point source waste load allocations (WLAs)
 - USGS SPARROW estimates
 - Other Federal / State / Local Estimates
- Using available monitoring data to calculate loading estimates
 - Routine ambient monitoring with flow
 - Special loading studies
 - Point source Discharge Monitoring Reports (PCS)

Estimating Nutrient Loads....

- Using models to estimate loads
 - Surface wash off models
 - AGNPS
 - SWAT
 - LSPC
 - SWMM
 - Others
 - Landuse models
 - SPARROW

Modeling Nutrient Fate and Effects

- Initial Considerations
 - What is the question?
 - At what scale?
 - Local – small estuary or portion of an estuary
 - Regional – estuary to near coastal
 - Global – estuary to near coastal to open ocean
 - Is sufficient information available to model at the selected scale?
 - How much can you spend?
 - How long do you have?

Model Selection

- Is a model really needed?
- How complex a model do you need?
 - What is the question and how much information do you have or can you afford?
 - Will a simple regression model be sufficient?
- Which processes are most important to answering the question or questions?
 - Does the model include the most important processes?
- Can the model results be understood by decision makers?
 - Pre and post-processing capabilities for complex models
 - A clear cause-and-effect relationship for simpler models

Model Selection....

- Previous model applications
 - Has the particular model been applied successfully to address the same or similar questions?
- Recommendations from others
 - Don't reinvent the wheel