

Update to Rates, Constants and Kinetics Formulations for Water Quality Modeling

Tim Wool

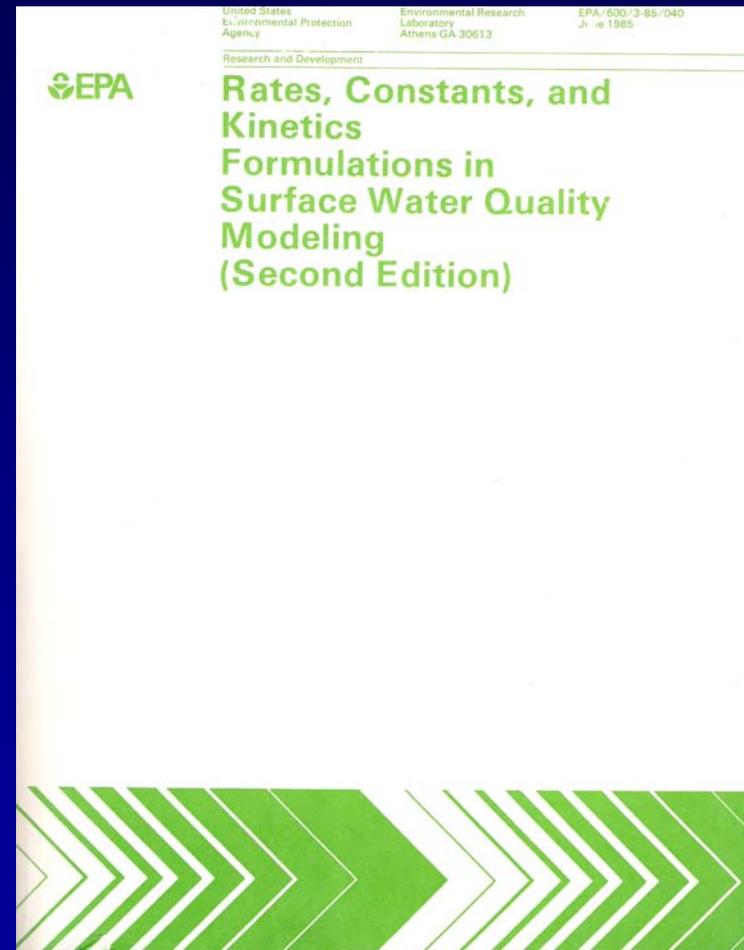
US EPA Region 4

ORD NERL/ERD



Background

- Original Published 1985
- Conventional Pollutants
- Simpler Models
- Change in Discharge Characteristics



Participants

- Dr. James Martin – Mississippi State University
- Dr. Roy Burke, III – Georgia Environmental Protection Division
- Dr. Earl Hayter – US ACE – Vicksburg
- Tim Wool – US EPA Region 4
- Robert Ambrose – US EPA ORD NERL/ERD
- Tom Barnwell – Retired US EPA



Purpose

- Support
 - Aid in Model Selection
 - Model Applications
 - TMDL Development
 - Watershed Protection Plans
 - Waste Load Allocations
 - Nutrient Criterion Implementation
 - General Reference (State of the Art)

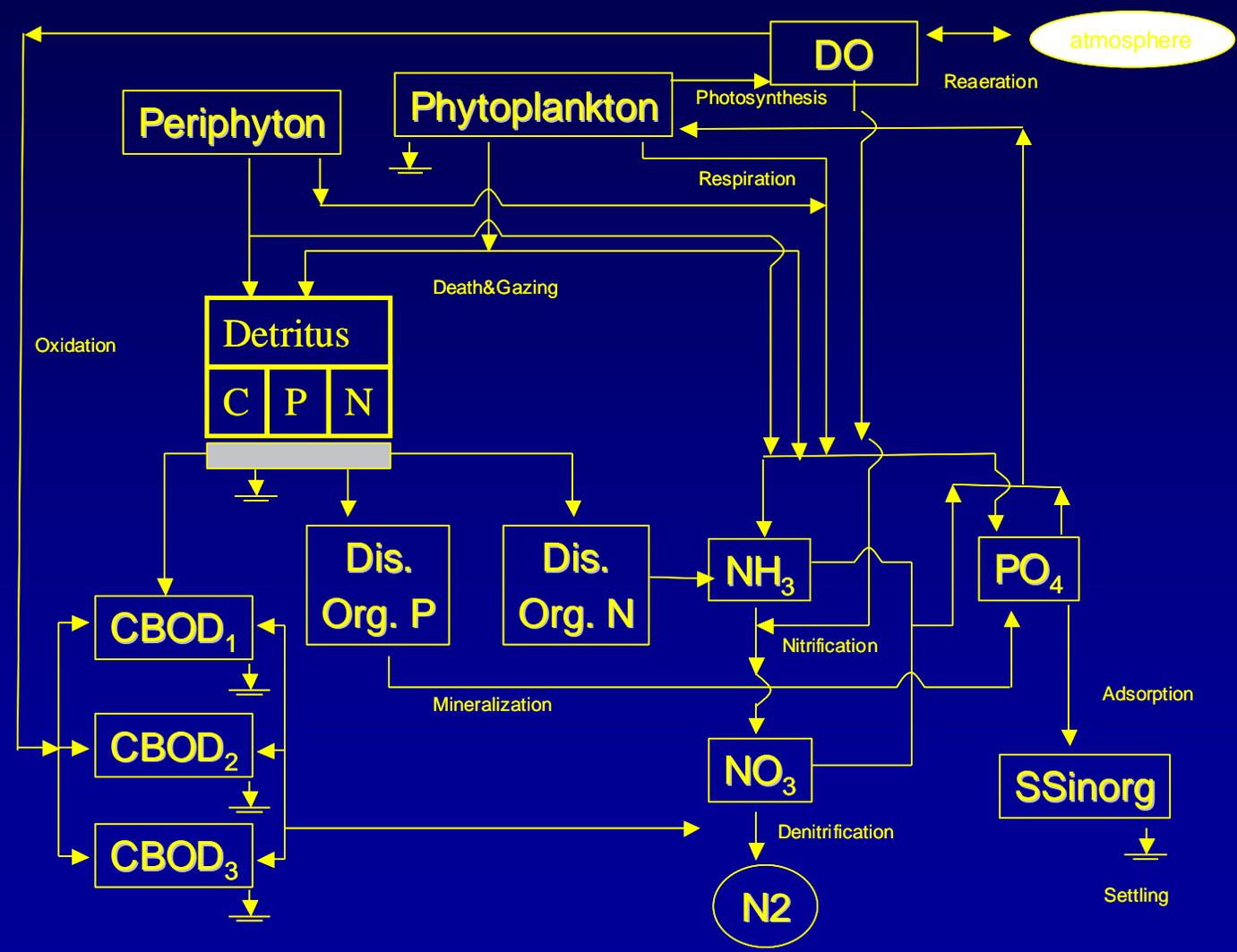


Current Plan

- Interactive Document
- Media Wiki Web
 - Document will Grow
- Expert Controlled
 - Information Reviewed before Release
- Publish Rates for Different Models/Areas
- Discussion Board
- Future Pollutant Types/Kinetics



Example



Example

$$\mu = \mu_{\max}(T_{\text{ref}})f(T)f(L)f(P, N, C, Si)$$

where

μ = algal growth rate, 1/time

μ_{\max} = maximum growth rate at a particular reference temperature (T_{ref})
under optimal conditions of saturated light intensity and excess nutrients, 1/time

$f(T)$ = temperature function for growth temperature (T), °C

$f(L)$ = growth limiting function for light

L = light intensity

$f(P, N, C, Si)$
= growth limiting function for nutrients

P = available inorganic phosphorus concentration, mass/volume

N = available inorganic nitrogen concentration, mass/volume

C = available inorganic carbon concentration, mass/volume

Si = available inorganic silicon concentration, mass/volume



When

- Draft is undergoing initial review
- Translate to Wiki Web Format
- Post on EPA Science Portal
- Identify Initial Reviewers/Outside Contributors
- Open to General Public

