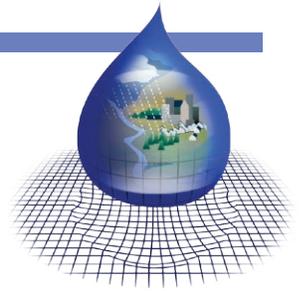
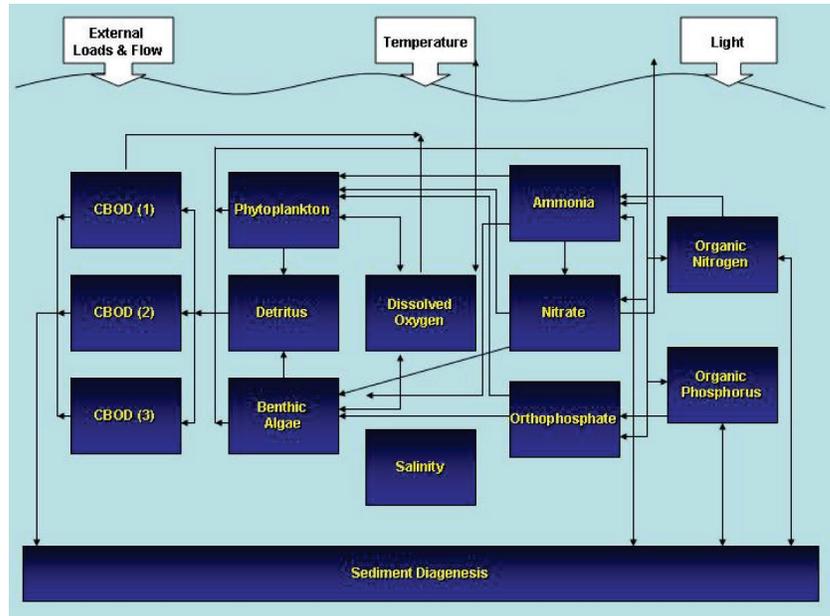


Water Quality Analysis Simulation Program (WASP)



The Water Quality Analysis Simulation Program—(WASP6), an enhancement of the original WASP (Di Toro et al., 1983; Connolly and Winfield, 1984; Ambrose, R.B. et al., 1988). This model helps users interpret and predict water quality responses to natural phenomena and man-made pollution for various pollution management decisions. WASP6 is a dynamic compartment-modeling program for aquatic systems, including both the water column and the underlying benthos. WASP allows the user to investigate 1, 2, and 3 dimensional systems, and a variety of pollutant types. The state variables for the given modules are given in the table below. The time-varying processes of advection, dispersion, point and diffuse mass loading and boundary exchange are represented in the model. WASP also can be linked with hydrodynamic and sediment transport models that can provide flows, depths velocities, temperature, salinity and sediment fluxes.



WASP has been used to examine eutrophication of Tampa Bay, FL; phosphorus loading to Lake Okeechobee, FL; eutrophication of the Neuse River Estuary, NC; eutrophication Coosa

River and Reservoirs, AL; PCB pollution of the Great Lakes, eutrophication of the Potomac Estuary, kepone pollution of the James River Estuary, volatile organic pollution of the Delaware Estuary, and heavy metal pollution of the Deep River, North Carolina, mercury in the Savannah River, GA.

Eutrophication Module	Organic Chemical Module	Mercury Module
Dissolved Oxygen	Chemical 1	Elemental Mercury
CBOD (1)	Chemical 2	Divalent Mercury
CBOD (2)	Chemical 3	Methyl Mercury
CBOD (3)	Solids 1	Sands
Ammonia	Solids 2	Fines
Nitrate	Solids 3	
Organic Nitrogen		
Orthophosphate		
Organic Phosphorus		
Algae		
Benthic Algae		
Detritus		
Sediment Diagenesis		
Salinity		

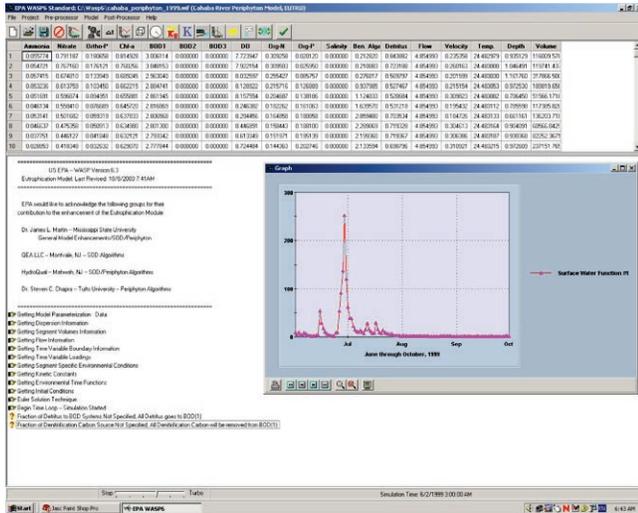
WASP Preprocessor

The data preprocessor allows for the rapid development of input datasets. The ability to bring data into the model is as simple as cut and paste or queried from a database. The preprocessor provides detailed descriptions of all model parameters and kinetic constants. When linking WASP with hydrodynamic models it is as simple as pointing to the hydrodynamic linkage file.

- Import time series from WRDB, Spreadsheet, Text Files
- Automatically import hydrodynamic model interface information
- Multi-session capable
- Run time diagnosis

Post Processor

The Post-Processor (MOVEM) provides an efficient method for reviewing model predictions and comparing them with field data for calibration. MOVEM has the ability to display results from all of the WASP models as well as others. MOVEM allows the modeler to displays the results in two graphical formats:

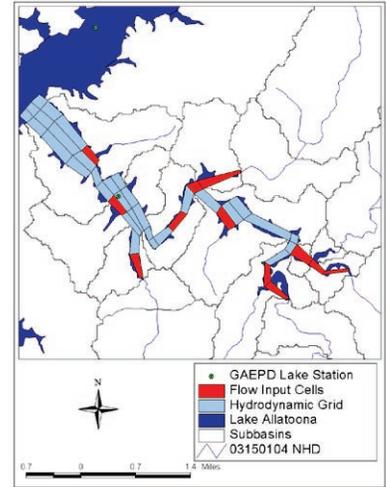


- 1) Spatial Grid—a two dimensional rendition of the model network is displayed in a window where the model network is color shaded based upon the predicted concentration.
- 2) x/y Plots—generates an x/y line plot of predicted and/or observed model results in a window.

There is no limit on the number of x/y plots, spatial grids or even model result files the user can utilize in a session. Separate windows are created for each spatial grid or x/y plot created by the user.

WASP Case Study for Little River Embayment, GA

WASP 6.1 was setup and calibrated for the Little River embayment on Lake Allatoona, Georgia to support the development of a nutrient TMDL for the State of Georgia. WASP was applied for three



consecutive growing seasons during 2000, 2001, and 2002 to simulate phytoplankton growth due to excess nutrients from point and nonpoint sources. The Little River drains 214 square miles of primarily residential and agricultural land into Lake Allatoona, which is located on the Etowah River approximately 30 miles north of Atlanta, Georgia. The LSPC model was developed to simulate the watershed flows and nutrient constituents to input in the EFDC and WASP models. EFDC was used to simulate the hydrodynamics in the embayment and developed a hydrodynamic linkage file for WASP. The calibrated WASP model was used by the State to develop management strategies to ensure water quality standards are achieved.



Visit the
**Watershed & Water Quality Modeling
 Technical Support Center Website**
<http://www.epa.gov/athens/wwqtsc/index.html>