# LINKING WATER QUALITY AND AQUATIC LIFE WITH AQUATOX 3.1

AQUATOX Release 3.1 includes numerous enhancements designed to improve model performance, more closely match data requirements with generally available data, improve data manipulation and analysis, and increase user friendliness.

AQUATOX is an ecosystem simulation model that predicts the environmental fate of various pollutants, such as excess nutrients and organic chemicals, and their effects on aquatic ecosystems, including fish, invertebrates, and aquatic plants. AQUATOX is one of the preeminent tools available for ecosystem analysis and management and has been used all over the country and many parts of the world in a wide variety of ecological risk assessments.

What's New

AQUATOX Release 3.1 contains many enhancements over Release 3.0 that increase the accuracy and utility of the model. The most important enhancements include:

- Better representation of water chemistry in estuaries.
- Ability to model bioaccumulation in anadromous fish.
- More options for modeling bioaccumulation and toxic effects.
- Updated estimates of toxicity from Web-ICE (Interspecies Correlation Estimator).
- More example studies.
- Enhanced sensitivity and uncertainty analysis.
- Expanded data management, graphics, and statistical analysis.
- Now 64-bit OS compatible and can run under Windows 7.
- New *Technical Notes* on data requirements and management, and on managing flow data.
- Complete materials from training workshops added to web site.
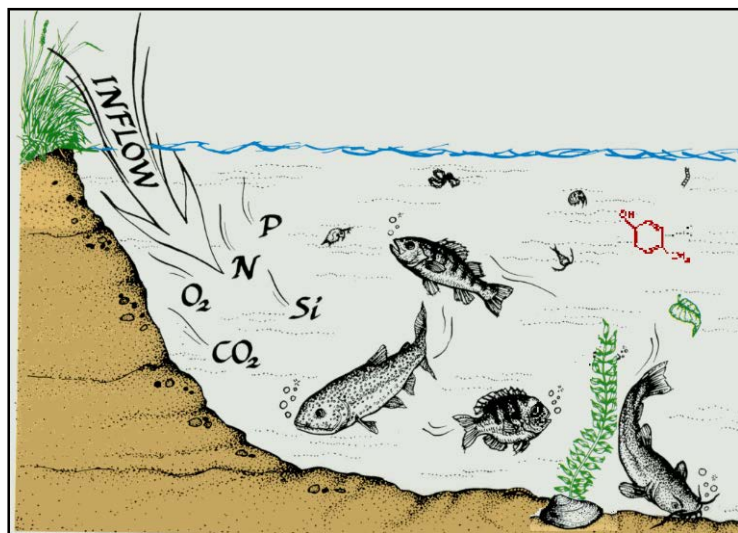
Background

One of the biggest challenges to protecting or restoring our nation's waters is adequately understanding the relationships between the environment and the organisms that live there. Ecosystems are complex, with natural variations over time, and multiple interactions between components. The health of biological communities in many water bodies is impaired, but the causes of the impairment may not be obvious due to numerous environmental stressors. It is difficult to predict how the aquatic community will respond to changes in pollutants or environmental conditions using simple methods of analysis, especially if those methods address only one stressor at a time. A complex simulation model like AQUATOX may be more effective.

Features
- Simulation model for aquatic ecosystems and impacts on aquatic organisms
  - Streams, rivers, lakes, reservoirs, estuaries
  - Effects on algae, plants, invertebrates, and fish
- Predicts responses of aquatic life to multiple stressors
  - Nutrients, organic loadings, sediments, organic chemicals, and temperature
  - Bioaccumulation of organic chemicals
- Flexible and versatile
  - General or site-specific application
  - Can model just the species and scenarios you need to understand
  - Contains sophisticated uncertainty and sensitivity analysis tools
  - Contains many example studies and data libraries
- PC-based, available at no cost on EPA web site
- Open source software
- User friendly interface, with built-in Help files available to lead users through required model input

Applications
AQUATOX can be used to better understand the processes relating the chemical and physical environment to the biological community. You can use AQUATOX to:
- Develop numeric nutrient targets based on desired biological endpoints.
- Evaluate which of several stressors is causing observed biological impairment.
- Predict effects of pesticides and other toxic substances on aquatic life.
- Predict changes in the ecosystem due to climate change.
- Predict effects of land use on aquatic life by linking to the watershed models in BASINS.
- Estimate the time to recovery of contaminated fish tissues to safe levels after reducing pollutant loads.

Additional information
Additional information on AQUATOX, including directions for downloading the model and its associated documentation is available at https://www.epa.gov/ceam/aquatox. You may also contact the AQUATOX team for further questions.

AQUATOX links water quality to biological endpoints