

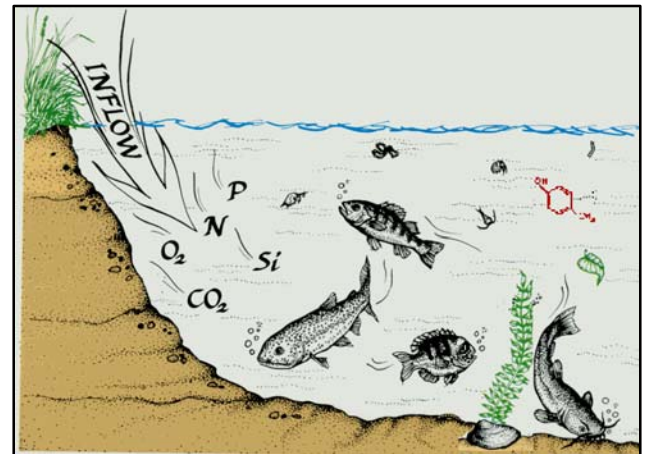


AQUATOX (RELEASE 3): MODELING ENVIRONMENTAL FATE AND ECOLOGICAL EFFECTS IN AQUATIC ECOSYSTEMS

AQUATOX is an ecosystem simulation model that predicts the 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 a valuable tool for ecologists, biologists, water quality modelers, and anyone who performs ecological risk assessments for aquatic ecosystems. EPA has just released an enhanced version of AQUATOX, Release 3, which includes the capability to represent estuaries and to more realistically model nutrients.

Background

One of the biggest challenges to protecting or restoring our nation's waters is to adequately understand the relationships between the chemical and physical environment and the organisms that live there. Ecosystems are complex, with seasonal and annual variations and multiple interactions among species. The biological communities in many water bodies are impaired, but the causes of the impairment may not be obvious in the face of numerous environmental stressors. It is difficult to predict how the aquatic community will respond to changes in pollutants or environmental conditions with simple methods of analysis, especially if the methods address a single stressor at a time. A complex simulation model may be required.



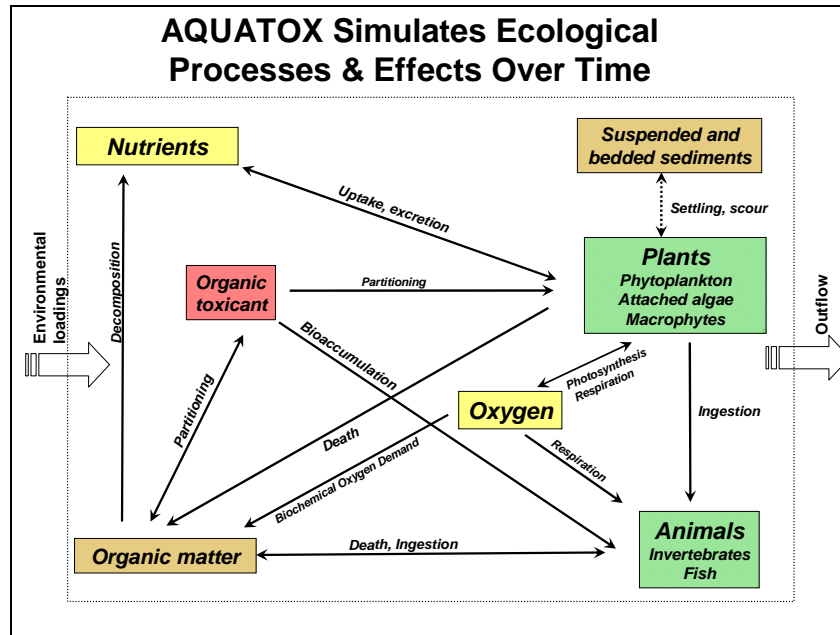
About AQUATOX

AQUATOX is a PC-based ecosystem model that predicts the fate of nutrients, sediments, and organic chemicals in water bodies, as well as their direct and indirect effects on the resident organisms. AQUATOX simulates the transfer of biomass and chemicals from one compartment of the ecosystem to another. It does this by simultaneously computing important chemical and biological processes over time. AQUATOX simulates multiple environmental stressors (including nutrients, organic loadings, sediments, toxic chemicals, and temperature) and their effects on the algal, macrophyte, invertebrate, and fish communities. AQUATOX can help identify and understand the cause and effect relationships between chemical water quality, the physical environment, and aquatic life. It can represent a variety of aquatic ecosystems, including vertically stratified lakes, reservoirs and ponds, rivers and streams, and now estuaries.

AQUATOX Applications

AQUATOX can be used to address a wide variety of issues requiring a better understanding of the processes relating the chemical and physical environment to the biological community. Possible applications of AQUATOX include:

- Developing numeric nutrient targets based on desired biological endpoints.
- Evaluating which of several stressors is causing observed biological impairment.
- Predicting effects of pesticides and other toxic substances on aquatic life.
- Evaluating potential ecosystem responses to climate change.
- Determining effects of land use changes on aquatic life by using the linkage with BASINS.
- Estimating time of recovery of fish communities after reducing pollutant loads.



What's New in Release 3

AQUATOX Release 3 contains many enhancements that increase the realism and utility of the model. The most important enhancements include:

- Capability to represent estuaries at a screening level
- Capability to model multiple linked river and reservoir segments
- Enhanced nutrients analysis, including nutrient release from sediments, daily dissolved oxygen fluctuations, and toxicity from low oxygen and ammonia
- Capability to simulate biological effects of suspended and bedded sediments
- Calculation of biological metrics
- Enhanced sensitivity and uncertainty analyses
- Toxicity data estimation from ICE (Interspecies Correlation Estimation)
- Expanded data management, graphics, and statistical analysis
- The software is now open source, meaning that other modelers can customize AQUATOX for their particular application

Additional information

Additional information on AQUATOX is available at <http://www.epa.gov/waterscience/models/aquatox/>. You may also contact Marjorie Coombs Wellman at 202-566-0407 (phone) or wellman.marjorie@epa.gov.