

Forecasting of Services Provided by Stream Ecosystems: Integrated Modeling

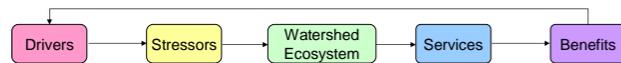
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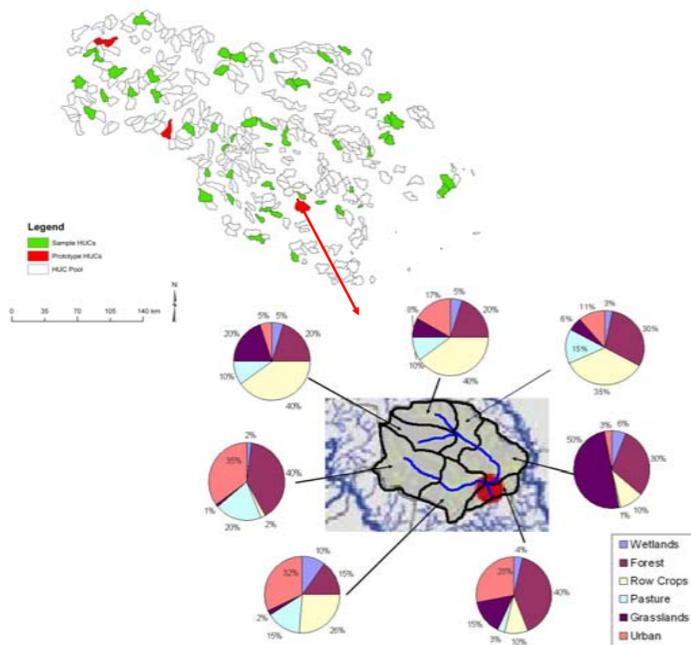
INTRODUCTION

Stream ecosystems provide important services to people, including recreation and food, regulation of ecosystem processes, and aesthetic benefits.

An understanding of the links from ecosystem drivers to stressors to services allows the services to be forecasted under alternative future scenarios, and considered in management and restoration.



SAMPLE HEADWATER WATERSHEDS



STUDY SITE LOCATION



MODELING SYSTEM

To address this issue, we linked process-based models with these technologies, which are reusable by any modeling team.

FRAMES (Framework for Risk Analysis for Multimedia Environmental Systems)

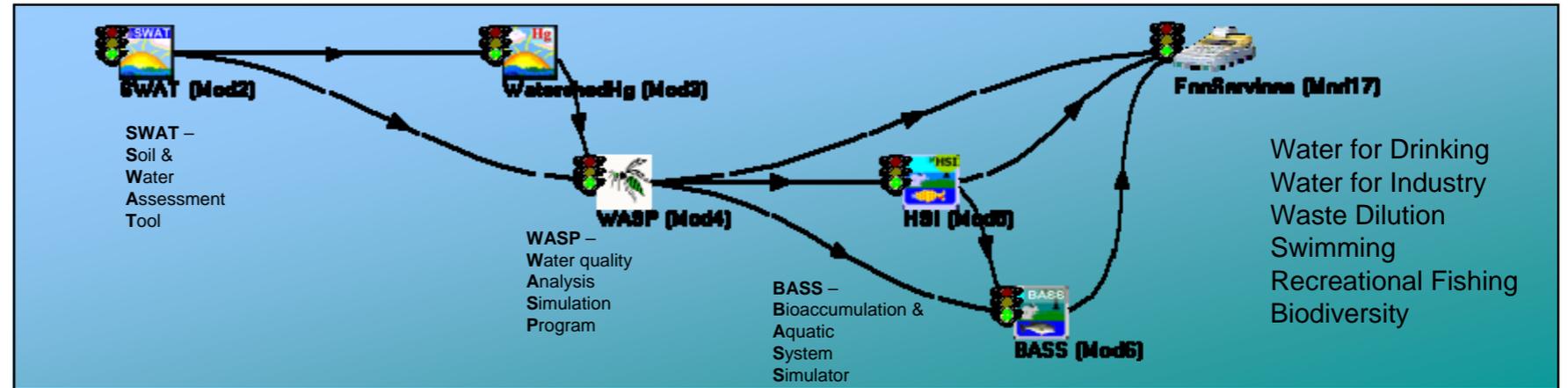
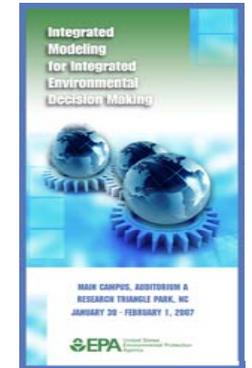
A modeling infrastructure that facilitates the linking and execution of individual models and data with tools that facilitate experimental design, parameter estimation, I/O data capture, and subsequent data analysis, sensitivity analysis, and uncertainty analysis (e.g., dealing with natural variability, measurement error, model structure error, etc).

D4EM (Data for Environmental Modeling)

An automated method to retrieve data from national databases

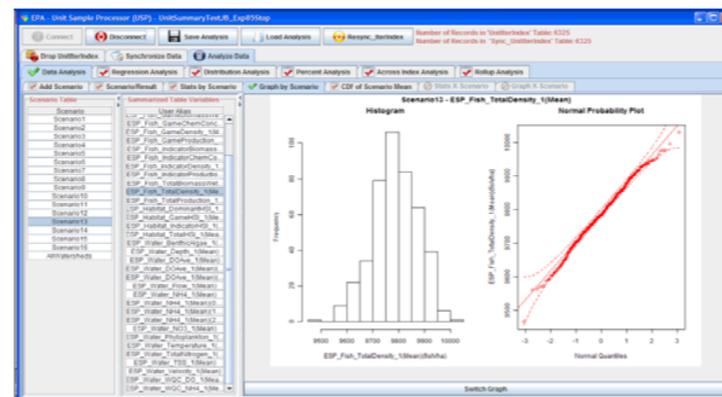
SuperMUSE (Supercomputer for Model Uncertainty and Sensitivity Evaluation)

A software system that facilitates management of and parallel computing across a clustered network of PCs, supporting both Linux and Windows OS.



OUTPUTS

We examine the effects of alternative climate and landuse scenarios on services and service trade-offs. The long term goal is to include valuation and feedback of values to ecosystem drivers, to assess the effect of environmental decisions on the ecosystem.



UNCERTAINTY ANALYSIS

We can statistically analyze results in many ways, and extrapolate to the regional scale with concurrent uncertainty characterization. In our experiences pursuing integrated multimedia model development, specific problems drive technology development, and technology integration tends to lead science integration.

