Development of an Ecosystem Services Tools Database

Introduction to the Problem
Planners and decision makers are challenged to consider not only direct market costs, but also ecological externalities. There is an increasing emphasis on ecosystem services in the context of human well-being; therefore, the valuation and accounting of ecosystem services is becoming an integral component of economic efficiency. (Costanza 2003, Millennium Ecosystem Assessment 2005)

Depending on the type of decision to be made, associated ecosystem services may be quantified by using a variety of approaches that could consider deterministic physical and chemical processes, known empirical relationships, and socioeconomic valuation methods. There are existing lists and directories that emphasize process modeling to evaluate results of water resources decisions, changes in mass and energy budgets, and other direct physical manipulations. These can be found on several governmental and nongovernmental websites.

In the context of decisions that affect ecosystem services in the more general sense, ecological externalities may be quantified using process models, but there may be tools and techniques that consider broader measures. The Ecosystem-Based Management Tools Network has developed a database of tools that consider bundled ecosystem services emphasizing coastal and marine systems. (NatureServe 2008) The database augments the scope of ecosystem services in the broad sense of decision support related to EPA's Ecosystem Services Research Program. (U.S. EPA 2009) There is a need to augment the scope of this and other tools databases to include ecosystem services in a broader sense.

Objectives
The objective is to provide an evolving searchable database of tools, approaches, and techniques that can be applied in analytic-deliberative decision support processes, accounting for improving decisions that may affect ecosystem services.
**Approach**
The Ecosystem Services Tools database will be developed using the MySQL database management system. In fiscal year 2010, a user interface will be developed. It will allow users to build a query to find a list of tools that can help meet their decision-support needs based on a series of questions. These will include questions about the type of decision to be made, the category of tools needed, the temporal and special scales of interest, the amount and type of data available, the user's scientific background, and the type of ecosystem being considered.

**Accomplishments to Date (October 2009)**
The Ecosystem Services Tools database contains approximately 235 records; this number is increasing. The database was originally assembled using MS Access; it has now been migrated to MySQL, a more robust database management system. Work has begun on developing a Java user interface that will allow browsing and searching of tools.

**Near-Future Tasks**
During fiscal year 2010, work will continue on developing the user interface to the database. Tools will be continually added as they are developed.

**References**

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