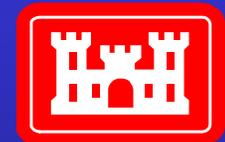


# Upper Mississippi River Navigation and Ecosystem Sustainability Program **Decision Support System**



**US Army Corps of  
Engineers**  
St. Louis District  
Rock Island District  
St. Paul District

## **Science Panel Recommendation (from draft 2005 report):**

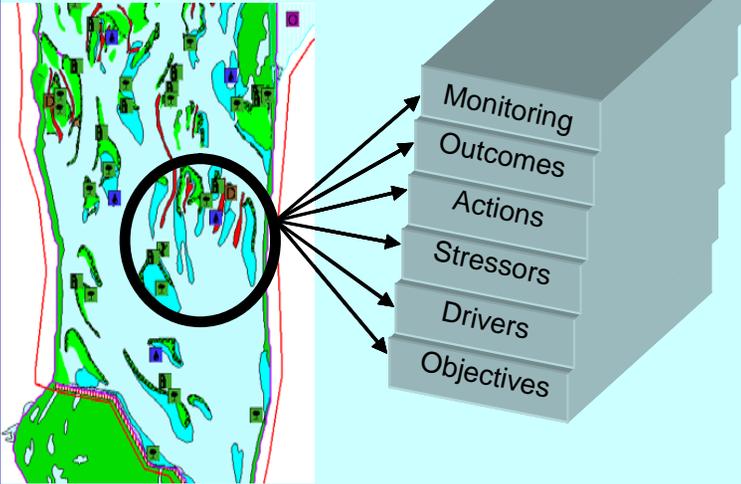
**We recommend that a decision support system (DSS) be developed using the ecosystem objectives matrix and the family of ecosystem models to assist project sequencing, planning, monitoring, evaluation, reporting on NESP progress and on condition of the river ecosystem. The DSS would be a geographic information system (GIS) database to enable visualization and analysis of the spatial arrangement of ecosystem conditions, projects and management measures. The GIS-based DSS would enable spatially explicit application of ecosystem models (or their compiled results) in project planning.**

## **Science Panel Recommendation (from draft 2005 report):**

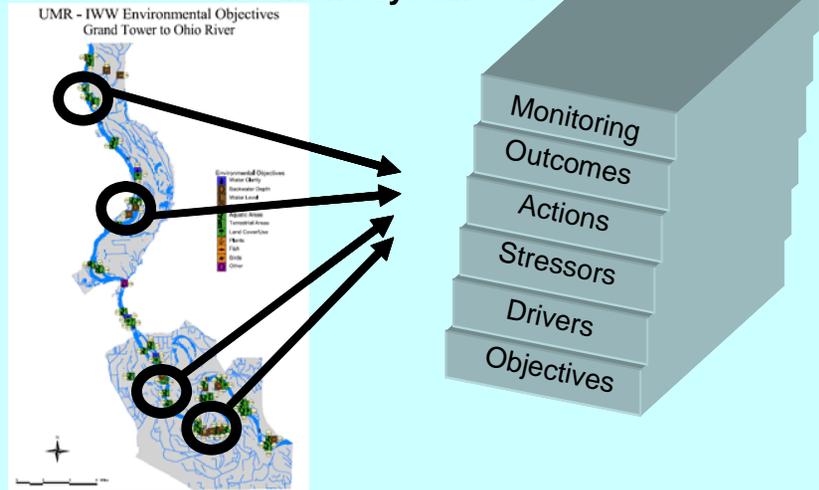
**The DSS would incorporate incremental analysis techniques to identify the best value sequence of management measures to apply within project areas to attain objectives for condition of the ecosystem and to increase ecosystem services.**

**The DSS would be made available to project teams, resource managers, and decision-makers via the Internet. The NESP Internet site would include information about the program, ongoing projects, a synthesis of ecosystem modeling results, instructions for use of the DSS, and the Ecosystem Restoration and Management Plan. The Internet site would be designed to enable tracking implementation of management and restoration measures and system response as revealed by monitoring.**

**Spatial Link From Site  
To Information Management:  
Site Scale**



**Spatial Link From Sites  
To Information Management:  
Reach and System Scale**



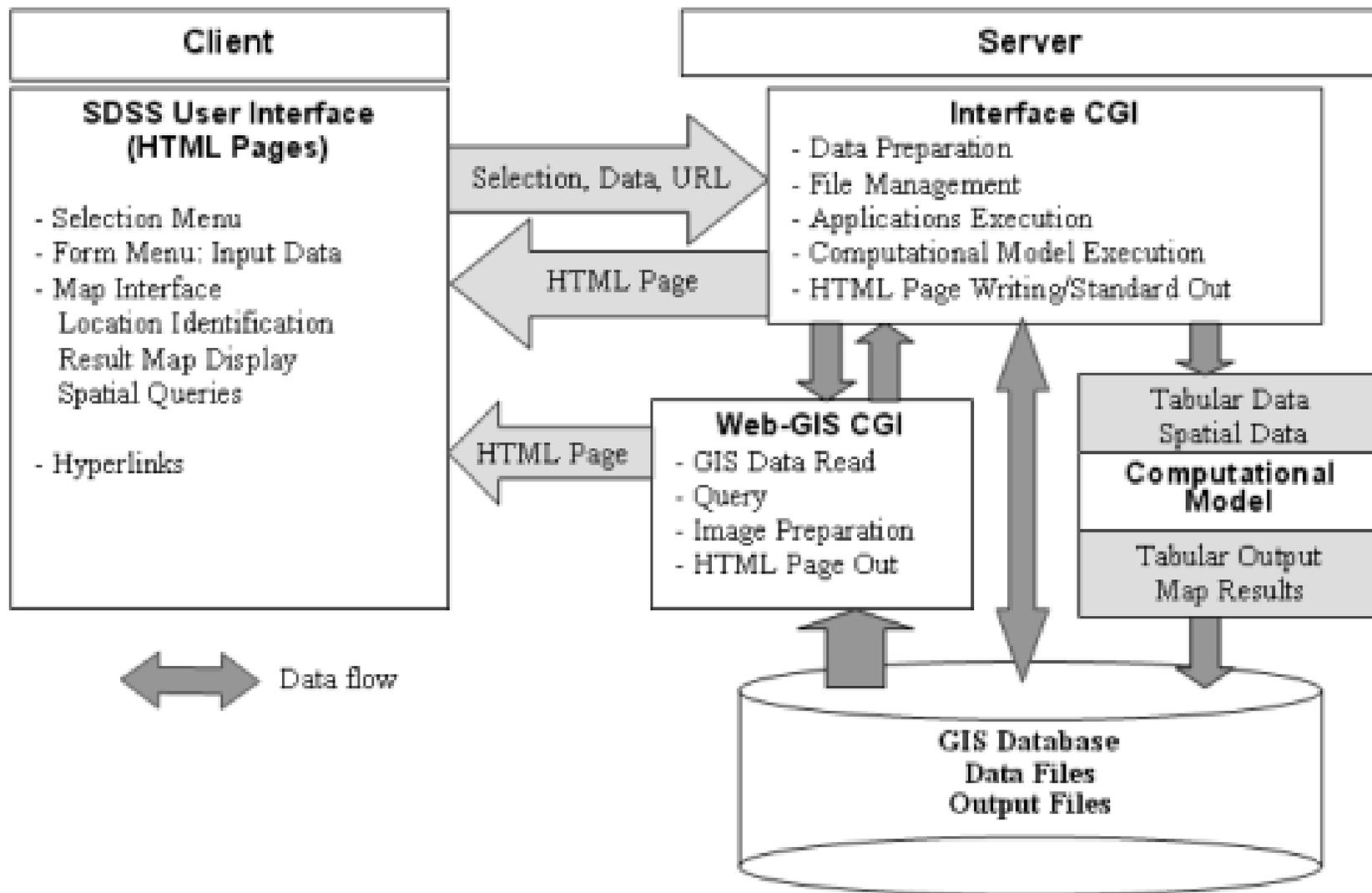


Fig. 1. Schematic diagram for a web-based SDSS framework using common gateway interface.

## Proposed DSS for the NESP

The DSS will consist of a family of process-based hydrologic, hydraulic, and ecological simulation models, GIS, ecological economics valuation models, plan formulation, alternatives analysis, and evaluation models. Because water flow is the central process, this modeling effort will emphasize the hydrology and other material mobilization, transport, and fate processes in the UMRS.

## Proposed DSS for the NESP

The DSS will enable examination of existing conditions, forecasting of future conditions, and simulation of alternatives that would be ecologically sustaining and socially desired.

The DSS will address ecosystem restoration needs at the project area, navigation pool, river reach and system-wide levels of spatial scale.

## Proposed DSS for the NESP

The primary purpose of the DSS will be to assist PDTs in the selection, design, implementation, monitoring, and evaluation of ecosystem management and restoration measures.

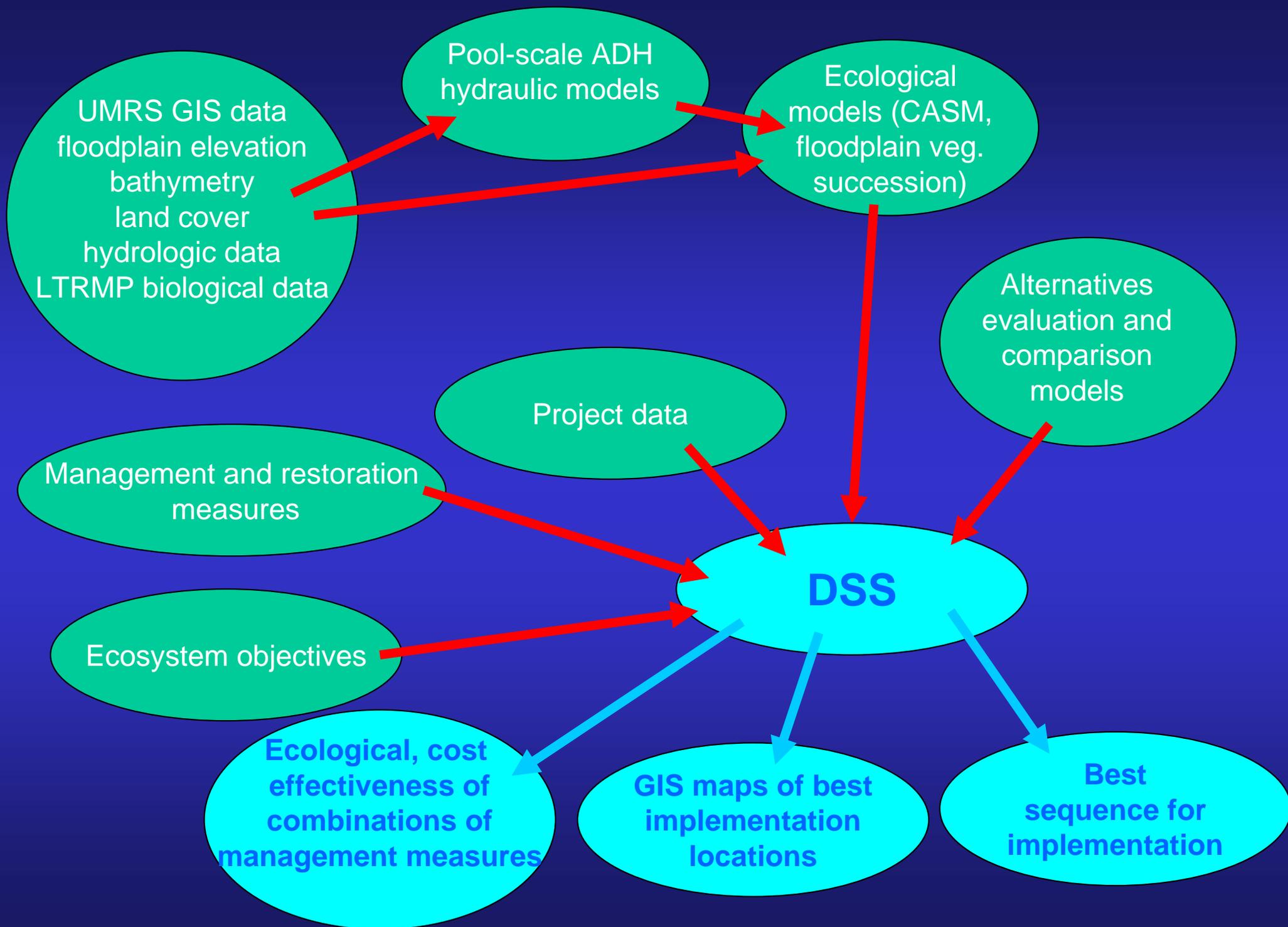
The DSS will assist decision-makers and the public in identifying optimal investments and the long-term requirements to meet ecosystem objectives in the NESP.

## Proposed DSS for the NESP

Another primary use of the DSS will be tracking the NESP projects, through delivery of information about individual projects, objectives, management actions, monitoring activities, geographic distribution of multiple projects, mapping, monitoring results and lessons learned.

# Decision Support System

- **Designed to meet partners needs**
- **Owned and operated by the NESP**
- **Delivers results of model system simulations**
- **Geographically linked**
- **Tracks projects and program**
- **Continually updated**



## **Menu – Select Area, Scale**

- **Entire System**
- **River Reach**
- **Navigation Pool**
- **Project Area**

## **Menu – Select Ecosystem Objectives (one or more)**

**From NESP list of 45 objectives**

- **Water quality**
- **Geomorphology**
- **Habitat**
- **Biota**

## **Menu – Select Management Measures**

**(linked to choice lists)**

- **Hydrologic modifications**
- **Habitat modifications**
- **Water quality management**
- **Vegetation management**
- **Biota management**
- **Navigation management**
- **Recreational use management**
- **Other measures**

## **Menu – Analyze Management Measures**

- **Include all**
- **Include single measure selected**
- **Include combination of measures selected**

## **Menu – Analyze Management Action Combinations**

- **Identify best combination for all objectives**
- **Identify best for single objective selected**
- **Identify best for combination of objectives selected**

**Spatial distribution**

**Level of investment**

**Sequence for implementation**

## **Menu – Outputs**

- **GIS map for management measures implementation**
- **Change in ecosystem services by type**
- **Change in economic benefits by type**

