U.S. Army Corps of Engineers (USACE)
BUILDING STRONG®

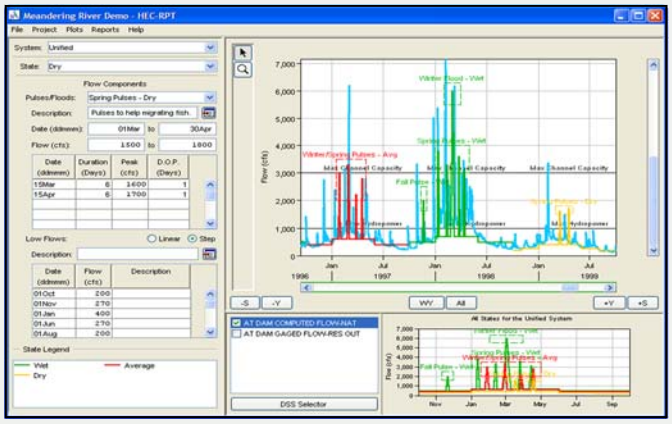
Hydrologic Engineering Center (CEIWR-HEC) Environmental Analysis Software

Ecosystem Restoration & Management

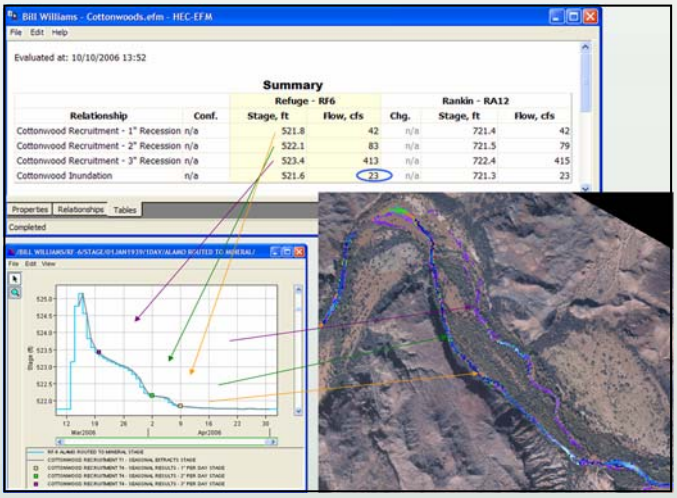
Formulating Alternatives (HEC-RPT)

The Regime Prescription Tool (HEC-RPT) facilitates entry, viewing, and documentation of ecosystem and water management scenarios in real-time, public settings.

HEC-RPT seeks to improve 1) communications in group settings by allowing real-time recording and display of the scenarios as they are developed and 2) the scenarios produced by making hydrologic information more immediately accessible to scientists, engineers, and water managers during the formulation process.



Linking Hydrology, Hydraulics, & Ecosystems (HEC-EFM)



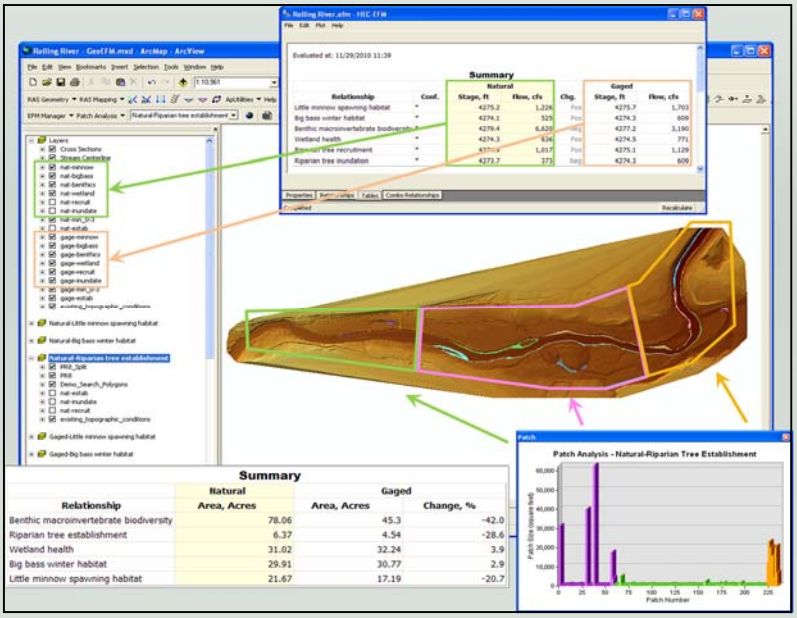
The Ecosystem Functions Model (HEC-EFM) helps planners, scientists, and engineers determine ecosystem responses to changes in the flow regimes of rivers and wetlands. HEC-EFM analyses involve:

- statistical analyses of relationships between hydrology, hydraulics, and ecology,
- hydraulic modeling, and
- GIS programs to display results and other relevant spatial data

Habitat Mapping (HEC-GeoEFM)

Physical Connectivity

HEC-GeoEFM is the spatial component of HEC-EFM. This tool is as an ArcMap® extension and is being developed through a partnership between CEIWR-HEC and the Environmental Systems Research Institute (ESRI). HEC-GeoEFM computes and compares habitat areas for different water management policies, provides GIS calculators for querying spatial data sets, and offers a patch tool for looking at habitat connectivity.



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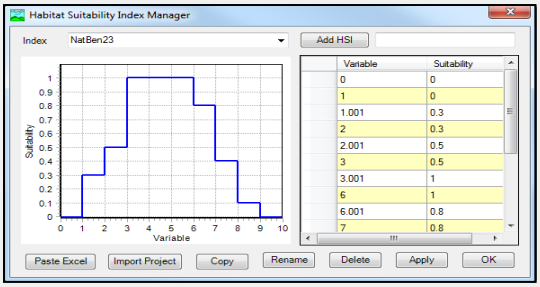
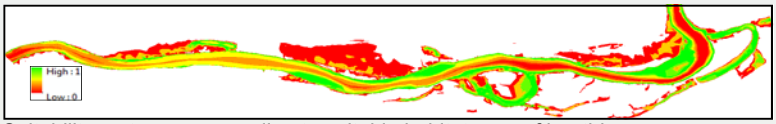
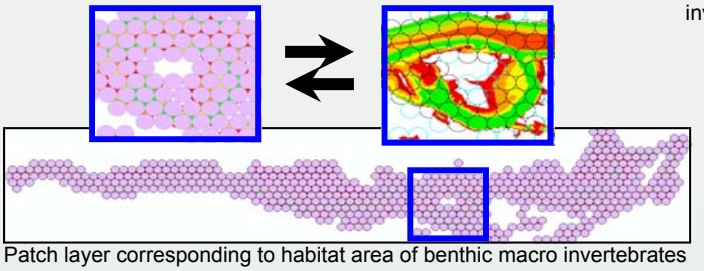
Habitat Suitability & Patch Methods



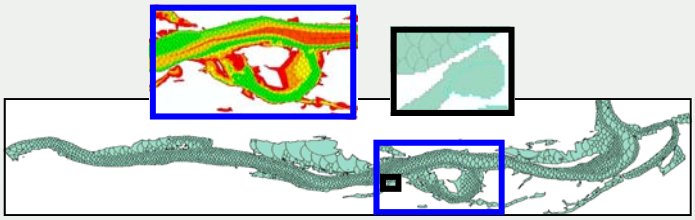
Depth raster corresponding to habitat area of benthic macro invertebrates.



Suitability raster corresponding to suitable habitat area of benthic macro invertebrates.



Patch layer corresponding to habitat area of benthic macro invertebrates using the Buffer method.



Patch layer corresponding to habitat area of benthic macro invertebrates using the Nearest Neighbor method.

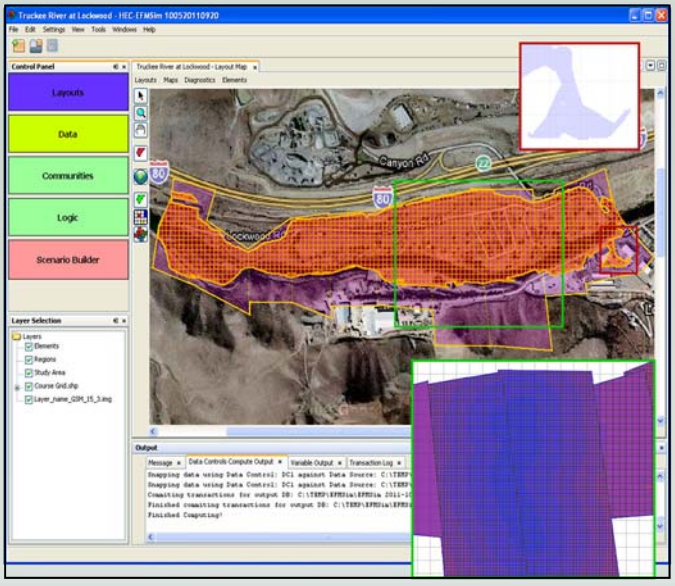
Simulations of Ecosystems (HEC-EFMSim)

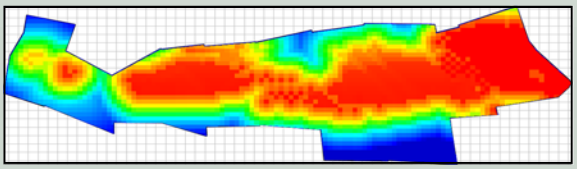
Environments for Natural Communities

HEC-EFMSim is a new software tool that simulates ecosystems spatially and temporally. It enables modelers to use multiple spatial data sets to predict changes in ecological communities as related to land use, water management, water quality, climate, and any other spatial and temporal variable of interest to the user.

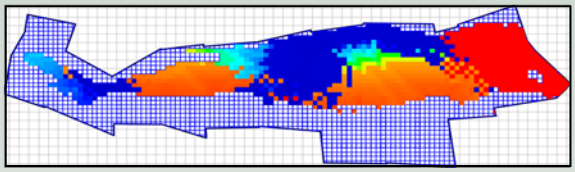
Interactions Between Communities

Ecosystems are simulated in accordance with rules defined by the modeler. Rules can be defined based on conditions within a single spatial element (i.e., recruitment, growth, mortality, stress, boost, and succession) or that involve horizontal influences (i.e., spreading, attraction, and consumption).

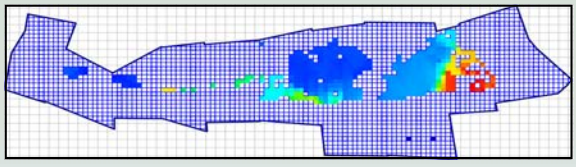




Rabbits-Grass Attraction layer



Grass being consumed by rabbits



Rabbits consuming grass