



# sanborn

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## Sanborn Ecosystem Management DSS

Ecosystem Decision Support Software

Working with leading forestry ecologists, Sanborn has developed and implemented an Ecosystem Decision Support System (EcoDSS) based on the ArcGIS platform that integrates a suite of applications for addressing ecosystem management requirements in support of forestry operations on military installations.

It is common for forest land managers to use "Ecosystem Management" guidelines to develop stand prescriptions, apply growth and yield projections, and plan forestry activities to achieve desired forestry and ecological management objectives. Often, this needs to be accomplished while still growing commercial timber, protecting endangered/threatened species and cultural resources, managing for a wide variety of forest types and wildlife habitat, protecting and enhancing unique ecosystems, and preventing soil erosion.

The problem of how to spatially distribute forest prescriptions and other activities to achieve a wide variety of goals that often compete with each other is being addressed by the use of Sanborn's EcoDSS product.

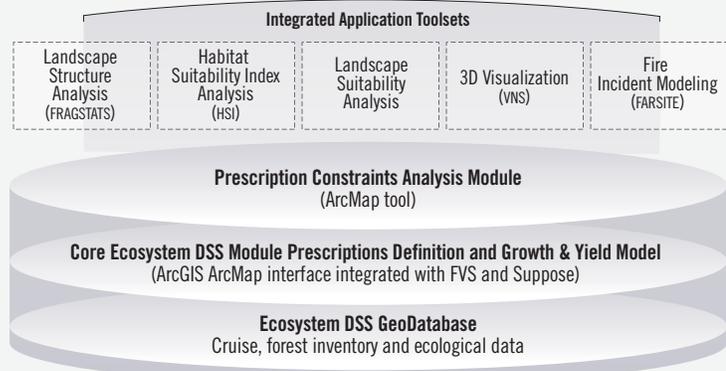
Forest activities are continually being planned by local personnel based on a myriad of data parameters such as, environmental objectives, current and past forest stand data, growth and yield models, wildlife habitat suitability models, insect and disease models, site criteria and location of threatened species and cultural resources, forest health monitoring data, and land form features.

### Tools for Ecosystem Management

The ultimate goal of the EcoDSS is to improve the ecological landscape and promote better forest management, by enhancing communication and clarifying visions between forest managers and environmental personnel. The EcoDSS assists with the challenge of assigning prescriptions to the numerous forest stands while considering environmental protection requirements, and Ecosystem Management principles.

The EcoDSS has been architected to support consideration of management issues such as Old Growth, Streamside Management Zones, Erosion Control, Threatened / Endangered Species, Wildlife Management, Cultural Resources and Wetlands. The EcoDSS was specifically designed to utilize an organization's forest inventory database and custom prescriptions, so the application can easily be customized for other organizations and management situations.

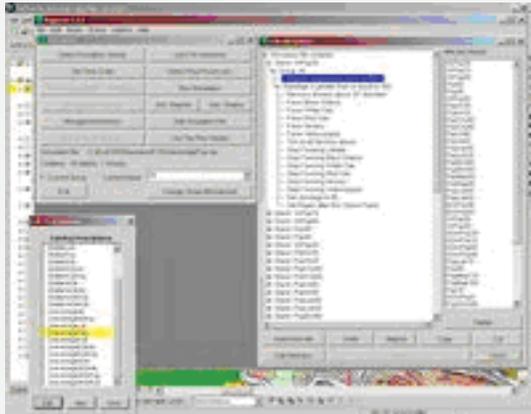
### Sanborn Ecosystem DSS Framework



## Ecosystem Management DSS, continued

### A Modular Framework

Because EcoDSS has a modular architecture, new modules or tools can also be added, or existing functions could be deleted or modified for other installations. The EcoDSS is comprised of a core application supplemented by plug in modules:



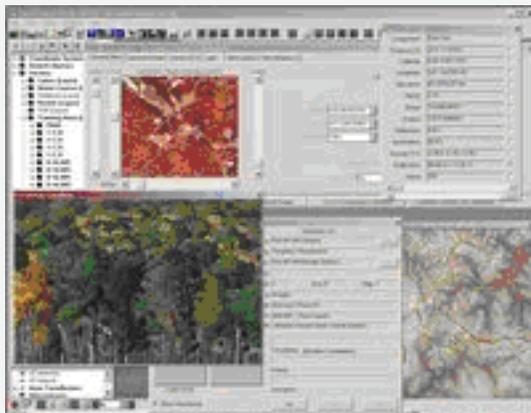
### Core Ecosystem DSS

- Silvicultural treatment definition (FVS Suppose)
- Forest growth and yield model (USFS Forest Vegetation Simulator)
- Prescription constraint and areas of concern analysis
- Landscape structure analysis (FRAGSTATS)
- Wildlife habitat suitability indices (HSI) analysis
- Primary query, reporting and mapping tools for temporal simulations



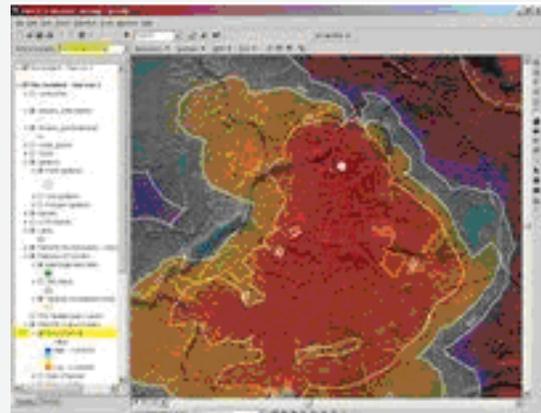
### Military Training Area Suitability Analysis

- Suitability models for Tactical Concealment Areas using temporal projections of landscape conditions
- Hot links for training area photos
- Hot links for TCA ratings
- Model parameters allow user to undertake sensitivity analysis for determining suitability



### 3-D Visualization

- Advanced landscape level tools using EcoDSS results stored in an ArcGIS GeoDatabase to visualize future landscape conditions
- Visualize current or future conditions using FVS Growth and Yield projections
- Includes foliage library that incorporates different 3-D age class symbols
- Generates 3-D still scenes or flyby animations
- Operates as a custom Visual Nature Studio (3D Nature, Arvada, CO) application



### Fire Growth Modeling and Impact Analysis

- Seamless integration with FARSITE v4 as the core fire behavior model
- Supports full suite of FARSITE v4 capabilities
- Input and output data is seamlessly converted between ArcGIS GeoDatabase and FARSITE v4
- ArcGIS tools to track fire scenarios modeled using FARSITE v4
- Analysis using fire perimeters output to identify impacts of fires

### Seamless FVS Integration

A core component of the EcoDSS is the integration of the Forest Vegetation Simulator (FVS) software (developed by the USDA Forest Service) with the inventory system of the specific installation. This includes deriving tree lists for the inventoried stands within the management area, developing the custom FVS key files and calculations, defining the specific prescriptions for different land types, and integrating the operational FVS Suppose interface into the core EcoDSS ArcMap interface.

There are 21 existing geographic variants of FVS for use around the country, and other specific local growth models could be incorporated if available. The ability to project forest structure into the future is crucial because it allows resource managers to assess the future impact of current decisions on wildlife, cultural resources, training areas, and timber production. Output FVS projections are seamlessly transferred into the ArcGIS Geodatabase structure to facilitate querying, reporting and mapping.

Constraint analysis tools aid the user in identifying where conflicts occur between current features and planned stand prescriptions. Depending on the type of conflict that exists, the user can modify the prescription for a specific stand to reduce the conflict.

### Prescription Constraint Analysis

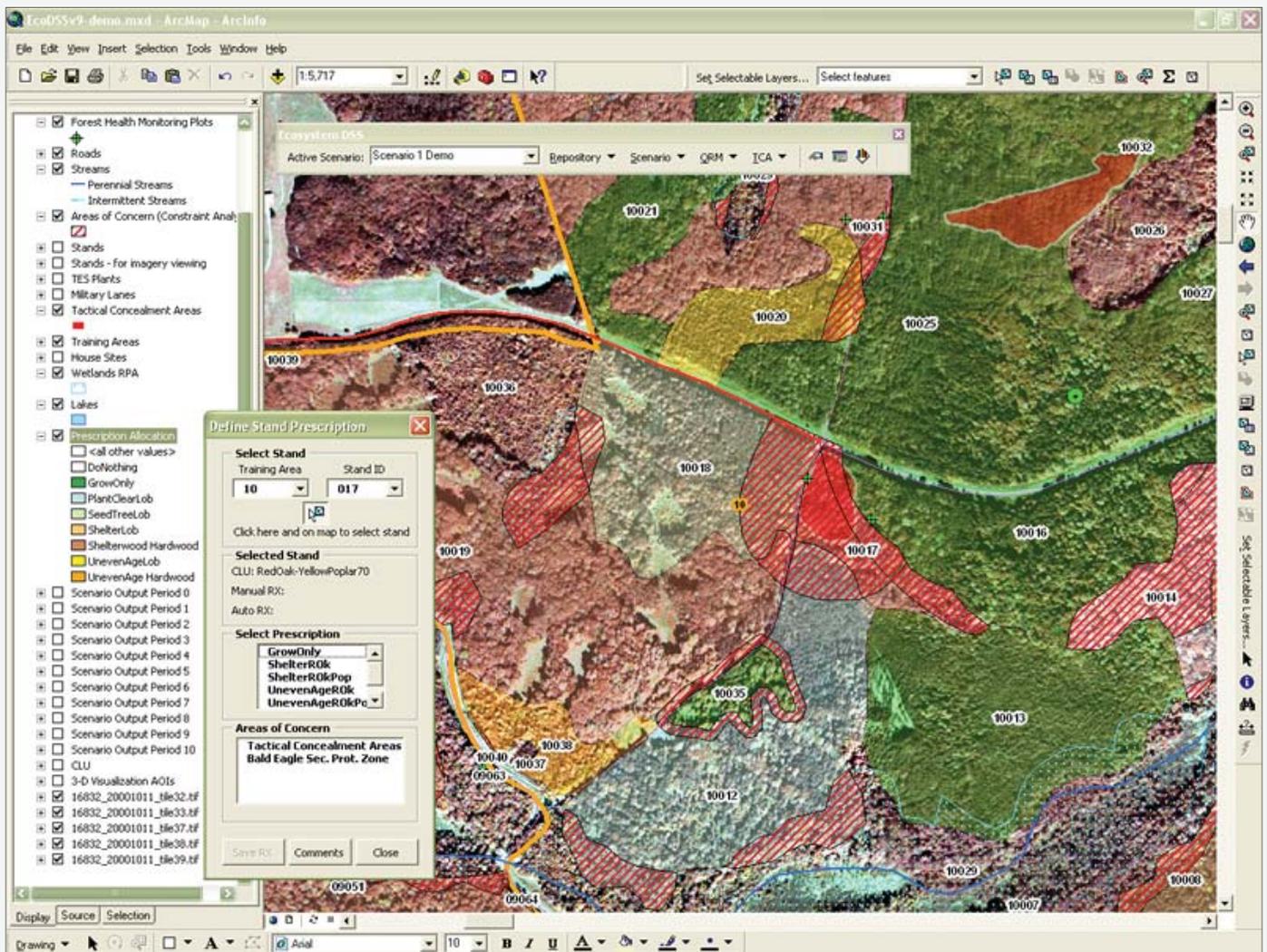
Because forest activities often conflict, a usable system must be able to identify potential problems before they happen, and have the flexibility to make adjustments. The iterative scenario modeling design used by EcoDSS allows users to perform a constraint analysis, and then adjust their plans to accommodate values at risk (see screenshot below).

A combination of automatic and spatial allocation tools aid the user to selecting appropriate stand prescriptions while minimizing the conflict between land uses and ecosystem values.

### Leveraging the ArcMap Framework

Each module includes utilities for displaying, querying, and printing maps for a number of GIS data layers, as well as creating reports on that data, all integrated into the ArcMap framework. Access to specific modules and capabilities, is provided through the use of custom toolbars available within the ArcMap interface.

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#### How To Order

To order Sanborn products or services, contact Sanborn customer service at 1.866.SANBORN or e-mail [information@sanborn.com](mailto:information@sanborn.com). Shipping and handling fees apply.

#### About Sanborn

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