Using Web-Based Technology to Deliver Scientific Knowledge:

The Southern Forest Encyclopedia Network

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Southern Forests…

- provide more timber than any single country
- are owned by 5 million individuals of diverse backgrounds and objectives
- are the subject of a vibrant research community

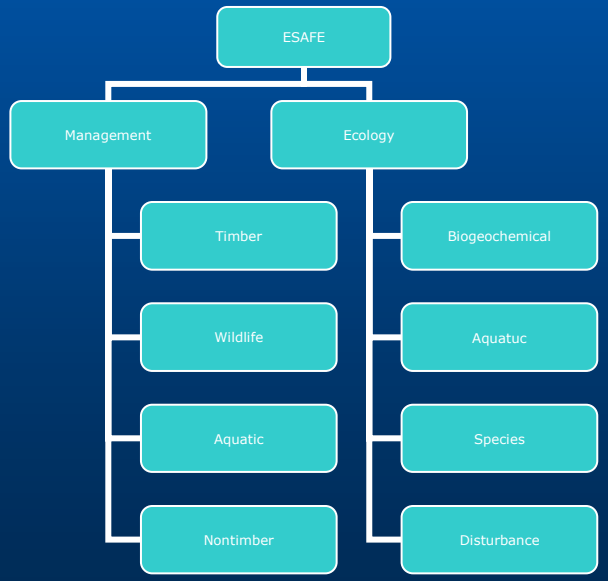
The Objective

Develop a system which delivers:

- concise, authoritative syntheses of knowledge,
- organized to meet user needs and…
- changing to reflect the growing scientific literature on which it is based

Forest Encyclopedias

- Using the Internet to produce and distribute…
- Focused summaries of knowledge,
- Organized in a hierarchical information architecture
- With quality ensured by:
  - Author attribution
  - Full citations
  - Peer review



Why “Network”?

A collection of hypertext encyclopedias:

…Southern Appalachian Forest Ecosystems
…Southern Fire Science
…Southern Forest Science
…Southern Bioenergy
…(with more planned)

All sharing a common infrastructure

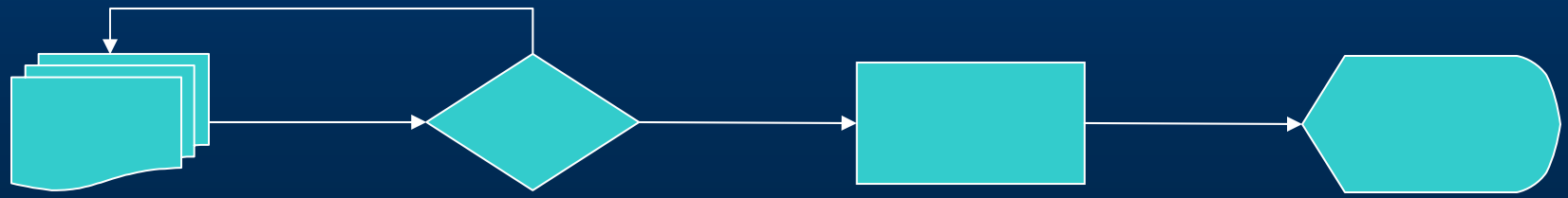
Progress

- Started in 2000
- Some one hundred contributing authors and a dozen+ editors
- Now offering:
  - 1,700 pages of text
  - One thousand images
  - Over 7,000 citations

Content Management System

- simplifies web authoring and citation management
- standardizes page design and display
- enforces role-based security
- manages the flow of work

authoring ➡ review ➡ editing ➡ publication



Forest Encyclopedia Network

Welcome to the Forest Encyclopedia Network. This site contains a wealth of information about understanding the ecology and management of Southern forest ecosystems and their enjoyment and use by people. The knowledge found in this site has been prepared by numerous scientists working at government, university, and private research institutions throughout the South. We have synthesized literature from thousands of sources to provide natural resource managers, land owners, researchers, students and the interested public easy access to scientific knowledge about our Southern Forest Ecosystems.

The Forest Encyclopedia Network (FEN) currently contains 4 encyclopedias: the Encyclopedia of Southern Appalachian Forest Ecosystems, the Encyclopedia of Southern Forest Science, the Encyclopedia of Southern Bioenergy, and Encyclopedia of South-wide Forest Science. Each encyclopedia is in a different stage of development. The Home Page of each encyclopedia contains information about the publication status for that encyclopedia.

New Users

If this is **your first visit** to the encyclopedia and you wish to get some introductory understanding both about the content you will see and about the navigation sytem you will use to find your way around then just click here.

Encyclopedias

- Encyclopedia of Southern Appalachian Forest Ecosystems
- Encyclopedia of Southern Bioenergy
- Encyclopedia of Southern Forest Science
- Encyclopedia of Southern Fire Science

Encyclope[dia of Southern Appa]chian Forest Ecosystems

The ESAFE c[ontent is currently] published as of November 2004. This core content is undergoing the peer review process and [will be updated on a] continual basis as new contributions are reviewed and published. User feedback is encouraged [by clicking the Feedback a]bove and selecting the Feedback option.

This hypertext encyclopedia contains a wealth of information on the ecology and management of southern Appalachian forest ecosystems. We have synthesized literature from thousands of sources to provide resource managers, land-owners, researchers, students, and the public at large easy access to scientific knowledge about the forests of the southern Appalachians.

All the scientific knowledge in this encyclopedia has been organized as follows:

- **Landscape**: contains a biological, geological, climatological, hydrological, and soils description of the southern Appalachian landscape
- **Resource Management**: management of the many resources provided by the southern Appalachian region
- **Ecology**: ecological foundations to understand the management of resources
- **Forest Health**: insect, disease, nonnative invasive species, and air quality threats to forests of the region
- **Social Science**:economics, recreation, native American history, etc.

In addition, the Tools section (see drop down menu above) contains administrative and user help information to help you understand what this site is all about and how to use it better. For example, you might like to visit the user help page that discusses what knowledge can be found in this encyclopedia and what cannot.

Timber

Timber management has strongly shaped the landscape of the southern Appalachians. Practically all of the region's forests have been harvested at least once since the mid-1800s, and an industry based on sustained timber growth and production in second-growth forests thrives there today. Several forest types are managed for timber in the southern Appalachians, including mixed oak and cove forest (71% by area), mixed pine-oak forests (12% by area), pine forests (12% by area), bottomland hardwood forests (2% by area) and high elevation forests (3% per area) (Conner and Hartsell, 2002).

The focus of this encyclopedia is currently primarily on the management of the two most common hardwood forest types in the southern Appalachians: **mixed oak** and **yellow-poplar** dominated cove forests. The management of the other forest types will be covered at some point in the future.

For a brief overview of the timber resource and options for its management, see **Managing the timber resource.** The following sections of the encyclopedia discuss in more detail various aspects of timber management in the southern Appalachians:

- **The timber industry** describes the economic importance of the timber industry in the southern Appalachians, including the extent of timberland, ownership of this land, and factors influencing timber supply and demand.
- **Silvics of major species** provides summaries of the silvical characteristics of important Appalachian hardwood and conifer species from the Silvics of North America (USDA Forest Service 1990).
- **Silviculture of oak stands** describes techniques for establishing regeneration and managing established stands of oak.
- **Silviculture of yellow poplar stands** describes techniques for establishing regeneration and managing established stands of yellow-poplar.
- **Silviculture of low quality hardwood stands** defines low-quality stands and explains the special management considerations they require.
- **Timber harvesting and roads** discusses techniques for harvesting timber and road construction.

Author: D.K. Kennard
Encyclopedia Id (EID): 57. Last modified 02/10/2005.

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Timber
- The Timber Industry
- Managing the Timber Resource: An Overview
- Silvics of Major Species
- **Silviculture of Oak Stands**
  - Importance of Oaks
  - Oak Regeneration Problems
  - Oak Silvics/Ecology
  - Establishing Oak Regeneration
  - Managing Established Oak Stands
- Silviculture of Yellow-Poplar Stands
- The Silviculture of Low-Quality Hardwood Stands
- Timber Harvesting and Roads

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Silviculture of Oak Stands

Oak (*Quercus*) forests cover an extensive area in the Central and Eastern States and constitute one of the most ***important*** tree species in the United States. In the southern Appalachians, oaks are economically valuable for wood products as well as for numerous wildlife, recreation, and aesthetic uses and values. Comprehending the options, opportunities, and limitations in managing oak forests requires, among other things, an understanding of oak regeneration problems, oak sivics/ecology, and management options for new and mature oak stands.

Author: D.K. Kennard
Encyclopedia Id (EID): 61. Last modified 11/22/2004.

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Establishing Oak Regeneration

Oak can be regenerated by several silvicultural methods and managed either as even-aged or uneven-aged stands. Oak seedlings and sprouts cannot grow into the overstory as long as they are heavily shaded (Johnson, 1993). Therefore, clearcutting, shelterwood, group selection, or other methods that substantially reduce overstory density are usually used to regenerate oak stands (Hannah 1987, Sander and Clark 1971). However, treatments to stimulate oak height growth often trigger an overwhelming response by competing vegetation or can expose the seedlings to frost or freezing problems. There is a fine line between just enough light only to stimulate oak seedling growth and too much light, thus stimulating shade-intolerant reproduction. In the following sections, concepts and techniques for establishing oak regeneration are reviewed.

- ***Oak regeneration potential:*** The key to replacing current oak stands with new oak stands is having well-established oak advance reproduction in place when the final harvest is made. Therefore, the first step in planning for oak regeneration is to evaluate the oak regeneration potential, or, the *potential of the oak advance reproduction plus stump sprouts to replace the current stand.* The oak regeneration potential can be **poor** (seedlings or saplings not present), **marginal** (seedlings present but not tall enough), or **adequate** (saplings present and at least 4.5 ft. tall). In reality, the situation where numerous oak understory stems are greater than 4.5 ft. rarely occurs (C. Smith, 1993).
- ***Management implications of acorn production:*** Seed production for oaks, particularly red and white oak, is very sporadic and unpredictable. To be successful in establishing oak seedlings, good-to-bumper acorn crops are necessary to assure there are enough to feed wildlife and still have acorns to germinate new seedlings. However, planning forest management practices around production of acorns has too much uncertainty in the Appalachians to be effective. Maintaining the good acorn producers in the stand in a dominant position is currently the only practical management means to enhance acorn production. (C. Smith, 1993)
- ***Natural regeneration methods:*** Oak can be regenerated by several silvicultural methods and managed either as even-aged or uneven-aged stands. Among the various natural regeneration methods researched, the **shelterwood method** is probably the most promising method for regenerating oaks in the southern Appalachians. **Group selection** methods are also potentially suitable for regenerating northern red oak. Although **clearcutting** has

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Large Woody Debris	Patricia A. Flebbe	11/22/2004 05:08 PM	
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Stream Habitat Management	Mark Scott	11/22/2004 05:05 PM	
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Ecology of Running Waters

Running waters, **streams and rivers**, are an important feature on the landscape of the southern Appalachians. They also play an important role in the hydrologic cycle of the earth. Streams are organized on the landscape in drainages.

Key aspects of stream and river ecology are:

- **Physical and chemical environment**
- **Stream biota**
- **Ecosystem processes**

Streams and rivers are strongly influenced by the landscapes that they drain, and exhibit considerable variation from headwaters to larger rivers. The River Continuum Concept (Vannote et al. 1980) is a useful framework for understanding changes in **aquatic ecosystem processes**, such as organic matter inputs, that correspond to changes in geophysical characteristics occurring longitudinally along stream courses. In turn, **biological communities** dependent on aquatic environments show similar longitudinal variation.

Authors: Mark Scott and Patricia A. Flebbe
Encyclopedia Id (EID): 3499. Last modified 11/22/2004.

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Forest Encyclopedia Network Citation

Vannote, R.L., G.W. Minshall, K.W. Cummins, J.R. Sedell, and C.E. Cushing. 1980. The river continuum concept. Canadian J. Fisheries & Aquatic Sciences. 37: 130-137.

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Biological Communities of Rivers and Streams
Stream Ecosystem Processes
Ecology of Reservoirs and Lakes

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- Planning Tools for Managing Landscape Aesthetics
- Using Fire to Manage Aesthetics
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- The Meaning of Aesthetics

The Aesthetics of Fire

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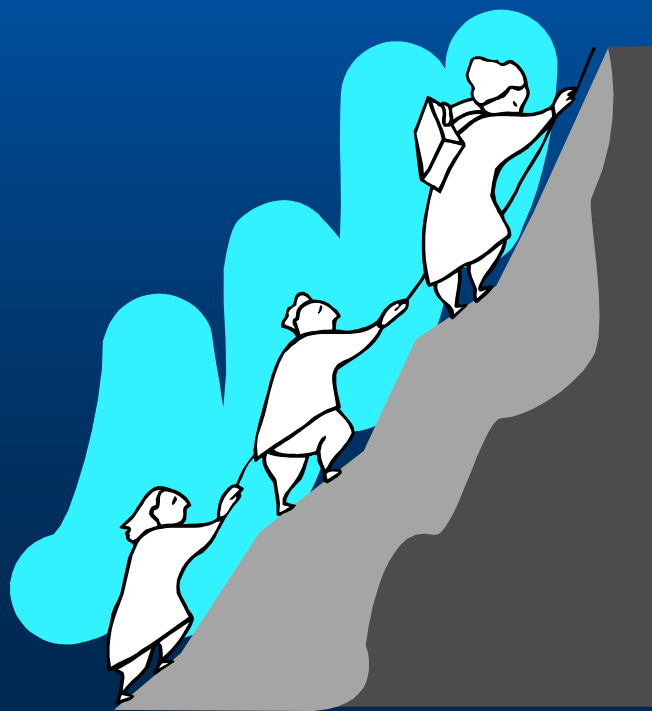
Challenges

- Motivating authors and editors
- Adapting writing style
- Keeping content current
- Marketing the site



Credits

Authors:

- Mike Rauscher
- Deb Kennard
- Pat Flebbe
- Bryan Jordin
- Bill Hubbard
- Cissy Fowler
- Denny Ward

Organizations:

- Southern Research Station
- Cooperative Forestry Program
- Southern Regional Extension Forestry
- Southern forestry universities

Additional Funding:

- National Research Initiative
- Bioenergy program
- National Fire Plan
- Joint Fire Science Program

Questions

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