

**Public Summary of the  
Forest Management Certification  
Evaluation on the Forest Concession Area of  
Yale-Myers School Forest**

**Conducted under auspices of the SCS Forest Conservation Program**

**CERTIFICATION REGISTRATION NUMBER  
SCS-FM/COC-00043N**

**Submitted to**

**Yale School of Forestry and Environmental Studies  
360 Prospect Street  
New Haven, Connecticut 06511  
USA**

**Date of Audit**

**29-31 October 2001**

Update: October 2003 (See Section 4.1)

Update: December 2004 (See Section 4.2)

**Update: November 2005 (See Section 4.3)**

**By**

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## **Preface**

Michael Ferrucci and Michael Thompson conducted the field portion of this evaluation of the management of the Yale-Myers School Forest for Scientific Certification Systems. Both authors would like to thank the faculty, students, and staff of the Yale School of Forestry and Environmental Studies for their efforts during the evaluation. The materials prepared in response to requests for information were very helpful and greatly aided our efforts. In addition, we found that all participants were open to the process and provided thoughtful and candid responses to our questions. Finally, the hospitality exhibited during our stay at the Yale-Myers Forest was warmly received and we would both like to thank the faculty, students, and staff for making us feel welcome.

## **Dedication**

This report is dedicated to the efforts of Dr. David M. Smith and his colleagues and students, who over the years provided the careful stewardship needed to produce the well-managed forest that we see today. Both authors would also like to express their appreciation for the time that Dr. Smith took to review the history of the Yale-Myers Forest with us. The perspective that this provided was invaluable to our efforts and greatly appreciated.

## **Organization of the Report**

This report of the results of our evaluation is divided into two sections. Section A provides public summary and background information that is required by the Forest Stewardship Council. This section is made available to the general public and is intended to provide an overview of the evaluation process, the management programs and policies applied to the forest, and the results of the evaluation. Section B contains more detailed information for the use of the Yale School of Forestry and Environmental Studies.

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## **SECTION A. PUBLIC SUMMARY & BACKGROUND INFORMATION**

### **1.0 GENERAL INFORMATION**

#### **1.1 FSC DATA REQUEST**

Name and contact information for the certified operation:

- Certified Forest: Yale-Myers School Forest, Yale University
- Contact Person: P. Mark S. Ashton, Ph.D., Professor of Silviculture and Forest Ecology, Director of School Forests
- Address: Yale School of Forestry and Environmental Studies, Marsh Hall, 360 Prospect Street, New Haven, Connecticut 06511, USA
- Telephone: 203.432.9835
- Fax: 203.432.3809
- E-mail: mark.ashton@yale.edu
- Products: Predominantly hardwoods, including red oak, white oak, black oak, and sugar maple, with lesser amounts of white pine, red pine, hemlock, and other species.
- Number of Acres (hectares) certified: 7,840 acres (3,173 ha)
- Biome: Nearctic, Temperate Broadleaf and Mixed Forest – Northeastern Coastal Forest (NA0411) as described by the World Wildlife Fund<sup>1</sup>
- Nearest Town: Eastford, CT
- Tenure: Private University
- Forest Composition: Primarily mixed hardwoods on glacial till soils with a large component of hemlock, several scattered white pine stands (mainly of old-field origin), and occasional red pine stands planted in the 1940s after field abandonment.
- Managed as: Natural Forest

#### **1.2 GENERAL BACKGROUND**

Scientific Certification Systems (SCS), a certification body accredited by the Forest Stewardship Council (FSC), was retained by Yale University to conduct a certification evaluation of its Yale-Myers School Forest. Under the FSC/SCS certification system, forest management operations meeting international standards of forest stewardship can be certified as “well managed”, thereby enabling use of the FSC endorsement and logo in the marketplace.

In October 2001, an interdisciplinary team of natural resource specialists was empanelled by SCS to conduct the evaluation. The team collected and analyzed written materials, conducted interviews and completed a 3-day field audit of the subject property as part of the certification evaluation. Upon completion of the fact-finding phase of the evaluation, the

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<sup>1</sup> Davis, M., W. Eichbaum, and J. Adams (see [www.worldwildlife.org](http://www.worldwildlife.org))

team assigned performance scores to 18 different evaluation criteria, which were cross-referenced to score the 10 FSC Principles and Criteria, in order to determine whether award of certification was warranted.

This report is issued in support of a recommendation to award FSC-endorsed certification to Yale University’s School of Forestry and Environmental Studies for its management of the Yale-Myers School Forest. In the event that certification is ultimately awarded, SCS will post this public summary of the report on its web site ([www.scs1.com](http://www.scs1.com)).

### 1.3 FOREST MANAGEMENT ENTERPRISE

#### 1.3.1 Background Information

The focus of the evaluation was the 7,840-acre (3,173 ha) Yale-Myers School Forest owned by Yale University and located in the towns of Ashford, Eastford, Union, and Woodstock in Windham and Tolland Counties, Connecticut. This is the largest of the eight tracts of land in the Yale School Forest system. According to information supplied by Yale, this parcel has the most activity in terms of education, research, and harvesting operations of all Yale’s holdings.

The forest is dominated by mixed hardwoods on glacial till soils with a large component of hemlock, several scattered white pine stands (mainly of old field origin), and occasional red pine plantations started in the 1940s after field abandonment. There are also numerous small ponds and wetland areas created by beaver activity. Table 1 illustrates the diversity of land uses found on the Yale-Myers Forest.

**TABLE 1  
LAND USE ON YALE-MYERS FOREST**

<b>Land Use Zone</b>	<b>Acres</b>	<b>Percent</b>
Production Forest	5,513	70.3%
Selection Systems	251	3.2%
Planted Red Pine Stands	25	0.3%
Open Areas	22	0.3%
20-foot Road Buffers	155	2.0%
Research Areas	54	0.7%
Early Successional Reserves	175	2.2%
Future Late Successional Reserves	184	2.3%
Late Successional Reserves	141	1.8%
Old Fields	75	1.0%
Water Bodies	112	1.4%
Wetlands	643	8.2%
50-foot Wetlands and Water Body Buffers	488	6.2%
<b>Total</b>	<b>7,840</b>	<b>100%</b>

The Yale-Myers Forest is located near several relatively large state parcels, including Bigelow Hollow State Park, Nipmuck State Forest, and Natchaug State Forest. Most of the adjacent private landholdings are small in terms of acreage, but Hull Forest Products owns two large in-holdings in the forest. The Yale-Myers Forest is in one of Connecticut's most remote forest areas, although residential dwellings are becoming more common in the region.

This forest is managed for a variety of purposes, including revenue generation, as a site for instruction and the development of professional skills, and as a research forest. Many of the forest managers are internationally recognized silviculturists (see Smith *et al.* 1997<sup>2</sup>) and a substantial amount of the knowledge base for the management of mixed species forests has been developed here.

### 1.3.2 Management Objectives

The management objectives for the Yale-Myers Forest are described in the School's *Forest Manager's Handbook*, which is a controlling document for management of the forest. The overall goals for management of the forest are to provide:

- A hands-on, working (managed) forest laboratory for teaching;
- A permanent, fully owned site for scientific research, especially that which extends over several decades;
- An asset in the School's investment portfolio;
- Maintain the overall integrity and health of the forest ecosystem dynamic.

Specific management objectives are:

- The forest ecosystem dynamics paradigm is used in formulating management decisions;
- All faculty members of the School should be able to use the Yale Forest System for any instruction or research, which can be carried out on New England forestland;
- It should be possible for any faculty member of the School to use the Yale Forest System to develop or practice professional management expertise;
- All faculty members of the School should be able to establish research plots (either long or short term) without fear that the study will be destroyed before completion;
- The total value of the Yale Forest System should be caused to continue to rise;
- The Yale Forest System should represent a source of financial flexibility for the School;
- The School should make information available to the public regarding current activities on the Yale Forest System;
- The Yale Forest System should be available to researchers and faculty outside of the School.

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<sup>2</sup> Smith, D.M., B.C. Larson, M.J. Kelty, and P.M.S. Ashton. 1997. *The Practice of Silviculture: Applied Forest Ecology*, Ninth Edition. John Wiley & Sons, Inc., New York. 537 pp.

### 1.3.3 Silvicultural Systems

The shelterwood silvicultural system is the predominant approach utilized on the forest. This system has proven successful in regenerating valuable, productive mixed species forests that are structurally similar to those in place. The goal is to maintain even aged or nearly even aged stands on most of the forests. Intermediate treatments generally involve a series of harvests designed to develop trees of high quality and which have large crowns. Regeneration treatments often include a shelterwood establishment harvest designed to assure that conditions are suitable for the germination and successful establishment of seedlings of desirable species, with a particular emphasis on red oak. Red oak is the most valuable timber produced locally, and has proven to be somewhat difficult to regenerate throughout its range. Establishment harvests designed to favor red oak generally also regenerate a large number of associated hardwood and softwood species, assuring that stands have tree species diversity.

Removal (regeneration) harvests are conducted according to guidelines developed by Dr. Mark Ashton, Director of School Forests (see sidebar). Dr. Ashton, or the School Forest Manager, must approve any removal harvests in advance of marking.

The ecosystem management and stand development paradigms are used throughout the management program at Yale. Impacts of management on the ecosystem as a whole are considered in decision-making, and no activity is done that would knowingly eliminate a species from the forest. Treatments are only applied if there is likely to be a positive future benefit.

#### **Regeneration Considerations Dr. Mark Ashton, Director of School Forests**

The following regeneration guidelines apply to any harvests that involve significant removal of the overstory, e.g. removal cutting of a shelterwood or seed-tree, or a one-cut shelterwood.

1. On hardwood sites, a matrix of black birch should establish after complete canopy removal (or be easy to establish in the case of one-cut-shelterwoods). A matrix can be defined as the majority of the regeneration to be released (at least 1000 per acre; approximately 6.5 foot spacing for a regular grid). Established black birch can be defined as seedlings at least three years old and 15 cm in height.

2. On conifer sites the majority of regeneration to be released should comprise a matrix of established pine or hemlock (at least 1000 per acre). Established pine and hemlock must be at least three years old and 15 cm in height.

3. On both hardwood and conifer sites other species (maples, hemlock, pine, hickories, and oaks) should be well represented as advanced regeneration (at least 100 per acre of several species; approximately 21 foot spacing for a regular grid). This should complement the birch or pine/hemlock matrix, according to site. Advanced regeneration can be considered seedlings at least three years old and above 15 cm in height.

4. On sites managed for oak, advanced regeneration of oak should be at least five years of age and 15 cm in height. There must be at least 100 individuals of this size and age per acre.

### 1.3.4 Estimates of Maximum Sustainable Yield

The calculated allowable annual cut (AAC) for the entire school forest system is 1 million board feet, but the actual harvest has generally been below the allowable cut. For the 1981-1990 period the average annual harvest across the entire ownership was 800,000 board feet and for 1991-2000 it is estimated to have been 600,000 board feet. Most of this harvest comes from the Yale-Myers Forest.

The estimated allowable harvest is very conservative compared to actual growth. As shown in Table 2, the standing inventory increased by over 1 million board feet per year at Yale-Myers during a period when harvests removed another 500,000 board feet per year.

**TABLE 2**  
**Yale-Myers Stand Volume, Growth and Yield Estimates**  
**Based on CFI System (millions of board feet)**

Species Group	Standing Volume 1984	Standing Volume 1993	Harvested 1984-93	Net Increase
Oak	10.8	14.7	1.30	3.9
Pine	6.5	9.3	0.90	2.8
Hemlock	12.9	13.3	2.20	0.4
Other Hardwood	6.2	9.3	0.70	3.1
<b>Total</b>	<b>36.3</b>	<b>46.6</b>	<b>5.10</b>	<b>10.2</b>

The harvest schedule for Yale-Myers is based primarily on area regulation with volume targets. The objective is to treat about 300 acres to remove between 450 and 500 mbf annually according to the guidelines in Table 3.

**TABLE 3**  
**YALE-MYERS ANNUAL TREATMENT GUIDELINES**

Area (acres)	Silvicultural Treatment	Volume (mbf)
100-200	Low, crown and free form thinnings, crop tree management, timber stand improvement, firewood cuts	100-200
50-100	Establishment cut of a two-cut shelterwood/seed tree	150
50-100	Overstory removal of a two cut shelterwood/seed tree and various irregular, two- and multi-age class systems; occasional one-cut shelterwoods and patch clearcuts	150

### 1.3.5 Estimated, Current and Projected Production

The school tracks volume of timber marked annually. Because harvests can lag several years behind marking or sale layout, marking tally estimates are the preferred method of controlling the volume for harvest. Estimates below (see Tables 4 and 5) do not include volumes of trees from “leave-tree marking” areas, which are estimated to average less than ten percent of the annual volume. The shelterwood harvest marked in the Boston Hollow Division in 2000 was an exception, with an estimated 50,000 board feet available for harvest not included in the volume numbers (Table 5).

**TABLE 4**  
**Summary of Silvicultural Treatments by Area (Acres) Treated**  
**On the Yale-Myers School Forest**

<b>Treatment</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>Target</b>
Final Shelterwood	8	0	40	45	7	50-100
Initial or Partial Shelterwood	70	68	86	19	21	50-100
Thinning	35	105	98	103	155	100-200
<b>Total</b>	<b>113</b>	<b>173</b>	<b>224</b>	<b>167</b>	<b>183</b>	<b>200-400</b>

All figures are acres marked during the year compiled from individual prescriptions

**TABLE 5**  
**Summary of Silvicultural Treatments by Volume (Board Feet)**  
**On the Yale-Myers School Forest**

<b>Treatment</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
Final Shelterwood	402,920	104,000	194,297	46,979	170,474
Initial or Partial Shelterwood					
Thinning	61,000	123,780	102,282	115,031	322,745
<b>Total</b>	<b>463,920</b>	<b>227,780</b>	<b>296,579</b>	<b>162,010</b>	<b>493,219</b>

Notes: Board feet volumes may not include untallied overstory removal (2000). Data supplied by Dr. Mark Ashton, Director of School Forests

## **1.4 ENVIRONMENTAL AND SOCIOECONOMIC CONTEXT**

The following description of the environmental and socioeconomic context of the Yale-Myers Forest is summarized from a history of the Yale School Forest system found in the *Forest Manager's Handbook*.

### **1.4.1 Environmental Context**

George H. Myers (Yale MF, 1902), a member of the first class to graduate from the Yale School of Forestry and Environmental Studies, established the Yale-Myers Forest in the early 1930s. The Forest is comprised of approximately 100 former farm holdings held by Mr. Myers and is one of the largest privately held and professionally managed forests in the region.

Forest vegetation is still strongly influenced by past land use practices. Much of the land was cleared for pasture or agriculture from 1730-1850. With settlement of the more fertile mid-west, this rocky part of Connecticut was one of the first to be abandoned. Forest vegetation began to re-colonize the region following the exodus of many farmers. From 1850-1870, however, many areas were used for raising sheep, temporarily setting back the re-establishment of forests in some areas.

White pine was one of the first species to re-colonize the abandoned fields and pastures, resulting in stand type now known as "old-field" white pine. Once white pines had shaded out grasses in the abandoned fields, hardwoods and hemlocks could become established in small numbers. Following harvest of the pines, these species became more dominant in the forest canopy, resulting in the present-day, more natural mix of hardwoods and hemlock with scattered white pine.

Most of the present stands are approximately the same age and date to heavy harvests that occurred between 1890-1910 (91-111 years BP). A program has started to replace the old stands with a balanced mix of age classes, ranging from 0-100 years old, by approximately 2070. A percentage of the forest, however, will be managed as late-successional reserves and may have older aged stands. A major component of the forest also resulted from the 1938 hurricane (63 years BP).

#### **1.4.2 Socioeconomic Context**

The Wabbaquasset peoples are thought to have originally occupied the region encompassing the Yale-Myers Forest. These were an apparently peaceful people who gave their allegiance to whichever was the most powerful among the Nipmucks, Mohegans, or Pequots. Native populations are not believed to have been high in the immediate vicinity of the Yale-Myers Forest. A winter encampment, however, is thought to have been located near Boston Hollow, which is in the southwestern portion of the Yale-Myers Forest. Native peoples still live in the Connecticut region, but SCS is not aware of any land claims related to the Yale-Myers Forest.

The Yale-Myers Forest is rocky and at a higher elevation relative to more fertile parts of Connecticut and nearby Massachusetts. For this reason, the region was settled last and abandoned first by early colonists. As noted above, the region went through a period of agriculture and animal husbandry following European colonization. Today, scattered farms are still found in the region, but most of the area has reverted to forest. Although relatively rural in comparison to more heavily developed portions of Connecticut, the proximity to Interstates 84 and 395 has brought an increase in commercial and residential development to the region.

#### **1.4.3 High Value Conservation Forest**

*The Yale-Myers School Forest, while harboring many important ecological resources, does not meet the definition of High Value Conservation Forest (FSC Principle 9), according to the most recent draft regional standards prepared by the FSC Northeast Regional Working Group. When the final standards are developed,*

however, forest managers may need to reevaluate the Yale-Myers School Forest with respect to FSC Principle 9.

## **1.5 PRODUCTS PRODUCED**

Predominantly hardwoods, including red oak, white oak, black oak, and sugar maple. Additionally, white pine and hemlock, with lesser amounts of red pine and other species, are produced.

## **1.6 CHAIN-OF-CUSTODY**

At the request of Yale, SCS conducted a joint forest management and chain-of-custody certification evaluation of the defined forest area. With respect to the Yale-Myers forest, the chain-of-custody focus is on the “stump to forest or mill gate.” That is, chain-of-custody begins with the severing of a standing tree to produce a merchantable log and ends with that log(s) leaving the custody Yale, at the “forest or mill gate.” During and following the fieldwork for the forest management evaluation, the evaluation team also investigated the manner by which Yale can maintain chain-of-custody over the logs that leave the “forest gate” to assure that only logs from the “defined forest area” would carry the certified status. Yale scales all harvested timber on the landing before being loaded onto trucks. The Yale contractor tracks all outgoing loads including the date, trucking company, mill to which the wood is being sent, and species. Yale tallies are then cross-referenced against the mills records. It is the judgment of the evaluation team that chain-of-custody certification should also be awarded to the Yale-Myers University Forest.

## **2.0 THE CERTIFICATION ASSESSMENT PROCESS**

### **2.1 ASSESSMENT DATES**

**Pre-Certification Audit:** Correspondence and initial meetings occurred throughout September and early October of 2001.

**Certification Audit:** 29–31 October 2001 (actual office and field assessments).

### **2.2 ASSESSMENT TEAM**

Due to the size of the Yale-Myers forest, as well as the limited harvest activity (i.e., <300 acres per year), a two-person assessment team was assigned to the evaluation of the Yale-Myers Forest. *Michael Thompson* served as Team Leader for the evaluation while also taking the technical lead on forest ecosystem sustainability (SCS Element B) and socioeconomic and financial considerations (SCS Element C). Mr. Thompson has been conducting audits in the region for SCS for several years and he is also a member of the FSC Northeast Regional Standards Working Group. He is a Certified Wildlife Biologist and a partner in the Maine-based environmental consulting firm Woodlot Alternatives.

**Michael Ferrucci**, a licensed professional forester in the State of Connecticut, assisted in all aspects of the collaborative evaluation of the Yale-Myers Forest. He also served as the technical lead for the consideration of overall forest sustainability (SCS Element A). Mr. Ferrucci is an experienced auditor under the AF&PA SFI program, and a principal in the Connecticut firms of Ferrucci & Walicki and Interforest. Mr. Thompson and Mr. Ferrucci recently collaborated on an assessment of the Maine Bureau of Parks and Lands under both the SFI and FSC systems. The assessment of the Yale-Myers Forest was also a joint SFI-FSC evaluation.

The assessment team was assisted in all phases of the evaluation by SCS's *Forest Conservation Program* staff, including Mr. David Wager and Dr. Robert Hrubes. SCS also reviewed the draft evaluation report prepared by the assessment team.

### **2.3 ASSESSMENT PROCESS**

Scoping for the assessment took place via phone conversations and correspondence between Yale faculty and staff, SCS, and the assessment team during August-September of 2001. Formal initiation of the assessment process began with an initial meeting at Yale University in September of 2001 to discuss the audit process, interview faculty and staff, and begin compiling relevant information. This meeting was followed by a detailed request for information from SCS, which Yale responded to during September-October. Stakeholder consultation began at approximately the same time.

The field portion of the evaluation took place on 29-31 October 2001 and included a variety of sites designed to illustrate a cross-section of stand types and treatments, focusing on harvests conducted within the last several years.

The field audit agenda was:

#### **Monday 29 October 2001**

0900-0930	Opening meeting
0945-1115	<i>Glowing 'Shroom</i> <sup>3</sup> , Morse Division; active harvest operation by Tom Bernier
1130-1200	<i>Bittersweet</i> , Morse Division; 2000 harvest (not visited due to time)
1200-1230	<i>Porcupine</i> , Morse Division;
1230-1300	Lunch, including interviews with faculty and students
1300-1400	<i>Monsoon</i> and <i>Battery Park</i> , Still River Division; 2001 harvest
1415-1445	Boston Hollow, Late Successional Reserve
1500-1530	<i>Seven Fingers</i> , Boston Hollow Division, marked sale
1530-1600	<i>Cloud Forest</i> , Boston Hollow Division, marked sale
1600-1630	<i>Nature's Bounty</i> , Boston Hollow Division, restoration prescription

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<sup>3</sup> Harvest blocks are named, often colorfully, by crews comprised of forestry graduate students supervised by the Forest Manager. In all sale contracts the compartment numbers are always provided as reference points.

1900-2100 Dinner meeting with faculty and students

### **Tuesday 30 October 2001**

0800-0930 *Myers Pond*, Myers Division  
0930-1100 Oak Management Demonstration Site, Myers Division  
1115-1145 *Towering Inferno*, French Division; marked red pine stand  
1145-1215 Viewshed; marked hardwood sale  
1215-1245 Lunch, including interviews with faculty and students  
1245-1330 *Gimme Shelter*, French Division, marked oak shelterwood sale  
1415-1515 *Scarlet City*, Turkey Hill Division; 1999 harvest  
1600-1800 Compilation of field notes, interview with forest managers  
1900-2100 Assessment team meeting

### **Wednesday 31 October 2001**

0700-1200 FSC scoring by assessment team  
1200-1400 FSC and SFI closing meetings

## **2.4 STAKEHOLDER CONSULTATION**

Stakeholder consultation, an important component of the FSC/SCS evaluation protocols, took place before, during, and after the field evaluation portion of this audit. Key stakeholders included, but were not limited to: 1) FSC staff and regional members, 2) FSC Northeast Regional Standards Working Group, 3) Yale faculty, students, staff, and alumni, and 4) members of the local community. Additional consultation was attempted with a variety of natural resource professionals who might be familiar with Yale's management of the Yale-Myers Forest. The FSC Northeast Regional Working Group, however, has yet to develop an official list of regional stakeholders.

Most consultation was attempted via e-mail, which included a notice of the pending audit and links to the Draft Interim Standards used by the assessment team. The following individuals were sent notice via e-mail, phone, or correspondence:

### ***FSC Staff***

Hank Cauley, Director FSC US  
Cristian Vallejos, FSC AC

### ***FSC Northeast Standards Regional Working Group***

John McNulty, Seven Islands Land Company, Co-Chair  
Rob Bryan, Maine Audubon Society, Co-Chair  
Al Calfee, Consulting Forester and Smartwood Auditor  
Jane Difley, Society for the Protection of New Hampshire Forests  
David Publicover, Appalachian Mountain Club  
Mark Lorenzo, National Wildlife Federation  
Paul and Jula Sampson, A.E. Sampson & Sons  
Wayne Young, Domtar  
Richard Donovan, Smartwood

***Yale Faculty, Students, Staff, and Alumni***

Dr. David Smith, emeritus faculty  
Dr. Mark Ashton, faculty  
Alex Finkral, Ph.D. candidate, and Forest Manager  
John McKenna, Yale Staff & Ph.D. candidate at University Massachusetts  
David Ellum, Ph.D. candidate  
Michael Washburn, faculty  
Michael Debonis, M.S. candidate  
Ann Camp, faculty  
Alexander Evans, Ph.D. candidate

In addition, the notice of the pending audit was e-mailed to an internal Yale mailing list that encompassed campus-wide faculty, students, and staff. Brief personal interviews were also conducted with Dr. Oswald Schmitz, Professor of Population and Community Ecology, numerous graduate and undergraduate students, and J. Alan Brewster, Associate Dean for Management and Resources during the course of the evaluation.

***Other Stakeholders***

Terry Bellman, Woodstock, Connecticut Wetlands Commission  
Tom Bernier, Logging Contractor (personal interview)  
Juliana Brodin, neighbor  
Gregory Creighton, contractor for Mountain Laurel control on Yale-Myers  
Mike Enright, Connecticut DEP Conservation Officer  
Nick Georgeady, neighbor  
Mary Huda, Union, Connecticut Wetlands Commission  
Bill Hull, neighbor  
Sam Hull, neighbor  
Susan Jorgeson, Eastford, Connecticut Wetlands Commission  
Sharon Lyons, neighbor  
Bob Mancini, neighbor, Nipmuck Trail Steward  
Ed McGuire, Connecticut DEP Forester, Nipmuck State Forest  
Ralph Otto, neighbor  
Debra Peppin, neighbor

Bill Toomey, Ecologist, The Nature Conservancy  
John Trowbridge, Logging Contractor  
Tom Walicki, Yale alumnus

Very few comments were received in response to stakeholder consultation. This is relatively typical in the Northeast Region, however, for evaluations on small forest operations with low harvest volumes. There were no significant concerns expressed by stakeholders that the team needed to address prior to the evaluation. Graduate students who work on the Yale-Myers Forest, for example, appreciated the opportunity to gain experience in applied forest management and had no substantive concerns that warranted the attention of the team.

Non-forestry faculty who conduct research on the Yale-Myers Forest were generally satisfied with efforts of the forestry faculty to make them feel welcome to conduct research on the forest. Specific comments, indicating praise or potential room for improvement, included:

- Non-forestry faculty members are not aware of current policies related to deer management on the forest and cannot, therefore, determine if they concur with them;
- There does not appear to be a formal research committee providing a forum for forestry and non-forestry faculty to discuss research priorities, although forestry faculty members are very approachable and receptive to non-forestry faculty research needs;
- Overall funding mechanisms for the forest are a topic of interest, including the use of timber revenues to fund operations and maintenance and the School's overhead charges to faculty research projects conducted entirely on the Yale-Myers Forest
- Research facilities at Yale-Myers could be improved and such improvements may lead to more research interest.

The assessment team discussed most of these concerns with Dr. Ashton, who was already aware of most of them. Dr. Ashton indicated that improved communication with non-forestry faculty could be easily addressed. He also informed the team that a capital improvement program had already been prepared and submitted to the Dean (a copy was provided for the team's review). Concerns related to finances and facility upgrades were also discussed with the Associate Dean, Alan Brewster, who indicated that the capital improvement program was under active consideration.

## **2.5 GUIDELINES/STANDARDS EMPLOYED**

The standard development process in a region, such as the Northeast Region, where there is no approved final standard, starts with the SCS Generic Interim Standard. The generic interim standard is then modified to reflect the regional context, in this case Connecticut and the Northeast Region, to become the draft interim standard. This modification was based on the current draft of the regional standards, which are nearing completion. Next the draft interim standard is modified to reflect comments received from stakeholders to become the SCS Interim Standard. No comments on the interim standards, however, were received from stakeholders.

The Interim Standard is available upon request from the SCS offices in Oakland, California. In addition, consistent with SCS *Forest Conservation Program* evaluation protocol, for scoring purposes the team weighted sets of evaluation criteria for each of the three program elements. The evaluation criteria were designed to collectively span the range of concerns and technical issues relevant to a comprehensive assessment of the management of the Yale-Myers Forest and to fully “map” the FSC Principles and Criteria, as represented by the SCS “interim standard”.

### **3.0 RESULTS, CONCLUSIONS AND RECOMMENDATIONS**

#### **3.1 NOTABLE STRENGTHS OF THE FOREST MANAGEMENT ENTERPRISE**

As detailed later in this report, the evaluation team observed some circumstances and resource conditions that can be clearly characterized as exemplary forest management on the Yale-Myers Forest. Notable strengths include:

##### ***Timber Resource Sustainability***

- Stewardship efforts over an extended period on the part of the Yale School of Forestry and Environmental Studies have restored land previously used for agriculture and animal husbandry to a relatively natural forest;
- The 7,840-acre Yale-Myers Forest is an important block of forest habitat that harbors a wide range of native plant and animal species;
- Forest stands and natural communities are approaching a natural distribution and age class structure for the region;
- Stands are well stocked with commercially valuable species with good growth form;
- Harvest rates are conservatively placed below the annual allowable cut;
- Forest managers are internationally recognized experts in silviculture, with particular expertise in managing the mixed-species stands of the region;
- Road access on the Yale-Myers forest is well considered and there were no signs of erosion or excessive impacts to wetlands or water bodies;
- Management plans and related documents are informed by extensive historic files related to management of the property and contain progressive forest management programs and policies;

##### ***Forest Ecosystem Sustainability***

- Restoration of forest habitats following historic degradation during periods of agricultural use have helped to conserve plants and animals native to the region;
- Harvest operations are designed to minimize impacts to wetlands, water bodies, and riparian areas;
- Within stands, specific efforts are made to retain a wide diversity of tree species and associated understory plants;

- Specific policies lead to the retention of within stand features important to conserving biodiversity, such as snags and downed woody debris;
- Management practices do not lead to the need for herbicide use;
- Inventories have been conducted on the forest to identify rare plants and natural communities;
- Specific areas have been identified as current and future late-successional reserves;

### ***Financial and Socioeconomic Considerations***

- Yale University is committed to the long-term management of the Yale-Myers Forest;
- Management of the Yale-Myers Forest is financially stable and there are no pressures, at the current time, to sell the property (i.e., it is unique in the region to have such a long tenure of ownership);
- A capital improvement program has been developed and its implementation appears to have the support of the University;
- Graduate students are given an opportunity to gain invaluable experience working on the Yale-Myers Forest. Each year, 4-6 students are employed to work on the forest crew. Many of these students are already highly qualified forest managers and go on to contribute greatly to forest stewardship both domestically and in the international arena;
- Outreach programs sponsored on the Yale-Myers Forest provide opportunities for learning from international experts as well as local landowners and forest managers;
- Logging contractors working on the Yale-Myers Forest report excellent working relationships with Yale forest managers.

## **3.2 OPPORTUNITIES FOR IMPROVEMENT**

As with any forest management operation, there are opportunities for improvement should the managers of the Yale-Myers Forest wish to raise scores within program elements. Such opportunities include:

### ***Timber Resource Sustainability***

- Consider developing a more quantitative wood supply analysis that includes growth and volume projections, spatially explicit blocking plans, and quantitative queuing paradigms;
- Accelerate efforts to achieve a more balanced age class structure, to the degree that it does not compromise ecological goals and objectives (e.g., retaining certain late-successional stands);
- Organize historic files and make the data they contain more readily available (some efforts are already in progress);
- Accelerate the development of GIS tools that can be applied to managing the Yale-Myers Forest.

### *Forest Ecosystem Sustainability*

- Develop more explicit plans for the distribution and age class structure of natural communities over time on the Yale-Myers Forest that are based on an understanding of the natural disturbance cycle of forests in the region;
- Where necessary, develop specific restoration forestry plans to re-establish natural stand conditions in highly degraded stands (i.e., stands that deviate substantially from natural stand conditions);
- Develop interdisciplinary research programs focused on understanding the ecological effects of forest management on the Yale-Myers Forest;
- Develop more explicit guidelines for promoting biodiversity for tree markers to follow;
- Develop specific plans for monitoring and conserving populations of plants and animals in numbers that approximate natural conditions;

### *Financial and Socioeconomic Considerations*

- Consider establishing a committee tasked with promoting better communication among the various disciplines (e.g., forestry, wildlife, community ecology) that conduct research on the Yale-Myers Forest;
- Discuss the capital improvement campaign with a variety of faculty members so that short and long-term improvement plans are more widely understood;
- Work with campus-wide fundraising programs to determine if they can assist with capital campaigns (e.g., by coordinating fundraising from alumni);
- Work with University facilities management staff to gain a better understanding of the costs of building construction and renovation;
- Consider working with the Yale School of Architecture to develop plans for new construction or renovation;
- Work with the Dean's Office to promote a better understanding of the use of overhead fees charged to research projects conducted on the Yale-Myers Forest (i.e., funds that are used to fund the School's campus overhead needs).

### **3.3 SUMMARY OF STRENGTHS AND WEAKNESSES RELATIVE TO THE FSC P&C**

Certification is awarded on the basis of scores assigned to each of SCS's 18 evaluation criteria for Natural Forest Management, respectively, as well as the scores for each of the 10 FSC Principles, which are mathematically derived by cross referencing the 18 SCS criteria. In addition, under the accredited SCS protocols FSC compliance is assured through applying

fatal flaw guidelines that are found interspersed throughout the evaluation criteria. Failure with respect to a fatal flaw guideline precludes award of certification regardless of the strengths in other program areas.

Principle/Subject Area	Strengths	Weaknesses
<b>P1: FSC Commitment and Legal Compliance</b>	<ul style="list-style-type: none"> <li>▪ Appear to be in compliance with relevant Local, State, and Federal regulations</li> <li>▪ Forest managers are committed to sustainable forest management and appear to support the FSC's Principles and Criteria</li> </ul>	<ul style="list-style-type: none"> <li>▪ Commitment to FSC Principles and Criteria should become explicit in all management documents following award of certification</li> <li>▪ Forest managers should become more familiar with FSC Principles and Criteria</li> <li>▪ School should consider becoming a member of the FSC</li> </ul>
<b>P2: Tenure &amp; Use Rights &amp; Responsibilities</b>	<ul style="list-style-type: none"> <li>▪ Customary access patterns, such as hiking trails, appear to be encouraged</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential interests of local communities are not actively sought out</li> </ul>
<b>P3: Indigenous Peoples' Rights</b>	<ul style="list-style-type: none"> <li>▪ There are apparently no active claims to the land by indigenous peoples in the region</li> </ul>	<ul style="list-style-type: none"> <li>▪ Relationships with regional indigenous peoples are not actively developed</li> <li>▪ Surveys for potential sites of archaeological or cultural significance to indigenous peoples are not current</li> </ul>
<b>P4: Community Relations &amp; Workers' Rights</b>	<ul style="list-style-type: none"> <li>▪ Local logging contractors working on the forest express satisfaction with working relationships with Yale</li> <li>▪ Yale actively pursues opportunities to conduct public workshops on Yale-Myers</li> <li>▪ Graduate students employed on the forest express satisfaction with their compensation and opportunities to work on the forest</li> <li>▪ Yale makes effort to coordinate efforts with regional conservation initiatives</li> </ul>	<ul style="list-style-type: none"> <li>▪ Yale forest managers are not actively involved in the local business community</li> <li>▪ The social impact of operations on Yale-Myers, while minimal, are not explicitly addressed in detail</li> </ul>
<b>P5: Benefits from the Forest</b>	<ul style="list-style-type: none"> <li>▪ Management of the forest is financially stable</li> <li>▪ Yale's efforts over the years have preserved a large forest tract that might otherwise have been fragmented or developed</li> <li>▪ Management efforts are focused on improving forest productivity</li> <li>▪ Stands are well stocked with merchantable species</li> <li>▪ Harvest levels are conservative and well below the AAC</li> </ul>	<ul style="list-style-type: none"> <li>▪ Material benefits to surrounding communities appear to be minor, although indirect benefits are substantial (e.g., retention of open space)</li> <li>▪ Age class distribution is presently unbalanced</li> </ul>

<b>P6: Environmental Impact</b>	<ul style="list-style-type: none"> <li>▪ Forest managers are internationally recognized experts who understand the natural dynamics of region's forest</li> <li>▪ Inventories have been conducted to identify rare plant stations</li> <li>▪ Special attention is given to protecting water quality and minimizing erosion</li> <li>▪ Efforts to conserve within stand structural diversity (e.g., species diversity and retention of snags and downed woody debris) are explicit and highly sophisticated</li> <li>▪ Existing and future late successional reserves are explicitly identified</li> </ul>	<ul style="list-style-type: none"> <li>▪ The potential impact of forest management on wildlife populations should be more explicitly assessed</li> <li>▪ Forest managers should become more familiar with the FSC's evolving definition of High Conservation Value Forests</li> <li>▪ Plans for the future distribution of natural communities should be more explicit</li> <li>▪ Handling of fuel, oils, and outdated pesticides should be improved</li> </ul>
<b>P7: Management Plan</b>	<ul style="list-style-type: none"> <li>▪ Management objectives are explicit and address a wide variety of resources in addition to timber</li> <li>▪ Management plans are clearly focused on the very long term management of the forest</li> <li>▪ GIS tools are more advanced than what is seen on similar sized holdings in the region</li> <li>▪ Buffers and reserves are clearly identified on forest maps</li> </ul>	<ul style="list-style-type: none"> <li>▪ Future management plans should more explicitly address the FSC criteria identified in Principle 7</li> <li>▪ Yale should consider the benefits of developing a quantitative, spatially explicit wood supply analysis to direct future harvests</li> <li>▪ Landscape scale considerations should be more explicitly addressed</li> <li>▪ An improved public summary of the management plan, specifically addressing FSC requirements, should be prepared</li> </ul>
<b>P8: Monitoring &amp; Assessment</b>	<ul style="list-style-type: none"> <li>▪ Forest monitoring efforts are above the norm for this size of forest</li> <li>▪ Efforts are underway to compile historic forest monitoring information</li> <li>▪ Forest managers have a high degree of expertise related to understanding the natural development of stands in the region</li> </ul>	<ul style="list-style-type: none"> <li>▪ Monitoring efforts for plants and animals should be more explicit</li> <li>▪ Interdisciplinary research directed toward understanding the impact of forest management on plants and animals should be encouraged</li> <li>▪ Financial planning for individual harvests and for the forest as a whole could be more sophisticated</li> </ul>
<b>P9: Maintenance of High Conservation Value Forest</b>	<ul style="list-style-type: none"> <li>▪ According to current definitions provided by the Regional Standards Working Group, HCVFs are not found on the Yale-Myers Forest</li> </ul>	<ul style="list-style-type: none"> <li>▪ Forest managers should become more familiar with the FSC's evolving definition of HCVFs</li> </ul>

<b>P10: Plantations – Not Applicable</b>	▪	▪
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**TABLE 6**  
**Scores for the 10 FSC Principles**

<b>FSC Principles</b>	<b>Score</b>
1	93
2	94
3	92
4	93
5	92
6	94
7	91
8	92
9	93
10	Not Applicable

**3.4 CERTIFICATION RECOMMENDATION**

As determined by the full and proper execution of the SCS *Forest Conservation Program* evaluation protocols, the evaluation team recommends that the Yale-Myers School Forest be awarded FSC certification without conditions.

**3.5 JUSTIFICATION OF THE CERTIFICATION RECOMMENDATION**

As detailed throughout this report, and consistent with the accredited SCS *Forest Conservation Program* evaluation protocols, certification of the Yale-Myers School Forest is recommended in response to the element scores indicated in Table 7.

**TABLE 7**  
**SCS PROGRAM ELEMENT SCORES**

<b>Program Element</b>	<b>Score</b>
Timber Resource Sustainability	93
Forest Ecosystem Maintenance	94
Financial/Socio-Economic Considerations	91

**Peer Reviewers**

The following peer reviewers reviewed the draft of this evaluation report:

Robert S. Seymour, Ph.D., Curtis Hutchins Professor of Silviculture, University of Maine  
David E. Capen, Ph.D., Professor, School of Natural Resources, University of Vermont

The evaluation team carefully considered the comments provided by the peer reviewers and made changes, as deemed appropriate, in response to those comments. The peer review comments are the personal professional opinions of the experts that submit comments and do not constitute the opinions or positions of the organizations within whom they are employed.

## **4.0 AUDITS**

Per FSC and SCS protocols, all certified operations must be audited annually to assure continued compliance with the standards of certification. The annual audit includes a site inspection by one or more SCS auditors as well as an annual audit report. A summary of each annual audit report is then included as an update in this public summary of the certification report.

### **4.1 2003 Annual Audit**

#### **4.1.1 Audit Date**

October 8, 2003

#### **4.1.2 Assessment Personnel**

Michael Thompson

#### **4.1.3 Assessment Process**

The scope of the 2003 surveillance audit included (1) document review, (2) the field auditor spending time in the field inspecting recent harvest blocks, (3) interviewing management personnel, and (4) evaluating additional information provided by Yale following the field assessment in response to questions posed by the auditor.

As part of the field audit, the auditor visited every area that has been harvested following the original evaluation in the fall of 2001. This included harvest blocks referred to by Yale as (1) Sugar Bush, (2) Knickety Poo, (3) Mind The Gap, (4) Juicy Bits, and (5) Bigger Than Texas.

#### **4.1.4 Status of Conditions and Recommendations**

There were no open CAR's or recommendations from the initial certification audit.

#### **4.1.4 Additional Observations, Conditions and Recommendations**

Based upon this audit, the auditor concludes that the issuance of three new Corrective Action Requests (CARs) is warranted (see Section 3.1.1).

<b>Background/Justification:</b> Yale needs to increase efforts toward demonstrating a long-term commitment to adhere to the FSC Principles and Criteria particularly with regard to
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P&C 1.6.a of the regional standards.	
<b>CAR.2003.1</b>	By the 2004 annual audit, Yale must show that it has a long-term commitment to adhere to the FSC Principles and Criteria by: (1) referencing the FSC Principles and Criteria on the School Forest web page, (2) document that the FSC Principles and Criteria are being referenced during public outreach tours, and (3) demonstrate that student forest managers are being exposed to the FSC Principles and Criteria prior to their summer programs.
Reference	FSC Criterion 1.6
Deadline	Next field visit, fall 2004

<b>Background/Justification:</b> Yale does not appear to have a publicly available summary of the primary elements of the management plan that includes the information referenced in Criterion 7.1.	
<b>CAR.2003.2</b>	By the 2004 annual audit, Yale must prepare a publicly available summary of the management plan that complies with FSC Criterion 7.4. A draft of this summary must be submitted for SCS review prior to its being made available to the public. Once approved, this summary should be made available on the School Forest web page and in other appropriate public venues.
Reference	FSC Criterion 7.4 (see also Criterion 7.1)
Deadline	Next field visit, fall 2004

<b>Background/Justification:</b> Yale does not appear to have a publicly available summary of the results of their monitoring efforts, as required by FSC Criterion 8.5, including those elements required by FSC Criterion 8.2.	
<b>CAR.2003.3</b>	By the 2004 annual audit, Yale must prepare a publicly available summary of their monitoring efforts that complies with FSC Criterion 8.5. A draft of this summary must be submitted for SCS review prior to its being made available to the public. Once approved, this summary should be made available on the School Forest web page and in other appropriate public venues.
Reference	FSC Criterion 8.5 (see also Criterion 8.2)
Deadline	Next field visit, fall 2004

#### 4.1.5 General Conclusion of the Annual Audit

Based upon information gathered through site visits, interviews, and document reviews, the SCS audit team concludes that Yale University's management of its concession on the Yale-Myers School Forest continues to be in overall compliance with the FSC Principles and Criteria. That is, the SCS audit team has concluded from this annual audit that Yale's management is in general compliance with FSC Principles 1 through 9. As such, continuation of the certification is warranted, while subject to subsequent annual audits.

#### 4.2 2004 Annual Audit

#### **4.2.1 Assessment Personnel**

Mike Ferrucci served on the Audit Team for the original evaluation and he also conducted this second annual audit. Mr. Ferrucci has worked as a forester in the region for 26 years, and has participated in many FSC audits throughout the eastern United States. He is a partner in the firm Interforest, LLC where he leads the firm's Forest Certification Program involving FSC, SFI, and Joint FSC/SFI Certification.

#### **4.2.2 Assessment Dates**

The assessment was conducted on December 2, 2004. Substantial background material was provided on November 11<sup>th</sup>, and a planning meeting was held in New Haven on November 29<sup>th</sup>.

#### **4.2.3 Assessment Process**

The scope of the 2004 surveillance audit included (1) document review, (2) the field auditor spending time in the field inspecting recent harvest blocks, (3) interviewing management personnel, and (4) evaluating additional information provided by Yale following the field assessment.

As part of the field audit, the auditor visited every area that has been harvested, and most that have been marked, following the 2003 Annual Audit. These visits included harvest blocks referred to by Yale as:

- Area 51
- Shock and Awe
- Casino Royale
- Raising Hell
- Industrial Athlete
- Professor Beefheart
- What Would Jesus Have Marked

In addition the facilities at the main camp, one of the demonstration trails, and several research sites were viewed.

#### **4.2.4 Status of Corrective Action Requests and Recommendations**

The three CARs (see 2003 Annual Report below) involved: 1) demonstrating a long-term commitment to adhere to the FSC Principles and Criteria; 2) a publicly available summary of the primary elements of the management plan; and 3) a publicly available summary of the results of monitoring efforts. Yale has made significant progress on all three CARs, and two of the three are now closed.

<p><b>Background/Justification:</b> Yale needs to increase efforts toward demonstrating a long-term commitment to adhere to the FSC Principles and Criteria particularly with regard to</p>
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P&C 1.6.a of the regional standards.	
<b>CAR.2003.1</b>	By the 2004 annual audit, Yale must show that it has a long-term commitment to adhere to the FSC Principles and Criteria by: (1) referencing the FSC Principles and Criteria on the School Forest web page, (2) document that the FSC Principles and Criteria are being referenced during public outreach tours, and (3) demonstrate that student forest managers are being exposed to the FSC Principles and Criteria prior to their summer programs.
Reference	FSC Criterion 1.6
Deadline	Next field visit, fall 2004

Yale Myers Forest has demonstrated its commitment to the FSC by promoting its Principles and Criteria in several ways:

1. through references on the School Forest web page (<http://www.yale.edu/schoolforest/certification.html>)
2. during public outreach meetings
3. by posting standards in facilities used by student forest managers and researchers
4. by their inclusion within the Student Forest Manager Handbook provided to interns prior to their summer programs

Further, signs posted throughout the forest include the FSC logo, which is also used on appropriate documents published by the school.

These efforts collectively comprise conformance to the requirements under P&C 1.6.a of the regional standards. Thus CAR.2003.1 is deemed to be met and closed.

<b>Background/Justification:</b> Yale does not appear to have a publicly available summary of the primary elements of the management plan that includes the information referenced in Criterion 7.1.	
<b>CAR.2003.2</b>	By the 2004 annual audit, Yale must prepare a publicly available summary of the management plan that complies with FSC Criterion 7.4. A draft of this summary must be submitted for SCS review prior to its being made available to the public. Once approved, this summary should be made available on the School Forest web page and in other appropriate public venues.
Reference	FSC Criterion 7.4 (see also Criterion 7.1)
Deadline	Next field visit, fall 2004

The primary elements of the management plan are available on the Yale School Forests web site (<http://www.yale.edu/schoolforest/myers.html>) which provides an overview of the forests and their management. This site is linked to the website for the Yale School of Forestry & Environmental Studies and can also be found by typing the words “Yale School Forests” into a standard search engine. The site provides a wide range of information regarding the use and management of all its properties, with the greatest

detail regarding the management plan for the Yale Myers Forest. All aspects of FSC Criteria 7.1 are now covered including the “description of silvicultural and/or other management system, based on the ecology of the forest in question and information gathered through resource inventories” (Criteria 7.1 c). The breadth and strength of the information which is posted on the website is sufficient to close CAR.2003.2, although the information on silviculture should be assessed during the next surveillance audit.

<b>Background/Justification:</b> Yale does not appear to have a publicly available summary of the results of their monitoring efforts, as required by FSC Criterion 8.5, including those elements required by FSC Criterion 8.2.	
<b>CAR.2003.3</b>	By the 2004 annual audit, Yale must prepare a publicly available summary of their monitoring efforts that complies with FSC Criterion 8.5. A draft of this summary must be submitted for SCS review prior to its being made available to the public. Once approved, this summary should be made available on the School Forest web page and in other appropriate public venues.
Reference	FSC Criterion 8.5 (see also Criterion 8.2)
Deadline	Next field visit, fall 2004

Management at Yale Myers Forest includes varied breadth and depth of monitoring efforts ranging from typical forest inventory and stand prescription efforts to intensive, pioneering efforts in several lines of research. The CFI program and the study of understory vegetation dynamics comprise the monitoring efforts of greatest breadth, depth, and longevity.

During the 2004 Annual Audit monitoring protocols and results were discussed at length. Yale devotes considerable efforts to monitoring, including monitoring of understory vegetation at a level of detail that is not common in this region. Much of this monitoring is tied to long-term research projects, including PhD research projects. As such, the results will be available with publication.

Monitoring directed at forest health, at forest understory conditions, and at wetlands and riparian areas are well described on the forest’s web page, and are provided here:

“Forest Health and Protected Areas Assessments

Four hundred forest health and understory diversity plots were established in 1986 and are remeasured for floristic diversity, woody debris, forest structure, and tree species regeneration at ten-year intervals. These plots taken together assess current stand level conditions of groundstory herbaceous diversity, regeneration, vertical structure and woody debris in relation to current silvicultural prescriptions and management regimes.

The regeneration measurements have helped guide management in assessing regional differences in deer browse impact across the forest, and susceptibility to regeneration failure related to forest light conditions, seed source, and soil type. Groundstory floristic diversity measures have been used to assess and strategically plan for a sensitive areas network within the School Forests. Forest structure and composition and woody debris

measures are used to gauge wildlife (bird, amphibian, mammal) habitat suitability. During the last five years the wetlands of the forest have been assessed on the ground and using remotely sensed information. Each year amphibians have been quantified and related to local conditions including factors such as hydroperiod, wetland area, water chemistry, and forest cover. Change in wetland cover has also been documented as a result of the reinvasion of beaver. The seral sequence set up by beaver activities as well as the subsequent decay of their work results in a highly dynamic mosaic of wetland environment that suit different species at different points in their development and decay. Taken together these measures have been used to quantitatively support landscape-level integration of sensitive and special areas (riparian systems and wetlands; biologically unique areas; older forest components; early seral habitat; and recreational viewsheds) into a working forest landscape.”

Source: <http://www.yale.edu/schoolforest/management.html>

Despite the breadth, depth, and quality of these efforts there remains a gap: a summary of results. Because the monitoring program is so strong, and because results are available in the literature a determination was made to extend the deadline for the “Monitoring Summary” by one year, to the next annual audit.

CAR.2003.3 revised:

<b>Background/Justification:</b> Yale does not appear to have a publicly available summary of the results of their monitoring efforts, as required by FSC Criterion 8.5, including those elements required by FSC Criterion 8.2.	
<b>CAR.2003.3</b>	By the 2005 annual audit, Yale must prepare a publicly available summary of their monitoring results (general description) that complies with FSC Criterion 8.5. A draft of this summary must be submitted for SCS review prior to its being made available to the public. Once approved, this summary should be made available on the School Forest web page and in other appropriate public venues.
Reference	FSC Criterion 8.5 (see also Criterion 8.2)
Deadline	Next field visit, fall 2005

#### 4.2.5 Additional Observations and Corrective Action Requests

The practices on the Yale Myers Forest continue to demonstrate the highest standards of land stewardship and sustainable forest management. Yale’s faculty managers, student interns, and harvesting contractor should be commended for their consistent implementation of exemplary forestry on this forest.

#### 4.2.6 General Conclusion of the 2004 Annual Audit

Based upon information gathered through site visits, interviews, and document reviews, the SCS audit team concludes that Yale University’s management of its concession on the Yale-Myers School Forest continues to be in overall compliance with the FSC

Principles and Criteria. That is, the SCS audit team has concluded from this annual audit that Yale's management is in general compliance with FSC Principles 1 through 9. As such, continuation of the certification is warranted, while subject to subsequent annual audits.

### **4.3 2005 Annual Audit**

#### **4.3.1 Assessment Dates**

The 2005 annual audit took place on November 14<sup>th</sup> 2005.

#### **4.3.2 Assessment Personnel**

The 2005 Annual Audit was conducted by Robert Seymour (bio below) who is the principal author of this report.

**Robert Seymour** is the Curtis Hutchins Professor of Silviculture in the Department of Forest Ecosystem Science at the University of Maine, where he teaches courses in silviculture, the spruce-fir industrial ecosystem, and forest stand dynamics. His research interests include production silvicultural practices, forest canopy structure, and ecologically-based silvicultural systems. He has 25 years of experience in research and management of forests in the Acadian region of northeastern North America. He has authored or coauthored over 50 refereed publications and four book chapters. Prior to assuming the Hutchins Professorship in 1987, he worked as the timber management program leader for the Cooperative Forestry Research Unit from 1981-1987. In 1995, along with Mac Hunter, he was named a Conservation Scholar by the Pew Foundation and was awarded a three-year grant to study and write about managing forest biodiversity in the Northeast. He has served on FSC certification evaluation teams for seven landowners in North America totaling over 8 million acres. He holds a B. S. in Forestry from Ohio State University, and a Master of Forestry and Ph. D. in Silviculture from the Yale School of Forestry and Environmental Studies.

#### **4.3.3 Assessment Process**

The scope of the 2005 surveillance audit included (1) document review, (2) the auditor spending time in the field inspecting recent harvest blocks, and (3) interviews with management personnel. Auditor Seymour was presented with a binder that included a chronology of events since the last audit, and detailed documentation on all active sales (recently completed, ongoing, and marked).

As part of the field audit, the auditor visited a representative sample of marked, ongoing, and recently completed timber sales, including several that were inspected in past audits. The sale sites visited were, in order:

- Shawn Walker's Eyeballs
- What Would Jesus Mark?
- Communications Breakdown

- Raising Hell
- Bigelow Hollow (older sale)
- Blue Trail Beautification
- Knickety Poo
- Sugar Bush

#### **4.3.4 Status of Open Corrective Action Requests**

There were no open CARs from 2004 at the time of the 2005 annual audit.

#### **4.3.5 General Observations, New Corrective Action Requests and Recommendations**

##### *General Observations:*

With one exception, all sites visited were oak-pine stands treated by shelterwood cuts. Prescriptions are more or less uniformly applied, although nearly every stand has patches of advance regeneration resulting from prior entries that dictate heavier removals, as well as inclusions of uncommon structural features that typically are reserved. The shelterwood method is Yale's proven approach to regenerating this forest type, and is a very common one throughout southern and central New England. Based on Dr. Mark Ashton's research conducted on this forest and elsewhere, establishment cuttings are fairly heavy and resulting overwoods are quite open. Such open stands facilitate the destruction of interfering understory shrubs (mainly mountain laurel) and allow the oak seedlings sufficient light to outgrow more tolerant species. Additionally, the lack of deer cover and abundance of slash may reduce herbivory which has historically threatened regeneration success on this forest. At sales where sufficient time has passed to evaluate regeneration success (e.g., Knickety Poo), the method is working well.

One hemlock-hardwood stand (Communications Breakdown) was being regenerated by 0.4-acre gaps (oak desired), with the matrix being thinned to remove sawlog hemlocks. Contractor Bernier was operating a cut-to-length harvester on this site, offering a chance to see the excellent work of this skilled professional whom Yale uses for most of their commercial sales. Part of the Raising Hell sale was an oak stand treated by crown thinning, presumably because there was sufficient immature growing stock to delay regeneration for one cutting cycle.

A major theme of discussion throughout the day was the issue of structural retention and the use of reserve trees in the shelterwood system. Yale managers tend to view this issue at the landscape scale and cited numerous examples of where entire stands or unique habitats have been reserved from harvest. Furthermore, on the harvest sites visited, reserve trees tended to be grouped in wet areas, steep inoperable slopes, or along stand edges. Uniform, dispersed retention of reserve trees does not appear to be an objective, and may even be seen as a threat (excessive overstory competition with developing oak reproduction). If Yale has any quantitative targets for reserving trees, they were not mentioned in any written prescriptions (which are otherwise quite detailed). Boilerplate

language in each mandates retention of dead snags, high-value cavity trees, large legacy trees (uncommon) and pole-sized stems of rare and slower-growing species such as beech, hickory, white oak, and sugar maple. Quantitatively, reserve trees seem to comprise under 5% (ocular estimate) of the original-stand basal area over the gross area of the sale, a low value compared to public forests in the region managed with similar even-aged methods.

Tree condition resulting from hemlock adelgid attack varies markedly over the forest. Very little mortality was evident, however, and some stands (typically on mesic sites, e.g., the Communications Breakdown sale) appeared quite healthy. It was very encouraging to note that hemlocks in many stands appeared to be recovering, as evidenced by a nearly full cohort of new foliage over a sparse interior crown. Yale is by no means “panicking” and salvaging all the hemlock they can; hemlocks were observed as part of the residual stand in nearly every sale where this was possible to implement.

Logging operations all appear to be of very high quality, due in large part to the long-term relationship Yale has developed with contractor Bernier. Essentially no residual-tree damage was observed; regeneration damage in overstory-removal prescriptions was limited to the trails. No site damage (rutting, etc) was encountered.

No CARs were issued as a result of this audit.

#### **4.3.6 General Conclusions of the 2005 Annual Audit**

Based upon information gathered through site visits, interviews, and document reviews, SCS concludes that Yale University’s management of its concession on the Yale-Myers School Forest continues to be in overall compliance with the FSC Principles and Criteria. As such, continuation of the certification is warranted, subject to future annual audits.

## **5.0 PUBLIC INFORMATION ABOUT FOREST MANAGEMENT PLAN AND MONITORING**

Public information concerning the management of the Yale-Myers Forest is available on the School of Forestry and Environmental Studies website.