Long-Term Management Impacts and Costs of Forest Certification in North Carolina: The Experience of the Southern Center for Sustainable Forests Partners

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Abstract

The three participating organizations in the Southern Center for Sustainable Forests—North Carolina State University, Duke University, and the North Carolina DENR Division of Forest Resources—received both Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI) certification for their forests in 2001. The total costs of maintaining certification for SFI ranged from $0.39 per acre per year (NC DFR) to $3.87 per acre per year (Duke). For FSC, the costs ranged from $0.42 (DFR) to $2.92 (NCSU) per acre per year. These annual costs had small impacts on long-terms discounted cash flow returns as measured by the IRR or LEV. The IRR changes were 0.06 to 0.43 percentage points less, and the LEVs were $10 per acre to $47 per acre less depending on ownership and species group, at a 6% discount rate. For typical hardwood stands, IRRs decreased by 0.06 percentage points for DFR lands, and 0.42 percentage points for NCSU lands. Hardwood LEVs decreased $7 per acre for DFR lands and $51 per acre for NCSU lands. Certification benefits included better documentation, communication, research, and teaching, but better prices have not been received yet.

Introduction

Forest certification has been in effect for more than a decade to date, providing more opportunity to examine its costs and impacts. We have cooperated since 2001 in achieving and maintaining forest certification among the three partners of the Southern Center of Sustainable Forests—The North Carolina Division of Forest Resources, Duke University, and NC State University. This article summarizes our assessment of the costs of certification during that time and the long-term impacts on forest management investment returns.

As of 2006, there were about 280 million ha of certified forests in the world, with the large umbrella system of the Programme of Endorsement for Certification Systems (PEFC) having 187 million ha. This system endorses certification systems promulgated by individual
countries, including the Sustainable Forestry Initiative (SFI) in the U.S. and Canada, which certified 55 million ha as of 2006. The Forest Stewardship Council (FSC) is considered the greenest of the forest certification system because of its development and promotion by environmental non-government organizations. FSC had 73 million ha certified in the world in 2006. FSC has issued about 100 certificates on 5.8 million ha in U.S., and SFI has 132 company participants 52 licensees, with 18 million ha in U.S., and the balance in Canada.

The three partners of the Southern Center for Sustainable Forests (SCSF) certified much, but not all of their forests as part of this cooperative research and outreach project. There were three forests certified: (1) The NC Division Forest Resources—27,000 ac; (2) North Carolina State University—with 3 state and 2 forestry foundation properties—4,500 ac; and (3) Duke University private lands—7,000 ac.

Our forests have diverse tracts and objectives. The state Division of Forest Resources has production; amenity/biodiversity, and demonstration objectives. NC State University has multiple objectives for its forests, including education, forestry camp, income for merit undergraduate and graduate scholarships, outreach, and recreation. Duke manages forests for education, research, and recreation purposes. All of our forests must be self-supporting, and in fact usually must generate cash flows to fund all of the multiple forest objectives, as well as provide some modest returns back to the parent organization.

Southern Center Certification Process and Results
Each organization prepared for certification of our forests in 2000; each had separate forest certification inspections for SFI and FSC in sequence in 2001. The initial certification audits were paid for by a grant from the Pinchot Institute, and we have assumed these costs since. We have had annual re-audits for FSC each year. The annual FSC audits examine progress on the certification implementation and progress on meeting the usually many conditions and continuing action resolutions required by FSC. A major SFI re-audit was due in the third year after certification, although this was delayed until the fourth year due to the timing of the receipt of the actual certification certificate, and problems in issuing the (state) contracts with NC State University and the DENR DFR. SFI will now require annual surveillance audits each year as well. The SFI audits check on ongoing practices, check on correcting minor non-conformances, and our required participation in the State Implementation Committee.

Non-Conformances, Conditions, and Management Responses
We all had a significant challenge in meeting the certification standards for the first time, since we started from no specific preparation to being certified within about one year. For the first certification, the NC Division of Forest Resources had 6 major non-conformances (of 10 objectives) and 5 minor non-conformances. They made written reply on how they would remedy these shortcomings, and were then certified after a review of that report. The DFR was certified by FSC after meeting two pre-conditions. They then had 32 conditions and many recommendations.
In 2001, NC State University had 9 major non-conformances and 6 minor non-conformances under SFI. They made a written reply and plan changes to verify fixes, followed by a December 2001 remedy audit. They then met the standards and became certified in 2002 with 3 minor non-conformances. For FSC, NC State passed the audit with 1 pre-condition (clearcuts must be less than 40 ac), 23 conditions, and 12 recommendations.

Duke had 1 major nonconformance, and 2 minor non-conformances under SFI, and made a written reply to verify that they had corrected the shortcomings. For FSC, they passed the audit with no pre-conditions, and had 14 conditions and 14 recommendations.

Paraphrased examples of the management changes required to meet the SFI standard, or conditions that followed certification for FSC, are shown below.

Table 1. Selected Required SFI Management Changes – NCSU, 2001

- Management plans required for each forest
- Site specific plans for each timber sale
- Better worker training and safety records
- Better roads to meet BMP standards
- Train or use road contractors trained in proper BMP installation
- Quarterly BMP monitoring and inspection
- Maintaining all SMZs at 50 feet, not just meeting state Forest Practice Guidelines
- Water bars on steep slopes
- Water bars/dips on horse path breakdowns
- Clarify visual amenity and clearcut guides

Table 2. Selected Required FSC Management Changes – NCSU, 2001

Pre-condition

- 40 ac clearcut unless justified

Conditions- change w/in one year (23)

- Process to work better w/stakeholders
- Employ post harvest inspection checklist
- Plan to include landscape considerations
- Write ecological and silvicultural rationale for stand prescriptions
- Create a chain-of-custody process
- Incorporate neo-tropical bird/snag monitoring efforts in management plan
- Clarify “Special Use” areas with 20% or more in natural or semi-natural state
Table 3. Selected examples of Required SFI Management Changes – DFR, 2001

- Use SMZs by all streams and ditches
- No ditch outlets directly into streams
- Use utilization standards in all timber sale contracts
- Demonstrate current water quality and wildlife research activities
- Provide adequate training in wildlife and biodiversity
- Incorporate continuous improvement into annual personnel evaluation process

Table 4. Selected examples of Required FSC Management Changes – DFR, 2001

Pre-Conditions:

- Complete management plan
- 40 ac plantation clearcut max, unless have green tree retention for vertical structure

Conditions within 1 year

- Demonstrate support of FSC principles
- Develop stakeholder input process
- Provide guidance to field staff on minimum impacts to be assessed in the field before taking actions
- Modify rate prescriptions for chemicals

Conditions within 2 years

- Identify alternatives for use of chemicals
- Monitor environmental effects of timber harvesting, site prep, and chemical application
- Publish annual summary of all monitoring on state forest
- Identify and delineate high conservation value attributes
- Restore permanent fire lines to their approximate original grade and increase potential for native groundcover

Subsequent efforts required to maintain forest certification for Duke and Division of Forest Resources are paraphrased in the tables below.
Table 5. Selected Duke Internal Efforts, SFI and FSC, 2002-2005

SFI

- Revise wildlife management plan, recalculate Shannon-Weaver Diversity Index
  - 200 hrs, training
  - 20 hrs/yr (variable, 8-32 hrs/yr)
- Support of State Implementation Committee - 9 hrs
- Senior management review of SFI conformance – 2 hrs
- Long term sustainable yield calculations - 700 hrs

SFI & FSC

- Identification and maintenance of High Conservation Value Forests – planning, 12 hrs
- Natural Heritage proposal 20 hrs, implementation and maintenance/year

FSC

- Economic analysis of forest practices, 10 hrs
- Disseminate safety guidelines, informational signs
  - $700+56 hrs, policies, web site 5 hrs
  - Plus annual documentation 24 hrs/yr
- Written prescriptions w/ ecological & silvicultural rationale
  - 16 hrs plus 20 hrs/year
  - 2 hrs/management prescription
- Protocols specifying stand level considerations
  - 12 hrs plus 20 hrs/yr
  - 2 hrs/management prescription
- Assessment of fertility and compaction - 12 hrs
- Plans/policies to achieve strategic goals
- Annual report and plan - 40 hrs/yr
- Process for making mgmt plan available
- Website - 1 hr
- Chain of Custody Procedure - 16 hrs (implementation)
- Gather stakeholder attitudes/opinions
  - Stakeholder lists, biennial meeting - 6 hrs plus 12 hrs/year
- Review of timing of inventory and incorporation into management plan
Table 6. NC DFR Experience, FSC&SFI, 2002-2005

FSC

- Annual audits, 2002-2005
- Note – contract problems, with FSC and SFI
  - Sole source providers
  - State procurement challenges
- Preparation
- Old: Notebooks
- New: CD with hyperlinks to standards
- Audit process: day 1: office, paperwork; day 2: field trips
- Impression: well organized, friendly

SFI

- Needed to become a licensee of SFI
- Used same process as FSC with CD, hyperlinks to standards
- Not re-certified – 2 major non-conformances
  - Inability to perfect allowable cut
  - Inadequate continuous improvement element in job descriptions
- Impression: well organized, tense, intimidating and unfriendly
- DFR issues: lack of exact plantation area prevents exact allowable cut
- In theory, a new audit (not re-inspection), so need not show improvement yet

Certification Preparation and Audit Time and Costs

The time and costs for obtaining and maintaining certification for each system have been monitored by each of our organizations. The initial direct costs for obtaining certification were reported in Cubbage et al. (2003), and are updated below in Table 7. The subsequent annual time and costs of maintaining certification are summarized in the several tables below. Table 8 summarizes the time and costs for NC State with detailed breakdowns by type of activity as an example; Tables 9 and 10 summarize these data for all organizations. Table 10 includes the cost of preparing and paying for the audits, which were similar for all organizations, regardless of size. Payments included an average of $3,500 per year for the SFI audits, and $5,200 per year for the FSC audits for each organization. The SFI audit was a one-time cost after three years. This cost will increase in the future now that SFI has changed to require surveillance audits each year, and will be close to FSC annual costs.
Table 7. Direct initial costs of obtaining forest certification, 2001 ($)

<table>
<thead>
<tr>
<th>Practice / System</th>
<th>NCSU</th>
<th>Duke</th>
<th>DFR</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres</td>
<td>4500</td>
<td>8000</td>
<td>27000</td>
<td>39500</td>
</tr>
<tr>
<td>-- cost in dollars per acre --</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspections</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSC ($70K)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.77</td>
</tr>
<tr>
<td>SFI ($37K)</td>
<td>3.77</td>
<td>1.10</td>
<td>0.36</td>
<td>0.94</td>
</tr>
<tr>
<td>Preparation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSC ($15K)</td>
<td>1.87</td>
<td>0.60</td>
<td>0.06</td>
<td>0.38</td>
</tr>
<tr>
<td>SFI ($33K)</td>
<td>3.95</td>
<td>1.54</td>
<td>0.14</td>
<td>0.84</td>
</tr>
<tr>
<td>Total Direct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSC ($85K)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.15</td>
</tr>
<tr>
<td>SFI ($70K)</td>
<td>7.72</td>
<td>2.64</td>
<td>0.50</td>
<td>1.77</td>
</tr>
</tbody>
</table>

Notes: FSC costs were received as one price for all organizations, so are not separable. NCSU cost includes payment for a second remedy audit.

Table 8. North Carolina State University Direct Preparation Hours and Costs, 2002-2005

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Direct Preparation Hours</th>
<th>Direct Preparation Costs ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SFI</td>
<td>FSC</td>
</tr>
<tr>
<td>Preliminary meetings</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>Pre-audit meetings and preparation</td>
<td>160</td>
<td>240</td>
</tr>
<tr>
<td>Documentation preparation and collection of evidence</td>
<td>160</td>
<td>240</td>
</tr>
<tr>
<td>Office visits by auditors</td>
<td>36</td>
<td>32</td>
</tr>
<tr>
<td>Field visits by auditors</td>
<td>36</td>
<td>32</td>
</tr>
<tr>
<td>Post audit work</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Report analysis and response</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Total – four years</td>
<td>408</td>
<td>632</td>
</tr>
<tr>
<td>Average per year</td>
<td>102</td>
<td>158</td>
</tr>
</tbody>
</table>

Note: Costs assume labor and overhead at $50 per hour
Table 9. Certification Preparation Hours and Costs, 2002-2005

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Direct Preparation Hours</th>
<th></th>
<th>Direct Preparation Costs ($)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SFI</td>
<td>FSC</td>
<td>SFI</td>
<td>FSC</td>
</tr>
<tr>
<td>NC State University</td>
<td>408</td>
<td>632</td>
<td>20400</td>
<td>31600</td>
</tr>
<tr>
<td>4 year total</td>
<td>408</td>
<td>632</td>
<td>20400</td>
<td>31600</td>
</tr>
<tr>
<td>Avg/yr</td>
<td>102</td>
<td>158</td>
<td>5100</td>
<td>7900</td>
</tr>
<tr>
<td>Duke University</td>
<td>829</td>
<td>240</td>
<td>41450</td>
<td>12000</td>
</tr>
<tr>
<td>4 year total</td>
<td>829</td>
<td>240</td>
<td>41450</td>
<td>12000</td>
</tr>
<tr>
<td>Non-conformance response</td>
<td>1059</td>
<td>755</td>
<td>52950</td>
<td>37750</td>
</tr>
<tr>
<td>Total</td>
<td>1888</td>
<td>995</td>
<td>94400</td>
<td>49750</td>
</tr>
<tr>
<td>Avg/yr</td>
<td>472</td>
<td>249</td>
<td>23600</td>
<td>12450</td>
</tr>
<tr>
<td>NC DFR</td>
<td>550</td>
<td>500</td>
<td>27500</td>
<td>25000</td>
</tr>
<tr>
<td>4 year total</td>
<td>550</td>
<td>500</td>
<td>27500</td>
<td>25000</td>
</tr>
<tr>
<td>Avg/ yr</td>
<td>138</td>
<td>125</td>
<td>6900</td>
<td>6250</td>
</tr>
<tr>
<td>All Ownerships</td>
<td>2846</td>
<td>2127</td>
<td>142300</td>
<td>106350</td>
</tr>
<tr>
<td>4 year total</td>
<td>2846</td>
<td>2127</td>
<td>142300</td>
<td>106350</td>
</tr>
<tr>
<td>Avg / yr</td>
<td>711</td>
<td>532</td>
<td>35550</td>
<td>26600</td>
</tr>
</tbody>
</table>

Note: Costs assume labor and overhead at $50 per hour; Duke reported separate costs to correct minor non-conformances.

Table 10. Direct initial costs of maintaining forest certification per acre per year, 2002-2005 ($)

<table>
<thead>
<tr>
<th>Practice</th>
<th>Preparation</th>
<th>Audits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SFI</td>
<td>FSC</td>
<td>SFI</td>
</tr>
<tr>
<td>System</td>
<td>1.13</td>
<td>1.76</td>
<td>0.78</td>
</tr>
<tr>
<td>NCSU</td>
<td>3.37</td>
<td>1.78</td>
<td>0.50</td>
</tr>
<tr>
<td>Duke</td>
<td>0.26</td>
<td>0.23</td>
<td>0.13</td>
</tr>
<tr>
<td>NC DFR</td>
<td>0.92</td>
<td>0.69</td>
<td>0.27</td>
</tr>
</tbody>
</table>

We also estimated the impact of the preceding costs on discounted cash flow returns. For representative planted pine and natural hardwood stands, we estimated the base cash flows and capital budgeting returns with and without forest certification costs. Essentially, these costs are just an added negative cash flow in each year that they occur. We used the case of NC State and DFR in these analyses, which bracket the range for all three institutions. The effects of the returns on Duke would be fairly similar to those of NCSU.

These results of the discounted cash flow analyses are summarized in Table 11. Depending on the ownership size, certification costs reduced the Internal Rates of Return (IRRs) for typical pine management by .04 percentage points (DFR) to 0.31 percentage points (NCSU), and Land Expectations Values (LEV)s by only $10 per acre for DFR lands to $47 per acre for NCSU lands, at a 6% discount rate. For typical hardwood stands, IRRs decreased by 0.08
percentage points for DFR lands, and 0.43 percentage points for NCSU lands. Hardwood LEVs decreased $10 per acre for DFR lands and $54 per acre for NCSU lands.

Table 11. Analyses of Timber Investment Returns With and Without Forest Certification Costs: Internal Rate of Return and Land Expectation Value (6% discount rate)

<table>
<thead>
<tr>
<th>Species</th>
<th>Without Certification</th>
<th></th>
<th>With Certification</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IRR (%)</td>
<td>LEV ($/ac)</td>
<td>IRR (%)</td>
<td>LEV ($/ac)</td>
</tr>
<tr>
<td>Planted Pine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC DFR</td>
<td>9.46</td>
<td>604</td>
<td>9.40</td>
<td>596</td>
</tr>
<tr>
<td>NCSU</td>
<td>9.46</td>
<td>604</td>
<td>9.11</td>
<td>557</td>
</tr>
<tr>
<td>Natural Hardwoods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC DFR</td>
<td>3.63</td>
<td>-153</td>
<td>3.55</td>
<td>-163</td>
</tr>
<tr>
<td>NCSU</td>
<td>3.63</td>
<td>-153</td>
<td>3.20</td>
<td>-207</td>
</tr>
</tbody>
</table>

**Discussion**

This ongoing demonstration, research, and education project of the Southern Center for Sustainable Forests has provided considerable information about the practice and costs of forest certification for a range of ownership types and sizes. This summary provides one of the most detailed data sets on forest certification practices required, times involved, and costs that is publicly available. It provides a range of data based on the different size ownerships, which are still larger than almost all non-industrial private forest owners in the South.

The costs we computed and impacts are representative of larger owners, and include both paying for the audit costs and imputed costs of time spent on maintaining certification. We used $50 per hour for our “labor” costs of foresters, or essentially $100,000 per year. This is more than our foresters make, but would be a proxy for all the overhead costs including vehicles, fringe benefits, offices, equipment, etc. This should also provide a “high” estimate of costs and their impacts; it may be cheaper in some cases. Note also that it was the preparation costs that were most expensive in our certification. If less time could be spent, such as for large forest ownerships, or in group certification, or as in the Tree Farm System, the costs of forest certification would be very small and financial impacts minor.
**Time and Costs**

The time it took each organization to prepare for our first audits and receive certification varied considerably, from 67 hours to 117 hours per system for the NC DFR, and from 336 to 863 per system for NCSU (Cubbage et al. 2002). This time included document preparation, the field visits, and post audit required to satisfy any non-conformances or pre-conditions. To maintain certification, we needed to spend between 100 to 650 hours per year as well, including pre-audit meetings and preparation, document preparation, and field visits with auditors.

The time required to maintain certification led to moderate expenses for the foresters involved. This included the direct costs of paying for the audits each year, which averaged about $3,200 for SFI and $5,200 for FSC, which will both be more similar in the future with annual surveillance audits for both systems. The indirect costs of preparing for the audits and maintaining certification as an environmental management system were more significant. FSC average costs ranged from $6,250 (DFR) to $12,450 (NCSU) per year for each organization, and SFI costs ranged from $5,100 (NCSU) to $26,000 (Duke) per year.

The total costs of maintaining certification for SFI ranged from $0.39 per acre per year (NC DFR) to $3.87 per acre per year (Duke). For FSC, the costs ranged from $0.42 (DFR) to $2.92 (NCSU) per acre per year. These annual costs had small impacts on long-term discounted cash flow returns as measured by the IRR or LEV. The IRR changes were 0.06 to 0.43 percentage points less, and the LEVs were $10 per acre to $47 per acre less depending on ownership and species group. Forest certification costs had minimal impacts on the already low hardwood timber investment returns, and small impacts on pine plantation returns. Combined impacts of maintaining both SFI and FSC certification were greater, but still modest. For pine plantations, the worst case would be NCSU. For them, the IRR dropped from 9.46% to 8.71%, and LEV at 6% decreased from $604 to $495 per acre. For hardwoods, the comparable changes were an IRR decrease from 3.63% to 2.69% for NCSU and LEV decreases from -$153 to -$280 per acre. While significant, these costs are less than other costs (or benefits) that forest landowners may incur, such as sudden substantial property tax rises, changes in regulations, or government subsidy payments for forestry activities. Intensive management, better marketing, or timber stumpage price fluctuations and effective sales may have much greater impacts on timber investment returns than these forest certification costs.

**Benefits**

We also can identify benefits that we received from certification. None of these are better prices, unfortunately, but they are significant. First, we all surely have better environmental management systems (EMSs) since we adopted forest certification. We have better planning and discussion about our forest management, more thought about our principles and practices, more dialogue within our forest management and laborer groups, more continuous improvement of our practices, and much more documentation and records. We provide more
explicit training for workers, and pay more attention to guidelines for pesticides and best management practices.

We communicate more among our Southern Center partners, among the faculty and forest managers, and with external stakeholders. Certification has helped us learn and teach more about the principles, and probably increased morale among the foresters, even if it is for the common problems that achieving forest certification has caused. These indirect benefits also may help us maintain our reputation as leaders in forestry, and help forestry enhance its professional image.

Conclusions
Our experience found that maintaining forest certification has moderate direct costs to pay for audits and indirect costs of maintaining a forest certification EMS. NC State University had less costs for SFI than FSC; FSC was cheaper at the Division of Forest Resources and Duke. The total costs to prepare and maintain forest certification were fairly similar regardless of forest size. Thus the large DFR holding was consistently cheaper per acre than the smaller NCSU forests. Our conversations with industrial forest owners suggest that our cost range is typical of their expenses, with the large DFR ownership being more similar to the case of large ownerships.

FSC direct costs were more expensive because it required annual audits, but SFI has adopted that requirement as well now. FSC seemed to require less preparation time to maintain certification once it was received. This is somewhat surprising, since all our organizations had many FSC conditions and only a few SFI minor non-conformances. However, a minor SFI nonconformance—such as an excellent forest inventory or harvest scheduling approach—may sometimes require an effort that only large landowners are apt to be able to achieve well. FSC does take into account the scale of the owner in its audits, per explicit wording in its standards. However, comparative program costs surely depend on forests, staff, and certifier; there are no universal rules.

We might consider these certification costs in terms of their opportunity costs, as economists suggest. At NC State, the audit expenses of about $5,000 are equal to one or two undergraduate scholarships per year. These funds also may infer foregone opportunities for other forest management. On the other hand, the costs are only a fraction of the much larger Department and College research support and expenditures, which exceed $1 to $2 million per year.

Our efforts in obtaining and maintaining forest certification provide a practical example of its benefits and costs for fairly small scale owners. We all have one or more professional foresters on staff, but run fairly low-budget operations that must make a profit for our parent institutions. Certification has helped us learn more about EMS approaches and helped us teach more about the systems based on actual experience. We have walked the walk as well as talked.
Based on these efforts and our experience, we will take different paths for the future. We all think that it is too costly to maintain both forest certification systems indefinitely. Duke has chosen to only maintain FSC certification, at least partially due to the high time and cost requirements needed to meet the inventory and harvest scheduling requirements under SFI. The NC DFR has basically decided the same, for similar reasons and an adverse audit in 2006, and the excessive time requirements that would be required to correct the non-conformances. NC State has still maintained both systems, but is considering dropping FSC at least, and perhaps both systems, in favor of the American Tree Farm System. At a minimum, we concur that maintaining dual certification, particularly with the lack of any price benefits, is too expensive and time consuming. We will continue using some certification system in the future after consultation among our managers and internal stakeholders. The benefits we have received have been substantial, so we hope that we can continue to learn more and teach more about these systems based on our practical experience.

**Literature Cited**
