

THESIS

FOREST STEWARDSHIP COUNCIL

CERTIFICATION OF PUBLIC FORESTS: FIVE CASE STUDIES

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ABSTRACT

FOREST STEWARDSHIP COUNCIL

CERTIFICATION OF PUBLIC FORESTS: FIVE CASE STUDIES

This study characterizes the experience of five states that have chosen to pursue third party sustainable forest certification of publicly owned lands using the principles and criteria of the Forest Stewardship Council (FSC). Studying the impact of FSC certification on Minnesota, Wisconsin, Michigan, Ohio, and Pennsylvania may provide the Colorado State Forest Service and other forest stakeholders with an improved understanding of the potential impact of FSC certification of Colorado's public forests. This issue is especially pertinent to Colorado green builders who are attempting to acquire structural lumber from sustainably managed forests within a 500 mile (805 km) area of the construction site, as prescribed by US Green Build Council's (USGBC) Leadership in Environmental and Energy Design (LEED) standards. As there are no FSC certified forests in Colorado or neighboring states, sustainable builders cannot comply with some pertinent green building standards. Additionally, It is intended that this study will support sustainable forest policy studies and facilitate continuing research on the impact of FSC certification of Colorado public forests.

ACKNOWLEDGMENTS

I would like to take this opportunity to thank those people who have enabled me to complete this research and who have so enriched my understanding of sustainably managed forests and their significant role in constructing a carbon neutral built environment.

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good humor, showed me the errors of my ways, and always left me, her not so young novice, motivated to return to the drawing board to try it again. I am grateful to have had this unique opportunity to be guided by this cross-disciplinary team. The commitment of each of these scholars to advancing a more sustainable world through inspired and thoughtful research makes me desire to follow in their footsteps.

Lastly, I salute the departments of natural resources' civil servants, public and private foresters, forest scientists, environmental advocates, and wood products manufacturers of Wisconsin, Minnesota, Michigan, Pennsylvania, and Ohio who shared their experiences with me. These women and men from varied perspectives with differing missions provided important insights into how the FSC certification process impacted their forests and impacted the health of their forest communities. Moreover, I have been enriched by the sense of mission and passion that these professionals have for the stewardship of their states' forests, for the conservation of our finite natural resources, and for the preservation of our nation's environmental inheritance.

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CHAPTER 1: INTRODUCTION

Sustainable Forest Management is the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems. (Second Ministerial Conference on the Protection of Forests in Europe, 16-17 June 1993, Helsinki/Finland, Resolution H1, p1, para d.)

A. Background

Wood is one of the most sustainable materials available to the construction sector (Falk, 2010), and it is the preeminent structural material of choice for designers and builders for residential and commercial buildings up to six stories (Finkel, 1997). As green building continues to spread throughout the U.S. construction sector, the use of wood and wood products originating from sustainably managed forests will likely increase. This is encouraged, in part, by the United States Green Build Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program. The LEED program is a system of green building that provides industry-wide standards for what constitutes a certifiably green building (U.S. Green Build Council [USGBC], 2012). Increasingly, developers, architects, builders, interior designers, and consumers adhere to LEED standards as the accepted norm for all categories of buildings; thus, these industry professionals create ever-greater demand for wood from forests that can be FSC certified as sustainably managed, an important LEED standard (Turner, 2008). Because the Forest Stewardship Council (FSC) puts forth the most comprehensive certification standard for sustainably managed forests in the U.S.

(Pinchot Institute for Conservation, 2005), it is understandable that USGBC has adopted this standard.

In addition, it is expected when adhering to LEED standards that building materials, as much as possible, should be "...extracted and manufactured within the region [i.e., 500 miles (805 km)], thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation" (USGBC, 2006, MRc5.2 Reqs - NC v2.0). At this time it is not possible to apply this green building standard to construction projects in Colorado that require FSC certified structural wood products because there are no forests within 500 miles that have been certified by FSC as sustainably managed. Moreover, it defeats much of the purpose of green building if the acquisition of a sustainable product requires it to be transported long distances, thereby increasing the carbon footprint of the subject building. For example, the FSC certified forest closest to Fort Collins is the Potlatch Corporation forest in northern Idaho, a distance of 1,018 miles away. This unfortunate situation unfavorably impacts the nascent Colorado green building sector, possibly slowing the use of sustainable wood due to increased financial and environmental costs (i.e., carbon emissions from diesel locomotives used to transport wood building products from distant FSC certified forests to distribution centers within Colorado).

As the need for structural lumber originating from FSC certified forests increases among Colorado green builders, it may increase interest in FSC certification of state, federal, and private forestlands in Colorado. This immediately becomes problematic because the Colorado forest canopy is predominantly managed by the U.S. Department of Agriculture's U.S. Forest Service (USFS), the Department of Interior's U.S. National

Park Service (NPS), the U.S. Bureau of Land Management (BLM), and other U.S. government agencies. A map of land ownership in Colorado is provided at Figure 4. It should be noted that the USFS has tested FSC certification on five U.S. Forest units, but there are no programs or plans in place to implement FSC certification of federally managed forests in Colorado or elsewhere (mid-level USFS headquarters staff manager, personal communication, July, 2007).

B. Research Overview and Setting

The purpose of this research is to provide forest stakeholders with useful information by which they may better assess the benefits and costs associated with the potential FSC certification of publicly owned forests in Colorado. The information presented in this report summarizes a series of structured interviews of state civil servants, employees of wood products associations, and official representatives of forest advocacy and environmental organizations in the case study states of Minnesota, Wisconsin, Michigan, Ohio, and Pennsylvania during July and August of 2009. These interviews were augmented in the summer and fall of 2010 with interviews of Colorado forest stakeholders to determine the applicability of my case study observations and findings to their work and experiences. This report provides a record of the perceptions of interviewees regarding their respective state's experience with the certification of publicly owned forests by the principles, criteria, and processes of the Forest Stewardship Council-US (FSC). (Note: in this paper the abbreviation *FSC* refers to the U.S. chapter or "national initiative" of the Forest Stewardship Council-International [FSC-I], the worldwide parent organization).

C. Statement of the Problem

The problem motivating this research is green builders' need to use wood from FSC certified forests in their construction projects. This need is given further impetus by the green building standard to buy as much of the materials for a construction project "locally" as is feasible. According to the U.S. Green Build Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program standards, buying locally means purchasing materials that are acquired and fabricated or processed within 500 miles (805 km) of the construction site (USGBC 2006). It is currently impossible to purchase FSC certified wood products locally, because there are no FSC certified forests located within 500 miles. Because construction, particularly residential construction, requires large quantities of dimensional lumber, builders must transport this wood to construction sites in Colorado from over 1,000 miles (1610 km) away. Unfortunately, in order to transport dimensional lumber over such a distance creates carbon emissions that partially counters the benefit of using sustainably certified wood products. After identifying the need to study the potential for certifying forests in Colorado with the FSC to support the nascent green building industry, I determined that the Colorado State Forest Service was also interested in studying the process and feasibility for certifying Colorado forests in order to enhance the sustainability of their forest management program.

D. Research Goals

The first goal of this research was to acquire credible data on the experiences of other states with FSC certification of publicly owned forests and to analyze that data in order to provide the State of Colorado Forest Service managers and other forest stakeholders

with a baseline understanding of the potential benefits and risks in pursuing a similar public policy with Colorado forests. The second goal was to conduct research and analysis that aids in determining the potential feasibility of certifying Colorado forests with FSC to support the emerging regional green building industry.

E. Research Question, Topic and Data Collection Objectives

The question guiding this research was: *What were the experiences of other states with the certification of their publicly owned forests with the Forest Stewardship Council, and is that experience applicable to Colorado?* From this question I identified and framed the topic of this study: *What is the expected impact of FSC certification on publicly owned forests?* To answer this research question and to geographically define the source of data related to the research topic, I chose a method to acquire and document the informants' perceptions of their state's certification experience. Collecting and documenting these experiences was necessary in order to describe, characterize, and analyze each state's FSC certification experience I decided that the most appropriate primary method for collecting this information from individuals was to conduct structured interviews. Interview data were supplemented with written documentation that was prepared by the institutions, organizations, and other researchers involved in the experience.

F. Researcher's Perspective

As the researcher, I studiously avoided assuming any position in the age-old controversy of conservation versus preservation. I did not take a position on the merits and benefits of each of the several forest management standards. I chose to study only FSC certification, because it has a more rigorously and regionally nuanced set of criteria

and standards when compared with other forest management systems. Indeed, the Pinchot Institute for Conservation (2006) conducted a comprehensive review and comparison of forest sustainability management and certification systems in the U.S. In the comparison analysis of these systems, to include the forest stewardship system currently being used by the USFS, FSC principles and criteria included a greater number and wider spectrum of indicators for sustainable forest.

FSC certification also considers the impact on forest communities and indigenous peoples, who have important economic and cultural ties to the forestlands. Moreover, the governance of FSC, which is described below, encompasses a wide spectrum of stakeholders' input and has greater transparency in the development of its standards than most other forest sustainability management systems. Additionally, it includes a broader international and holistic eco-system perspective and is not overly influenced by any particular stakeholder interest group. Thus, considering each of these issues and benefits it was my perception that the FSC certification process holds greater promise in worldwide forest management improvement over time. That said, it is noted that other management systems are highly respected by various groups of forest stakeholders in America and that many of the persons interviewed for this study believed strongly in "dual certification" (i.e., being certified simultaneously by more than one certification system); this was the practice of all five states focused on in these case studies.

CHAPTER 2: LITERATURE REVIEW

Certification was developed to independently verify the quality of forest management, to communicate this to market players, and so to improve market benefits for the products of good management. (Bass, Markopoulos, & Grah, 2001)

A. Sustainable Forest Management Certification

In forestry, the FSC principles and criteria have become the most widely used set of standards, and an ever-growing number of FSC certified private and public forests are located in nearly all regions of the world; FSC is also the only global certification system (Bass, Thornber, Markopoulos, Roberts, Grieg-Gran, 2001). This system of forest certification was created to address the worldwide environmental degradation of forests. This environmental stress was greatly exacerbated by the impact of globalization and the growing need for forest resources, as well as the diversion of forestlands to other uses—primarily agricultural uses. Though FSC was started with a particular focus on the profound loss and degradation of Southern Hemisphere rain forests, as it has developed, the attention to FSC certified wood products has occurred primarily around Northern Hemisphere forests. Though more attention is now being directed toward Southern Hemisphere forests, nevertheless, FSC is a part of “mainstream market logics and practices [that] systematically encourage a privileged attention to Northern forests and actors” (Taylor, 2005). Indeed, 80% of certified forests are located in the Northern Hemisphere (Bass et al., 2001).

This paper will focus on FSC’s role in advancing sustainably managed forests in the U.S. through studying the experience of five states that have, or at the time of writing this paper, were in the process of completing FSC certification. In examining the

states' experiences of seeking a more sustainably managed forest, the primary issue of interest to this study is the *Certification Services* mission of FSC as it pertains to publicly owned forests.

FSC is an independent, non-governmental, not for profit organization established to promote the responsible management of the world's forests... It provides standard setting, trademark assurance and accreditation services for companies and organizations interested in responsible forestry. Products carrying the FSC label are independently certified to assure consumers that they come from forests that are managed to meet the social, economic and ecological needs of present and future generations. (FSC-I Website, 2008)

Until recent years, most of FSC's forest certification activities focused on privately owned or corporately owned forests. Starting in the late 1990s, increased interest in FSC certification of publicly owned forests emerged as a result of key stakeholders in the pulpwood industry who required that a percentage of all paper products be derived from pulp originating from certified sustainable forests. The majority of forestland in the Great Lake States from which wood pulp originates is, in fact, state or county owned forests.

B. History

1. The Need for Sustainable Forest Certification.

Bass et al. (2001) showed that the primary motivations for moving to independent, third party certification of forests were due to a lack of trust in to the government's ability to improve forest management. Forest owners and wood products producers were also concerned that the demand for product from sustainably managed forestlands would exceed the available supply. Both groups cooperated on a solution, and from their combined efforts "...forest certification emerged as a means of independent verification, linked by labeling to environmentally aware markets" (Bass et

al., 2001, p. 1). Though the formation of FSC began in California in 1990, its roots go back to the 1980s when World Wildlife Federation, and later, Friends of the Earth and other environmental organizations, initiated various programs to boycott tropical forest products; however, these groups turned to various certification schemes. Most of these schemes faltered and were not widely supported (Didier, 2009). The boycotts created numerous problems for conscientious users of tropical woods who wanted proof that their wood source originated from sustainably managed forests. An artisan who created musical instruments that routinely used tropical woods, Hubert Kwisthout, with the help of wood producers, wood product users, and environmentalists, formed the

Woodworkers Alliance for Rainforest Protection (WARP). WARP's goal was to create an independent system to certify responsible sources of tropical wood. At its first meeting in San Francisco in 1991, the participants agreed to name the organization the Forest Stewardship Council and agreed to develop standards for sustainable management of all forests throughout the world (Didier, 2009).

An interim board of directors was formed in Washington, DC in March of 1992, and the first FSC certificate for sustainable forest management was issued in Mexico in 1993. In October of 1993, this event was followed by the first FSC General Assembly in Toronto, Canada, which was attended by 130 participants from 26 countries. The Forest Stewardship Council – International (FSC-I) Secretariat was located at first in Oaxaca, Mexico but moved to Bonn, Germany in 2003. The *Principles and Criteria*, the heart of the FSC-I assessment program, were approved by the founding members in 1994. In 1996, the first certified and labeled FSC product, a wooden spatula, became available in the United Kingdom. In 2000, a FSC sponsored Global Trade Fair occurred in London,

UK and was attended by 1,000 participants from 52 countries. By 2005, the FSC-I website reported that FSC dominated the paper market in Europe and gained widespread recognition. An example of this recognition provided was that more than half of the citizens of Switzerland recognized the FSC label (FSC-I website, 2008).

The FSC-US Chapter opened its first office in Minneapolis, MN in 1995. Its purpose is to “coordinate the development of forest management standards throughout the different biogeographic regions of the U.S., to provide public information about certification and FSC, and to work with certification organizations” (FSC-US Website, *About Us: the History of FSC-US*, 2008).

2. FSC and the “Rio Meeting”

The U.N. Conference on Environment and Development that occurred in Rio de Janeiro, June 3–14, 1992, better known as the “Rio Summit,” or “The Earth Summit”, brought to the attention of public media and the wider world the serious problem being caused by greenhouse gasses (GHG) and their potential impact on climate change (U.N. Conference on Environment and Development website, 1992). The role of forests as key national and world resources that are essential to maintaining balanced, worldwide carbon cycles was an important topic of the Rio Summit. It is important to note, however, that several international declarations pertaining to climate change and sustainability were made at the end of this meeting, but the Agenda 21 and the nonlegally binding Forest Principles Declaration was watered down and, unlike the other agreements, was not legally binding. Thus, the impact was negligible (Didier, 2009).

Nevertheless, the Rio Summit provided a crucial forum for many nongovernmental organizations to come together and gather support for the innovative idea of a non-governmental, independent, and international forest certification schemes. (FSC-I website, 2012 History: An Innovative Idea Takes Root)

C. Governance

As an international organization dedicated to improving the world's forests, FSC has a diverse membership that includes environmental and social justice advocacy groups, timber trade professionals, forestry professionals, indigenous peoples organizations, corporations that process or distribute wood products, community forestry groups, sustainable development organizations, and forest product certification organizations. All major policy decisions are made by the General Assembly of FSC Members; the General Assembly has three membership chambers: Environmental, Social, and Economic (see Figure 1.). These three chambers represent the general grouping of stakeholders who have an interest in the future of America's forests. The members of the General Assembly elect 9 members to the Board of Directors, and board members serve three-year terms.

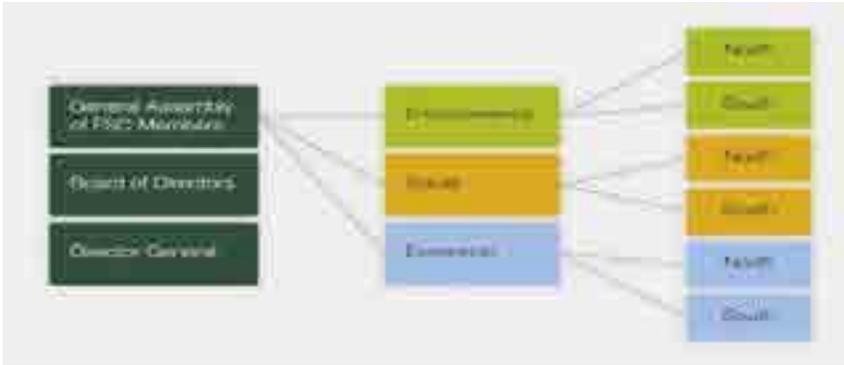


Figure 1. FSC Governance Process

Source: FSC-International, "Who We Are: Governance," acquired 8/15/12 from <http://www.fsc.org/governance.14.htm>

D. Certification Process

1. *Scoping:*

Scoping is a preliminary evaluation done collaboratively with the third party audit team and the forest managers 9 to 12 months in advance of the entrance or first year audit. Forest management documents are usually reviewed to assist the auditors with mapping the auditing process and to identify any problems that the forest managers should address prior to the entrance audit to avoid non-certification. The audit team identifies all key forest stakeholders so that invitations to participate in open hearings during the audit can be initiated. The activities occurring during Scoping not only set the direction for the actual audit and identifies all stakeholders so that they may be notified of the pending audit, but it also guides and informs the forest management staff so that they may be well prepared to support a successful audit event.

2. *Documents review:*

In preparation for the entrance audit, FCS's audit team will study all key internal forest management documents. These documents will be reviewed at the time of the

entrance audit in order to determine if any significant changes have occurred. This early review of documents will assist in identifying key inspection sites to audit and themes which required observation and/or interviews during the entrance audit.

3. *First Year Audit:*

At the beginning of the first audit year in the normal five year contract a detailed examination of the forest lands will occur to determine if what is stated in the management plans is occurring on the ground in the forest. The first year audit normally lasts about 2-3 weeks, depending on size of forest unit(s), and will typically be conducted by a team of 4-7 professionals to include foresters/silviculturists, wildlife biologists, botanists, ecologists, and sociologists or anthropologists (to address human dimensions impacted by the forest as it is currently managed, particularly related to forest communities and indigenous people). In the experience of case studies in this paper, these persons were accomplished professionals/academics with substantial field research and solid credentials in their respective fields. The first year audit may take 23 weeks, depending on forest size.

a. *Stakeholder participation:* The audit team is required to actively engage all forest stakeholders to include forest communities, environmental and forest advocacy organizations, social or indigenous groups, commercial organizations that are dependent on forest resources, professional and recreational associations, and other interested individuals. These dialogues with forest stakeholders usually occur at public meetings held in more than one location in or near the forest being audited. They are advertised in local media and organizations normally receive formal written invitations from the audit team.

b. *Reporting process:* Once the report has been completed, it is sent to the forest management agency for comment and review. This encourages an active dialogue between auditors and managers over the findings of the report. The agency may ask for corrections, but the audit team is not under any obligation to change the report. Once the comment period has ended, a final report is completed and sent to the forest management agency.

c. *Follow-on corrective action:* There may be both major and minor shortcomings identified in the reporting process. The agency is given a reasonable period of time to correct both major and minor shortfalls. Failure to correct major shortfalls may lead to non-certification. An example was Pennsylvania's first audit in 1998 during which the independent State Wildlife Bureau, not under the control of the State Forest Service, had pursued a policy for many decades of maximizing the deer population to support hunting. The uncontrolled deer browsing prevented successful forest generation and was thereby cited by auditors as a major shortfall that would result in non-certification if not corrected. This example from Pennsylvania required the intervention of the state's governor with the State Wildlife Bureau to prevent the State Forest Service from receiving non-certification (Keys & Wager, 2004).

E. Criteria, Standards and Measurement

1. Principles and Criteria.

There are ten (10) principles and fifty-six (56) criteria that express the FSC management's regime for a forest. Together, these principles and criteria represent FSC's core values and its organizational focus. These Principles directly affect the social, economic, ecological, cultural, and spiritual needs of present and future

generations (FSC-US website-FSC Rules, 2008). A complete list of the FSC principles and criteria are provided in Appendix E. The principles address the following issues:

- Prohibit conversion of forests or any other natural habitat
- Respect of international workers' rights
- Prohibition of use of hazardous chemicals
- Respect of Human Rights with particular attention to indigenous peoples
- No corruption – follow all applicable laws
- Identification and appropriate management of areas that need special protection (e.g., cultural or sacred sites, habitat of endangered animals or plants) (FSC Rules, 2008)”

2. *Regional Standards*

FSC-I must provide broad principles applicable throughout the world's forests. There are detailed Regional Standards (or policies) to customize the broad principles to specific and diverse eco-systems in various countries. In the United States, FSC-US is responsible for facilitating the development of these Regional Standards (see Figure 2.).

FSC-US has developed eight (8) separate sets of Regional Standards corresponding to the eight (8) recognized major forest ecology systems in the U.S. For example, in Colorado there are two sets of standards that are applicable: (1) The *Rocky Mountain Standard*, which covers that area of northern Colorado dominated by the Lodge Pole Pine, and, (2) the *South West Standard*, which covers the area of southern Colorado in which the Ponderosa Pine is more dominant (for details on Regional Standards see http://www.fscus.org/images/documents/standards/STND_RM_final_V2.PDF).

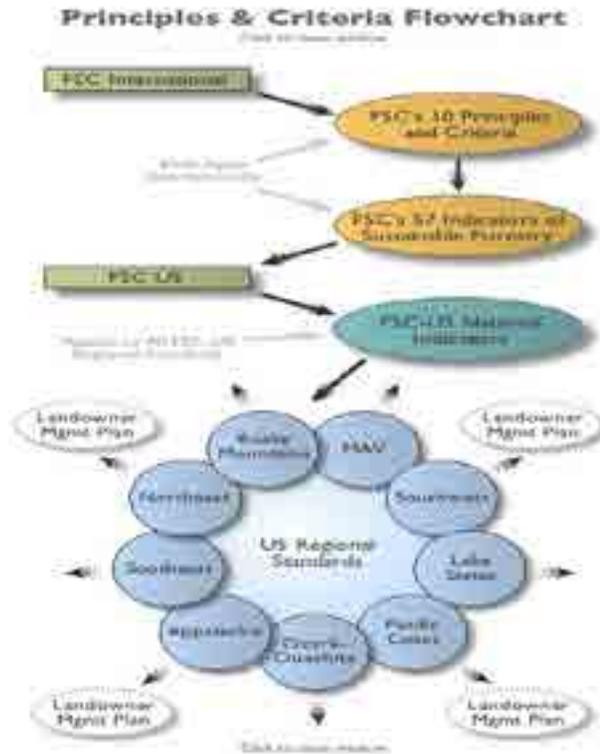


Figure 2. FSC Development of U.S. Regional Standards

FSC-US, "Standards & Policies," acquired 8/01/09 from http://www.fscus.org/standards_criteria/

F. Third Party Performance-Based Certification

In one of the first assessments of FSC certification of publicly owned forests in the U.S., Mater, Sample and Grace (1999) studied the experience of Pennsylvania, Minnesota, and Aiken County (in Minnesota) who completed third party audits of 1.5 million acres of state and county forests in 1997. As a result of SmartWood, Richmond, Vermont, an FSC affiliate, completing a certification of the Quabbin Reservoir forest land in Massachusetts in 1996, federal, state and county forest management agencies began to take interest in the results (Barten, Kyker-Snowman, Lyons, Mahlstedt,

O'Connor, and Spencer, 1998). The Pennsylvania and Minnesota certification projects quickly followed. The first project was 500,000 acres of Minnesota state and Aiken county, which were assessed separately by SmartWood. These are multiple-use forests that have highly sought-after timber used primarily for the lucrative pulp paper industry. This project was funded from the Rockefeller Brothers Fund.

A year later, the State of Pennsylvania's Bureau of Forestry began a second project with a grant from the Howard Heinz Foundation. This certification pertained to 1.2 million acres of state forestland. The following year another 1 million acres were added to the project (Mater et al., 1999).

The purpose of all three projects was to evaluate both the management of the subject forestlands and the process of certification. Certifiers conducted the audits by assessing the forest management system's compliance with FSC principles and criteria. Simultaneously, the certifiers were evaluated for their technical competency and performance (Mater et al., 1999).

Mater et al. (1999) indicate that the public forest agencies had four motivations to participate in these pilot projects:

1. To achieve outside verification of public land management, providing a third party perspective on the forest management practices.
2. To identify measurements for improvement from a competent outside source that may contribute new insights to the forest management regime.
3. To serve as a model to private land management. (Minnesota and later Wisconsin went on to develop comprehensive FSC certification programs for private owners of small acreage forestlands.)

4. To gain a better firsthand understanding of third party sustainable forest certification and to evaluate its potential to improve forest management. According to Mater et al., this approach to standards in the three pilot studies provided generally positive results (1999). Noted positive results included:

Better staff communication between field staff and the central office in both Pennsylvania and Minnesota state forestry agencies.

- Notable public and political visibility at regional, state, national, and international levels. In addition to many invitations to share their experience, the the state forest services received widespread recognition by citizens and politicians. In the case of Aitkin County certification efforts led the county officials to receive the Cooperative Public Service Award from Partnership Minnesota. In the case of Pennsylvania, where forest products are frequently destined for European markets, Pennsylvania forest products industry greatly increased their sales of hard wood floors to countries that only purchase FSC certified flooring products.

- Environmental support for private forests is generally uniform; however, there is more caution with the certification of publicly owned forestlands. The Audubon Society was actively engaged in the certification process as a stakeholder and was supportive of the results, as was the Pennsylvania Environmental Council; however, the national office of the Sierra Club voiced opposition believing that there should never be logging of any public lands. Mater stressed that the success of FSC certification is dependent on its credibility and its support by environmental groups.

While Mater focused on the forest management agency and the reasons that would lead to the agency's participation in third party forest certification, Ewald Rametsteiner and Markku Simula (2003) examined the actual process of certification and its potential impact on the forestlands and relevant stakeholders. In their broad assessment of sustainable forest certification, they showed that certification was a process by which an independent third party assesses the quality of forest management in relation to a set of predetermined requirements. They go on to explain how forest certification is a combination of both performance and process standards. Performance generally focused on ecological, economic, and social elements. Process focused on the actual management system and how it functions as part of a larger environmental management system. Most forest certification standards find their origins in the International Organization for Standards (ISO) 9000 series for quality and 14000 series for environmental management.

For forest certification to work there must be incentives to overcome the additional cost of the certification process. Having confidence that the forest is being managed according to a widely recognized regime of sustainable principles and criteria is reassuring to the public's sensibilities, but what advantages does it provide to the forest manager and all other stakeholders? Rametsteiner and Simula (2003) stressed that without tangible benefits, forest managers will have little incentive to improve their management at greater overall costs. Thus, a key indicator in the case studies that follow is to identify what tangible incentives make the cost of FSC certification worth the expenditure of time and resources.

CHAPTER 3: METHODS

A. Research Design

This research project used case study methods that adapted intensive interviewing and semi-structured interviews of individuals and small groups. To facilitate these interviews, I used a prepared list of open-ended questions with narrative reporting (Cresswell, 2008). Lofland, J., Snow, Anderson, and Lofland, L. (2006) state that

Intensive interviewing...encompasses both ordinary conversation and listening as it occurs naturally during the course of social interaction and semi-structured interviewing involving the use of an interview guide consisting of a list of openended questions that direct conversation without forcing the interviewee (usually referred to as the "informant") to select pre-established responses. (p. 17)

This blended method is intended to "...elicit from the interviewee rich, detailed materials which can be used in qualitative analysis" (Lofland et al., 2006). Rather than focusing on a sub-culture and its patterns of behavior, this study focused on an issue and on how people and organizations responded to that issue within a bounded system. In this case the bounded system is a specific state's publicly owned forestlands and the people whose vocation and life are directly connected to and impacted by what occurs to these forestlands. More specifically, this research is a *collective case study* where five separate case studies were developed that all focused on the same central issue of concern in this research: the FSC certification of publicly owned forests. Cresswell (2008, p. 477) states that a *collective case study* is one in which "multiple cases are described and compared to provide insight into an issue." In this study each case provided insights into this one central issue and showed how various state governments and local forest stakeholders responded to the FSC certification of their publicly owned

forests. Each case study was a separate bounded system and, thus, the study was of five bounded systems and the experience of those actors engaged in that system. During the course of the study, certain themes were identified that appeared across cases and that could potentially impact Colorado or other states seeking FSC certification of public lands. These themes emerged as repeated issues or experiences among the diverse sources that participated in this study. These themes were compared and analyzed with due consideration given, where possible, to how they may or may not apply to the forests of Colorado. In addition to the experiences of the persons operating within each bounded system, the specific details of the FSC certification process in each system was documented with supporting personal or group narratives; then the processes were described, characterized, and compared.

In addition, official open source documentation was obtained from the state governments and from other organizations that were public forest stakeholders or FSC certification agencies to include actual certification audits.

It should be noted that the purpose of a case study is not to generalize from the experiences of a small group of participants to a larger population having a similar experience (Creswell, 2007). Rather, it is to document and characterize the events and to observe the lessons learned through the narrative experience of the people who participated in the subject event (Creswell, 2007). Creswell emphasized that the data collection, which includes a detailed description and full chronology, may identify key issues, though "...not for generalizing beyond the case, but for understanding the complexity of the case" (p. 75). Creswell went on to say, "One analytical strategy would be to identify issues within each case and then look for common themes that

transcend the cases.” Identifying these themes and possible “lessons learned” from this event will enable others to identify patterns or issues which to avoid or to replicate as appropriate in future similar endeavors in such endeavors, researchers must fully recognize necessary adjustments to account for differing environments, circumstances, boundaries, organizational cultures, political/legal systems, personalities, and community values. Doing a *collective case study* provided more than one bounded experience pertaining to the same issue; with this, lessons learned can actually be compared. This comparison facilitated identifying similar patterns or events that appear in separate bounded systems.

B. Source Population

The states that were the focus of this study were selected based on two criteria: (1) they had state-owned and state-managed forests that were FSC certified (Note: Ohio had committed to FSC certification but had not completed the process at the writing of this report) and (2) they were in the same region of the U.S. and, thus, they had similar geographical, ecological, and cultural characteristics. An additional contributing reason was that these states, with the exception of Ohio, had all initiated and complete FSC certification in the same general time frame, and they were the first states to conduct FSC certification of their entire state forest or park systems.

The source population for each case study consisted of the State Forester or his or her designee, the State Forest Planner, and/or the State Forest Certification coordinator for each of the five states studied. At least two state civil servants who were actively involved with the FSC certification were interviewed in each state. Additionally, at least one officer or employee of a state-wide wood products association and one

official representative of a state-wide forest advocacy and/or environmental organization was interviewed. In a few cases, sources of opportunity were identified such as former government employees, academicians, or consultants with unique and authoritative historic knowledge of the certification experience. There were several instances of group interviews of 2-5 individuals at one time.

C. Research Instrument

The scripted questions (Appendix B) were intended to evoke answers that would assist in characterizing the historic chronology and characterizing the source's perceptions of the FSC public forest certification process in the subject's state or county. Perceptions of past and present experiences were the focus of the scripted questions. The rationale of focusing on sources' perceptions of the certification event(s) was to characterize the benefits, risks, organizational and social factors, and costs and lessons learned from their experiences.

D. Data Collection

I conducted a series of personal interviews during July and August of 2009. Most interviews were conducted in the informant's work space. When this was not possible, telephone interviews were used. Additionally, during each interview, a list of scripted questions (Appendix B) was used to guide each interview. Each question was addressed, though not always in the scripted order. My approach to asking the questions was to let the interviewee answer the question in an open-ended manner as I took notes. No electronic recording occurred in order to encourage uninhibited responses in a non-attribution interview where confidentiality was agreed to in advance. I would interject additional questions to either clarify the information that the interviewee

provided or to expand the questions to cover an unanticipated relevant subject that the interviewee brought up.. It was the intention my intention to permit the source ample freedom to answer the question and to raise additional issues as he or she wished. If the source failed to answer the question, then the source was courteously redirected to focus on the original question. Occasionally, the source was unable to answer the question. When this occurred it was noted and, where appropriate, the source would be asked for a referral to a local subject matter expert who might have the answer to the question. This occurred only a few times during this research. I restricted my participation in the dialogue to only asking the questions and occasionally requesting clarification to ensure I accurately understood their communication. I maintained an objective role before and during the interview and did not participate in personal reflections, nor did I interject any form of analysis until after the formal interview had been completed.

CHAPTER 4: RESULTS



Figure 3. Mount Sneffles Autumn #2 near Telluride

(Used by permission of John Fielder's Colorado, 833 Santa Fe Drive, Denver, Colorado 80204, (303) 744-7979, <http://www.johnfielder.com/home.php>).

1. The size and ownership of the forests in the case study states contrasted sharply with Colorado. Most of Colorado's forestland is managed by agencies of the federal government; its state-managed forestlands are relatively small. By comparison, the case study states had very limited federally managed forestlands, and the greater mass of forestland was managed by the state and counties (see Table 1). In addition, all case study states were similar to Colorado, in that they had coniferous forests; nevertheless, their forestlands were predominately broadleaf hardwood forests. Indeed, it is the latter that support most of the revenues that are derived from their large wood pulp industry. In comparison, Colorado's modest forest and wood products industry does not provide a similar portion of state revenues nor employs as many workers. .

Table 1.						
Forestland Size (millions of acres) by Major Categories & Percentage of Total State						
Land Mass (in parentheses) with Comparison to Colorado						
Case Study States	Federal	State	County/City & Tribal	Private	Forest Industry	Total
Michigan	2.70 (15%)	4.05 (21%)	>1%	10.6 (56%)	1.50 (8%)	19.30
Minnesota	2.10 (13%)	4.40 (27%)	2.30 (14%)	7.50 (46%)	Unknown	16.30
Ohio	0.27 (4%)	0.45 (6%)	0.24 (3%)	6.20 (76%)	0.93 (12%)	8.10
Pennsylvania	0.60 (4%)	3.80 (27%)	0.40 (2%)	8.90 (54%)	2.10 (13%)	16.60
Wisconsin	1.60 (10%)	1.10 (7%)	2.40 (15%)	11.10 (68%)	Unknown	16.20
Colorado	16.00 (68%)	0.60 (3%)	0.60 (2%)	7.10 (30%)	0.00	24.40
Note: Ohio was in the process of preparing for its first FSC audit at the time of this study.						
Source: case study states' Department of Natural Resources/State Forestry Agency websites						

Table 2						
Forest Measurement Impact Indicators.						
Case Study States	Timber Harvest (1000 Acres)	Stumpage Sale	Commercial Species	Forest Economy (Billions \$)	Forest Products (Billions \$)	Wild Fires (1000 acres)
	¹ (Average Size)					
Michigan	52.00 (1.1%)	Unknown	6.00	12.00	9.00	5.00
Minnesota	40.00	30 acres	6.00	7.00	Unknown	35.00
Ohio	unknown	72 acres ²	5.00	15.10	Unknown	4.50
Pennsylvania	14.00 (.01%)	Unknown	5.00	27.00	16.00	1.10
Wisconsin	52.00 (3%)	134 acres	Unknown	30.00	20.20	5.00
Source: Compiled from case study states' Department of Natural Resources/Forestry Agency websites						

Even with these significant differences, the forest management problem is essentially the same: How does the state forester maximize stewardship of the landscapes and habitat for which they are responsible for the best possible benefit for the largest number of stakeholders?

2. In nearly all case study states, forestry service staff and forest stakeholders expressed misgivings about outside experts coming into the state and providing a critical evaluation of state forest management practices and conditions. In all states, these early misgivings eventually dissipated once FSC accredited third party forestry auditors arrived in-state and began interacting with state foresters and with stakeholders.
3. Without exception, all state foresters that I interviewed praised the evaluation process and gave substantive examples of how their management of state forest lands improved as a result. Even when there were occasional disagreements between evaluators, the disagreements centered around how best to proceed on an improvement; these disagreements were invariably mitigated once improvements were accomplished.
4. In several cases the third party certification evaluation enabled the forestry service to confront and to make progress on chronic problems, many of which the forestry service had been unable to resolve due to internal political issues, often between state government agencies. A good example was an instance of overbrowsing of deer in Pennsylvania. There were 25 deer per square mile in Pennsylvania State Forests, which far exceeds the norm necessary to permit natural regeneration of the forest. This chronic problem remained unresolved for many decades in that the deer

were under the purview of the State Game Commission, which traditionally kept the deer population high for the benefit of the powerful hunting lobby. Only after the certification evaluation was not approved due to the damage being caused by the deer and the lack of a deer control plan did the Bureau of Forestry finally get the attention of senior policy makers in the state to aid them in resolving the issue with the State Game Commission. Thus, the certification process actually provided the state forest service an awareness by senior state government officials of their unresolved problems due to either policy or funding, and simultaneously highlighted their successes which are confirmed unbiased third party auditing.

5. Without exception, through the process each state forest service discovered ways to significantly improve their forestry management and services to their stakeholders. All state foresters interviewed believed that the FSC evaluation audit process brought their management policies, plans, methods, and insights to a higher level of quality and effectiveness.

6. Nearly all stakeholders interviewed, including forest products association staff and forest advocacy and environmental organizations were supportive of the certification process. Members of the forest products association believed it secured their market position due to the greater demand for FSC certified products, particularly pulpwood. Some state chapters of environmental groups were strongly in support, even if their national headquarters opposed certification. A few organizations were exceptions to this trend. Even then, they were not opposed to FSC evaluation (they strongly supported and were grateful for the demand by FSC auditors for greater transparency in forest service planning and operations). Their opposition was

predominantly philosophical: they opposed removing any trees from any publicly owned forest land and believed FSC audits might provide a rational basis for increased timber harvests. They either reject sustainably managed forests as a goal, preferring all publicly owned forests be converted to dedicated wilderness areas in which there is essentially no management nor human intervention, or they believe that removing trees (or any natural resource) from publicly owned land is tantamount to stealing from the citizens. These positions were held only by a few of the advocacy organizations, and, I might note, in another state, the same organization might have an entirely different position. There was little consistency between state chapters of some nationally known environmental organizations and in some cases, between the state chapters and the national headquarters of an environmental advocacy organization.

7. Two themes developed in this study that garnered the widest support from all participants for third party certification. The first theme was the idea that sustainably managed forests are those in which the management regime is firmly based in sound forest science. In this case, “sound forest science” was considered as the best practices widely accepted among forest scientists and well-documented in peer reviewed professional literature. The second theme that was widely supported was a need for transparency in forest management and planning in which all stakeholders are encouraged to participate. It was apparent that basing forest policy on clearly understood and well-established scientific research principles and criteria frequently aided in building a consensus among various forest stakeholders pursuing diverse agendas about best practice in a given forest canopy. Moreover, the methodical auditing scenarios where all stakeholders were invited to participate in and to interact

with the FSC auditors, and with other stakeholders, provided a process by which increased communication could occur and disagreements could be addressed constructively and openly. In addition, the facilitation of this communication by third party knowledge experts who were from outside the state, and, thus, generally detached themselves from local interests and agendas, provided an important service that enhanced overall understanding between stakeholders. The auditing process itself focused the dialogue among stakeholders and was a healthy point of departure for developing follow-on forest plans and policies.

8. An unexpected finding of this study was that there appeared to be a generational difference in perspective on forest management between state foresters. This theme appeared in all case studies. The forest and resource managers from the older generation that were interviewed all expressed, with only a few exceptions, reluctance to, and in some cases resistance to, having a third party review their state's forest management practices. However, without exception, these views held by the older and, thus, more senior managers in the state forest services and Departments of Natural Resources (DNR) were totally reversed during or after the audit process was completed. The older generation managers clearly saw substantive insights, innovations, and, frequently, political leverage created to resolve seemingly intractable inter-agency conflicts that previously prevented improvements for the state forest system. At the beginning of the audit process, younger foresters and managers appeared to favor the give-and-take of a more active public engagement with stakeholders that is required by FSC criteria and standards.. They also valued input and fresh analysis of their practices by scientists who were outside of the local forest

stakeholder community. Generally, the younger managers viewed an outsider's perspective as potentially insightful about which current practices were best which shortcomings they may have overlooked in their day-to-day work.

A good example of new insights and raising awareness of forest issues outside of the Department of Natural Resources was the chronic issue of deer over-browsing mentioned above that plagued the Pennsylvania State Forest Service. Only when FSC auditors identified the lack of a policy on this issue which would prevent FSC certification did the state forest service receive relief from the state governor (who feared non-certification would cause a decline in the important state wood products industry and, thus, a decline in the state revenues).

Another example of new insights and innovation occurred in Wisconsin where innumerable small to medium forest acreages owned by private parties that often are in, or adjacent to, state forest lands. No attempt had been made to ever integrate a consistent sustainability management plan based on a geographic based ecosystem rather than man-made land boundaries. Based in part on the recommendation of the FSC auditors a comprehensive small holder FSC certification program was initiated in order to create a state-wide comprehensive and integrated sustainable forest management plan regardless of land ownership. Tax credits were introduced by the state legislature that gave small holders financial incentives to participate in the program. Moreover, having FSC certified forest lands gave any logs harvested from these small holders' lands a premium value in the wood products market.

It should be noted, as well, that an important social change occurred in most cases between older generation forest managers and the diverse stakeholders in each state.

In the past, older foresters and managers were leery of open meetings in which stakeholders had opportunities to raise questions and make suggestions. Two of the older generation chief state foresters from this research's case studies provided an example of this bias by specifically and separately stating that it had always been the unwritten policy to avoid public meetings of forest stakeholders whenever possible. In the past, when these meetings were unavoidable, older managers found it important to control the agenda so that the stakeholders would not attempt to change current forest operations or budget. This is diametrically opposed to the FSC audit procedures in which open meetings occur during the audit process to solicit input from all forest stakeholders. The younger generation managers felt that these open meetings were important for building a consensus on forest planning and important for identifying issues that they might have been overlooking in their day-to-day work. The older generation managers' resistance to open meetings of forest stakeholders generally abated as they saw how those meetings unfolded with positive results due, in part, to the facilitation of FSC auditors who conducted the meetings.

9. Performing a pre-audit was an important aide to conducting a successful FSC certification in the states I researched; this audit was a comprehensive in-house review of management procedures, policies, training, database updates, and plans prior initiating the FSC certification process. All states in this study included a pre-audit in their contract with the FSC accredited certification agent to occur 9–12 months prior to

the actual audit-of-record. Some state forest services organized employee teams to do the preparation work, and others assigned these duties on a full-time basis to an experienced and highly motivated employee who coordinated and facilitated the forest service units' preparatory actions. It was also determined as a common theme among these states that another aide to success was to have a pre-audit visit by the team of FSC auditors 9-12 months in advance of the initial audit. For those states that used a pre-assessment, it proved to be the best preparation for the full audit. Additionally, states that put together an internal task force or certification preparation team to work all issues that surfaced in the pre-audit fared best and were able to take the greatest advantage of the FSC evaluation process. Though this added considerable work to forest service employees for the 12–18 months prior to commencement of the actual FSC audit, the desire to make sure the state performed well in the certification process created a highly motivated team.

10. In the final contract with the FSC accredited certification contractor, state forest services needed to ensure that timeframes for accomplishing goals were clearly stated. There were some reported issues with FSC audit teams not completing their pre-audit or final audit reports in a timely fashion. This made it more difficult for the state forest services to plan and organize budgeted resources to address corrective action that might be required by the FSC audit report.

CHAPTER 5: DISCUSSIONS AND CONCLUSIONS

A. Conclusions

This study concludes that it was beneficial to certify publicly owned forests in the states studied in this research. Overall, these states have had a positive experience with FSC certification, which in the perceptions of nearly all interviewees simultaneously enhanced state forest management and benefited the state wood products industry. The cost-benefit analysis - supported FSC certification of public lands in these states, primarily due to the wood products industry being a major component of their state economies (9-20 billion dollar industry in each of the states) combined with the demand of their largest customers for FSC certification; in contrast, it remains uncertain that FSC certification will significantly benefit Colorado forest stakeholders due to Colorado's relatively small wood products industry (2002 estimated at about 850 million) and no major customers demanding FSC certification. If significant growth in USGBC LEED based green building occurs in the years ahead FSC certification of public and private lands may potentially stimulate growth of an FSC based niche of the wood products industry in Colorado to support local builders. However, this is speculative and is dependent upon many variables beyond the control of the wood products industry. A follow-on study of the Colorado wood products and home building industries, including a detailed cost-benefit analysis and an evaluation of potential scenarios for introducing FSC certification of both state and federal forests is an appropriate next phase for this research and may provide needed information to guide decision making regarding FSC certification of public lands. However, it must be cautioned that an FSC certification initiative would should be vetted with all forest stakeholders to ensure good

communication and to avoid misunderstandings. Some environmental organizations that are philosophically committed to converting all publicly owned forests to wilderness areas might resist FSC certification, believing it might increase tree harvesting. Though a sustainably managed forest must limit tree harvest to retain its ecological integrity and preserve flora, wildlife, and watershed components. Nevertheless, this perception is a legitimate concern that should be further investigated. An appropriate next step would be to conduct a controlled experiment to test this hypothesis to determine if FSC certified forests would stimulate logging demand beyond a forest unit's sustainable capacity.

B. Discussion

1. The general experience of nearly all persons interviewed during this research was that the benefits of certifying their state-owned or county-owned forests with the FSC were positive and tangible, with few downside risks. Though the certification experience frequently began with some confusion, doubts, and occasional opposition from various stakeholders, this opposition abated after the certification process was completed. Nearly all local forest stakeholders, including most local forest advocacy and environmental organizations, agreed that the benefits are generally positive and tangible. It is to be noted, however, that there was a wide spectrum of responses from environmental and forest advocacy organizations. Some organizations are strong advocates of certification of publicly owned forests; others have taken a wait-and-see attitude; some believe that FSC was intended to certify private forest land and not public forest lands; still others believe it is appropriate to certify state, county, or privately owned forests, but draw a line with federally owned forests. Some stakeholders who

were opposed at the beginning of the certification process have come to recognize the benefits, but they are still concerned or suspicious that the process may not serve the best interests of the public in the long run. Nevertheless, nearly all sources interviewed agreed that having an objective third party team consisting of scientists and subjectmatter experts inspect and analyze the state or county forest management and planning regime reaped significant improvements in public forest management. Additionally, with almost no exceptions, those interviewed believed that the FSC certification process actually increased management transparency and encouraged increased stakeholder participation in local forest planning. Finally, in the case study states there was a widespread belief among those interviewed that there were tangible benefits of FSC certification to their forest management by enhancing their sustainability; to their forest economy by expanding its value and performance; and to the wood products industry by its ability to offer certifiably sustainable products to a growing market of sustainablyminded consumers.

2. This study originated in the idea that if some or all of Colorado forests could be certified by FSC, then there would be a local (i.e., within 500 miles of the construction site) source of timber for structural lumber which could then be used by the nascent green building industry. The five case studies clearly showed that, in their own unique situation (public lands, state and/or county forests), forests could be successfully .e. ^{A1]} FSC certified with commensurate pay back, both in marketing of the resulting timber and in improved forest management. But here is where there is a significant departure in the situation between Colorado forestland and the five case

study states. Colorado's wood products industry, which has waned in recent years, when compared to the case study states, is much smaller. This is primarily due to the lower value of soft woods compared to hard woods and the much smaller yield (both potential and actual) from Colorado's forest canopy. Moreover, Colorado does not participate in the pulp wood industry, which is exceedingly profitable. Thus, the fees paid by the case study states to have their forest lands FSC certified were negligible when compared to the potential payback, in that the wood products industries contributed billions of dollars to their state economies. This is not the case in Colorado where there does not appear to be any identifiable immediate financial payback for the expenditure of public funds to pay for the FSC certification. However, if the green building industry were to increase in Colorado and nearby states, the small mills currently operating in Colorado would likely benefit. This is particularly so if an FSC niche market could be developed with the help of national lumber distributors having outlets here in Colorado, and if the initial auditing process were to be financed by the federal government or private foundations as has occurred in other states. However, any hope of advancing the niche FSC industry in Colorado would require substantial leadership, education and collaboration by members of the wood products and the green building industries. Substantial education, surveys of forest stakeholders, research on marketing and distribution strategies for FSC certified forest products and a follow-on controlled experiment conducted in partnership between Colorado State University, the Colorado State Forest Service, the USFS, and USBLM to test FSC certification and its local community and state-wide impact would be needed to advance an FSC certified niche industry in Colorado. Without this research showing widespread

support and understanding of FSC certification, pursuing such a plan would be highly speculative.

3. A second significant difference identified between Colorado and the case studies included in the study was which government entities publicly owned forestlands. In Colorado 68% of the forest canopy is managed by a federal agency, whereas in the case study states, federal agencies owned only 4-15% of public land. Similarly, in Colorado only 6% of all publicly owned forest land is managed by the state, whereas in four of the case study states, the publicly owned forests range from 22–41% (Ohio had the lowest percentage of publicly owned forestland, at 9%). This means that FSC certification would be best served if applied to the federal lands in Colorado where much of the timber that is harvested in the state originates.

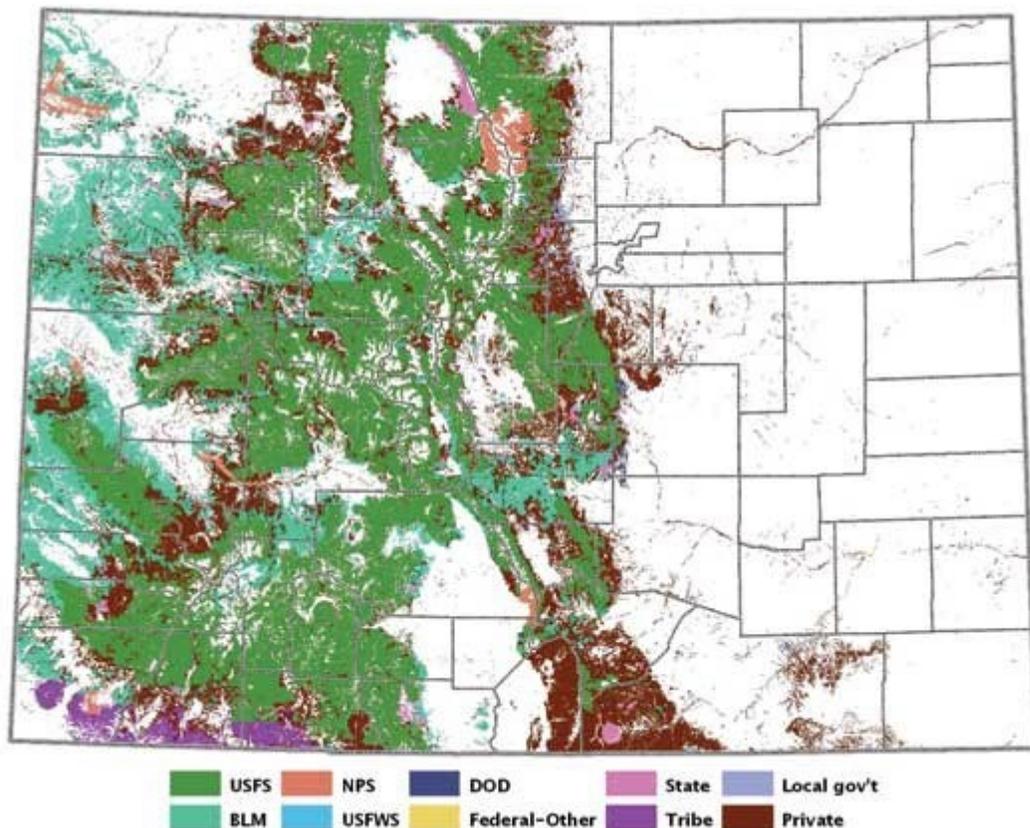


Figure 4. Colorado Land Ownership Map

4. There has been an experiment conducted by the USFS on five separate U.S. forests in which they were audited by accredited FSC audit teams. Though not directly the focus of this study, this experiment has provided the U.S. Forest Service with some experience with FSC certification. Moreover, this testing program was considered successful by most stakeholders that participated in the process and in the after-test public hearings. The only exception was the National Sierra Club, which did not take issue with the substance of the findings by the auditors but took issue with any FSC policy to certify federally managed forests as sustainable for philosophical reasons. Though the Colorado's state government can influence what occurs on the federal forests in their state, it would nevertheless require a major effort of both state government and congressional delegation to lobby for federal FSC certification of one or more of the seven USFS managed forests located in Colorado. This decision could not be made at the USFS Rocky Mountain Region Office and would have to be made at the USFS headquarters in Washington, DC. In informal interviews with USFS staff in Washington, DC I was left with a clear impression that such a move would be supported by staff, with the caveat that due to reduced budgets, it is uncertain as to when monies could be identified to pay for the certification process.

5. In addition to the issue of convincing the USFS to support FSC certification of federal forests in Colorado, it would also be necessary to address important issues at the U.S. forest management staff's working level. Due to the many legal mandates placed upon the USFS in their management of U.S. forests, it could be exceedingly complex to determine how to proceed with FSC certification in terms of auditing and certification procedures. It is widely believed among USFS staff that I have met and

interviewed in Colorado that the auditing and managing regime promulgated by FSC may require adjustment to accommodate the legal and regulatory parameters faced by the USFS. Moreover, in Colorado some U.S. forest management plans have not been updated in almost 20 years. The updates on these plans would have to be completed before FSC could initiate a certification audit. Additionally, a re-prioritization of work tasks would have to be adjusted to acquire the man hours to conduct the pre-audit preparation. Nevertheless, in the six U.S. Forest Service management offices in Colorado visited, there appeared to be genuine support for FSC certification among mid-level forest managers. At the writing of these conclusions it has been the Executive Director of the US FSC has indicated that discussions are planned with the USFS to develop a unique FSC certification regime to take into consideration the legislation and court mandates under which the USFS must function.

6. The cost of completing an FSC certification of Colorado State Forests and/or USFS managed forests in Colorado may be significant and prevent further consideration of third party certification unless a speedy and tangible payback?? can be identified or a benefactor pays these fees on behalf of Colorado and/or USFS managed forest units in Colorado. The five FSC certifications of USFS managed forest units was done on an experimental basis with funding from the Pinchot Institute. This indicates that it may be possible to seek funding from a foundation to pay for FSC certification in Colorado.

7. Though this research focuses on certification of public lands FSC encourages state wide umbrella certification for all small holders (ten acres or less). If FSC certification of public lands is pursued in Colorado, a parallel program of FSC certification

for all small holders willing to submit to FSC standards and criteria in the management of their small holder forest land, may also be appropriate to consider. Such a program has had success in Wisconsin and its feasibility should be further researched for applicability to Colorado small holders.

7. Environmental and forest advocates are important forest stakeholders in Colorado. Their support for FSC certification would have to be achieved prior to approaching congressional delegations and USFS in Washington, DC. In preliminary conversations with some leaders of these organizations, it appears that the atmosphere has significantly changed in recent years. The litigious strategies of previous years have subsided and have been replaced with a strategy of direct dialogue among advocacy organizations, USFS managers, and on-the-ground foresters. Active direct negotiation, science based analysis, and “walking the canopy” (i.e. physically going to specific forest areas under discussion and collaboratively assessing the situation in an attempt to find a common approach to issue resolution) have replaced lawsuits as the primary approach to stakeholder involvement. Some of the more outspoken leaders have informally indicated to me during an informal survey of forest Colorado stakeholders during July and August 2011 that they would support FSC certification on an experimental basis with 2-3 U.S. Forest Service managed forest units in Colorado. These stakeholders would like to avoid FSC certification anytime soon for two forest units where they have been actively negotiating new management plans with the USFS.

8. My final analysis of this research is that FSC certification will benefit Colorado green builders and the wood products industry over the long run, but any immediate payback (3–5 years) should not be expected. As the economy improves, the glut in

housing declines, and younger consumers seek greener housing stock, the need for FSC certified dimensional lumber and other wood products is likely to increase. With organized leadership from the Colorado Forest Service, CSU forest and construction scientists, local forest based communities, the wood products industry, and forest advocates to educate communities, legislators, and builders on the benefits of certification, FSC certification could possibly become a tangible enhancement to Colorado forests, directly supporting the green building industry, and contributing to Colorado's growing identity as a center for sustainable industries and communities.

9. It is recommended as a next step that research occur to determine the willingness and interest of forest stakeholders and green builders to encourage and participate in developing an FSC certified wood product niche industry in Colorado. This research should be structured to support decision making by Colorado policy makers.

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APPENDIX A: CASES

The following cases studies are organized in chronological order based on my schedule of field research interviews. In that I traveled by road to the interview locations, I began in the western most state in my study, Minnesota, and progressed consecutively through each case, finishing in the East, with Pennsylvania. Each case begins with a section titled “Forest Lands,” which provides a broad characterization of categories of forestlands that exist in each case and what %age is owned or managed by key stakeholders. This is followed by a section titled, “Forest Facts,” that provides a list of broad indices showing key indicators common to forestry and natural resource management. Because the primary readership of this research will be forest stakeholders, this information is provided in order to better understand the character of the particular case studies’ forestlands, wood products industry capacity, and magnitudes of impact by the subject forests on the state’s economy and natural environment.

In each case study, there is a broad overview of each state’s forests; this overview is followed by the chronology of events from the first consideration of FSC certification of their state and county forests until the certification had been completed (with the exception of Ohio, which was in the preliminary stages of organizing its FSC certification).

CASE 1: MINNESOTA



Figure 5. Red and White Pine Old Growth Forest, Minnesota
(Minnesota Department of Natural Resources website (2008))

1. Minnesota Forest Description and Facts:

a. Forest Land:

- i Total: 16.3 million acres
- ii Federal: 2.1 million or 13 %
- iii State: 4.4 million or 27 %
- iv County/municipal: 2.28 million acres or 14 %
- v Private: 7.49 million acres or 46 %
(includes industry owned, approx. 8%)

(MNDNR Forest Health Report, 2007).

- vi FSC Certifies: 6,105,687 acres (approx. 37 %) (Barnard, 2009).

b. Forest Facts:

i Timber Harvested: public forests: 40,000 acres (798,000 cords) ii Public & private forests: 3.2 million cord iii Average Stumpage Sale: 30 acres iv Native Tree Species: 52 v Forest Products Annual Economic Impact: \$6-7 billion vi Wildfires fought annually: 1,500 (30-35,000 acres burned) vii State Land Reforestation: 30,195 acres

1) Natural: 18,134 acres

2) Seedling: 5477 acres

3) Planting: 6,584 acres (Trees Planted: 3,991,800) (MNDNR, *Minnesota Facts & Figures*, 2008; personal communication, Sept 5, 2010)

c. Forest Management Organization: There are 58 separate state forests that are divided into 4 regional areas. The Division of Forestry assists the Division of Wildlife with the management of Wildlife Management Areas (WMAs). WMA boundaries overlap but do not directly correspond to the state forest areas and boundaries. Thus, a great deal of coordination must occur on many areas of common interest.

d. Forest Description: Minnesota is divided into four identifiable biomes. Two of these are grasslands, and two are different forestlands. The following descriptions are of the forestlands.

The Eastern Broadleaf Forest (EBF) Province: The EBF traverses Minnesota, Iowa, Wisconsin, Michigan, Ohio, New York, Illinois, Indiana, Kentucky, Tennessee, Missouri, and Arkansas. In Minnesota, the EBF Province covers nearly 12 million acres (4.9 million hectares) of the central state and serves as a transition, or ecotone, between semiarid portions of the state that were historically prairie and semi humid mixed conifer-deciduous forests to the northeast. The western boundary of the province in

Minnesota is sharply defined along much of its length as an abrupt transition from forest and woodland to open grassland. The northeastern boundary is more diffuse, with a gradual transition between eastern deciduous forests and the mixed conifer-hardwood forests of northern Minnesota.

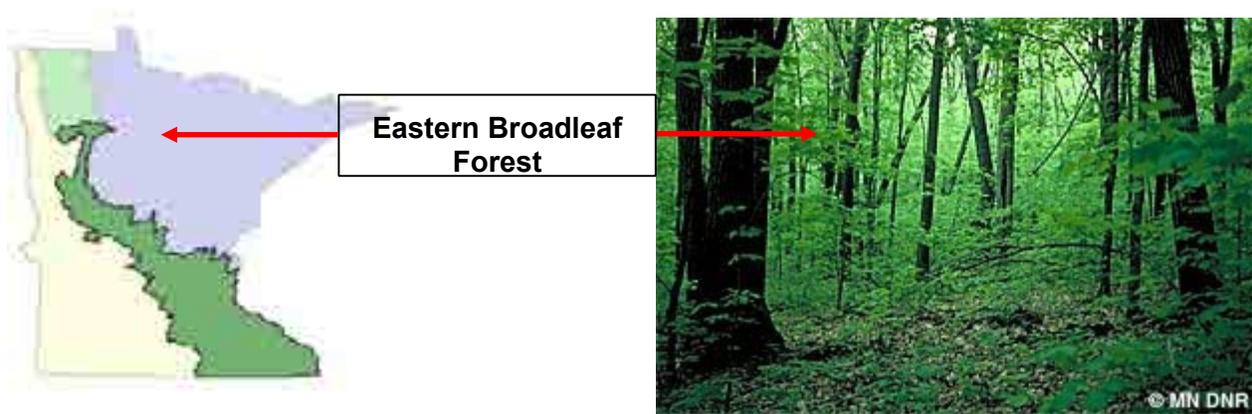


Figure 6. Eastern Broadleaf Forest region of Minnesota
(Minnesota Department of Natural Resources website (2008))

The Laurentian Mixed Forest (LMF) Province: The LMF traverses northern Minnesota, Wisconsin, Michigan, southern Ontario, and the less mountainous portions of New England. In Minnesota, the LMF Province covers a little more than 23 million acres (9.3 million hectares) of the northeastern part of the state. In Minnesota the province is characterized by broad areas of conifer and mixed hardwood forest and conifer bogs and swamps. The landscape ranges from rugged, lake-dotted terrain with thin glacial deposits over bedrock, to hummocky plains with deep glacial drift, to large, flat, poorly drained peat lands. Precipitation ranges from about 21 inches (53 cm) annually along

the western border of the province to about 32 inches (81 cm) at its eastern edge in Minnesota. Normal annual temperatures are about 34°F (1°C) along the northern part of the Province in Minnesota, rising to 40°F (4°C) at its southern extreme. The Eastern Broadleaf Forest (EBF) Province: The EBF traverses Minnesota, Iowa, Wisconsin, Michigan, Ohio, New York, Illinois, Indiana, Kentucky, Tennessee, Missouri, and Arkansas. In Minnesota, the EBF Province covers nearly 12 million acres (4.9 million hectares) of the central state and serves as a transition, or ecotone, between semiarid portions of the state that were historically prairie and semi humid mixed coniferdeciduous forests to the northeast. The western boundary of the province in Minnesota is sharply defined along much of its length as an abrupt transition from forest and woodland to open grassland. The northeastern boundary is more diffuse, with a gradual transition between eastern deciduous forests and the mixed conifer-hardwood forests of northern Minnesota.

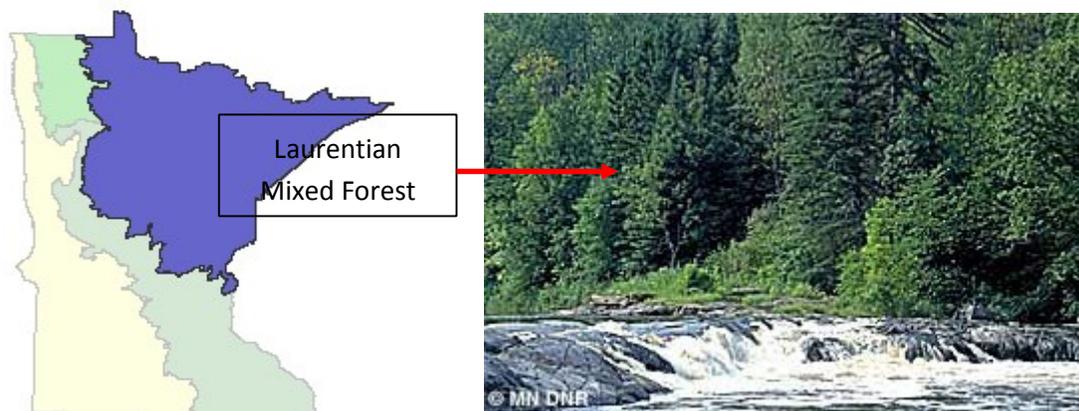


Figure 6. Laurentian Mixed Forest Province of Minnesota
Minnesota Department of Natural Resources website (2008)

Under influence of climate, the overall pattern of vegetation varies across the Province in Minnesota from warm and dry habitats in the southwest, to cooler and moister ones in the northeast. Linked to climate are several other factors with southwest to northeast gradients that have important influence on vegetation and species ranges. Most notable are growing-degree days, evapotranspiration, and the depth and duration of snow cover (Minnesota Department of Natural Resources, , 2008).

2. Minnesota FSC Certification Experience:

a. Background:

i The first interest in FSC certification occurred in the mid 1990's and was prompted by the Pinchot Institute for Conservation that approached several state forestry services in an effort to promote forest certification. With funding assistance from the Rockefeller Brothers Foundation, the Pinchot Institute wished to demonstrate the benefits of certification as a tool for better stewardship of public forests, which would also serve as a demonstration for the private landowner, thereby helping to improve forest stewardship across the region.

ii The newness and lack of experience with the concept of third party certification of the public forests raised many questions within the MN-DNR and among other Minnesota forest stakeholders. There were some parties, including members of the MN DNR, who believed that FSC, with its international headquarters located in Bonn, Germany, was a European organization and that it would be forcing "foreign" forest management standards on the United States. Additionally, there were environmental organizations that questioned the very concept of certification due to their philosophical presupposition that there should be no human intervention in publicly owned forests.

From this perspective, certification was only intended for privately owned forests. There were still other environmental organizations, though not necessarily opposed to third party accreditation that believed the FSC accredited auditors were not going to be “tough enough.” The local chapter of the Sierra Club, however, believed that the FSC certification regime was originally intended for private forests and should not be used for public lands. The many questions raised by various forest stakeholders about the certification concept and process caused the first certification effort to be delayed and down-sized to a smaller “pilot project” located in Aitkin County. The first FSC certification audit, thus, was focused on both county owned and state owned lands restricted to Aitkin County and was paid for by the Rockefeller Brothers Foundation (Report from Aitkin County, Office of the Land Commissioner, 2009). Moreover, due to the questions raised regarding the thoroughness of the auditing process, actual staff members from FSC International were present in Minnesota during the initial audit and monitored the auditors to ensure they met FSC standards.

iii An additional incentive for FSC certification of public and private forests in Minnesota and neighboring North Central states arose when TI-Paperco, Inc. set forth new standards for its purchases of paper. Ti-Paperco, Inc. is the paper purchasing subsidiary of Time-Warner, which procures all of the paper for Time-Warner’s one hundred and thirty-five (135) magazines and eight (8) book publishing houses, By 2006, Time-Warner aimed to have 80% of all paper acquired in the U.S. to come from certified, sustainably managed forests (Forest News Watch, 2003). More recently many major U.S. mail catalogue publishers followed suit and made it corporate policy that a certain %age of their wood pulp must be from FSC certified forests and/or recycled

paper(Gunther, 2006). This impetus in corporate policy has resulted in a much greater demand for wood pulp originating from certified FSC forests. Other woods, particularly wood products associated with the building industry such as dimensional lumber (i.e. stud milling), were not in as high of demand. Nevertheless, according to anecdotal reporting from the Minnesota wood product industry, they noticed that demand increased for other categories of FSC certified wood products.

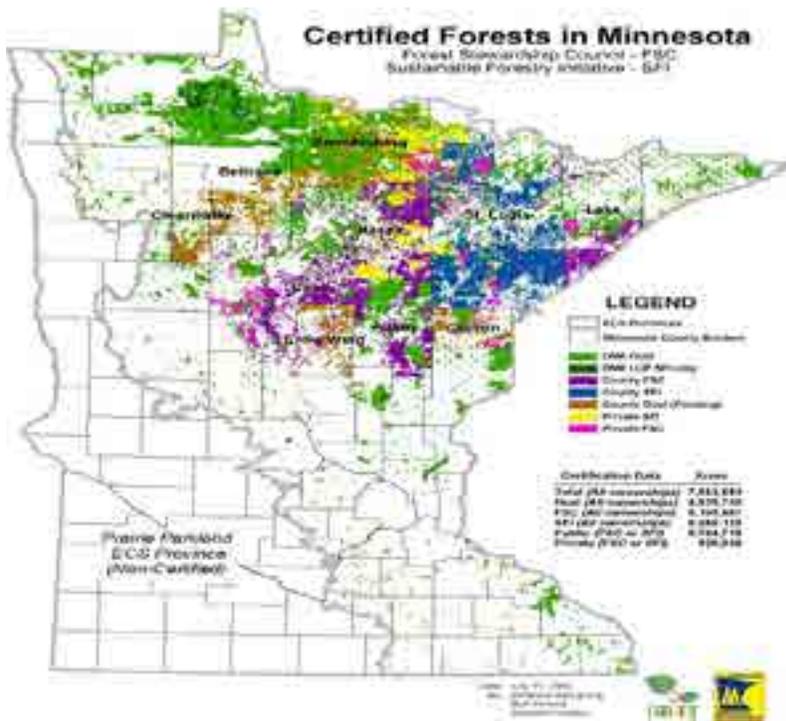


Figure 8. Map of Certified Forests in Minnesota

Minnesota Department of Natural Resources (2008), "Forest Certification"

b. **Certification Chronology:** The following chronology refers to the second iteration of FSC certification within the state of Minnesota. The first was its "pilot project," restricted to state and county lands in Aitkin County. (This occurred in 1997, as noted in the background section, above.)

i. Request for Proposals (Fall 2004): The Minnesota Department of Natural Resources (MN--DNR) published requests for bids to conduct the FSC certification. There are six companies that conduct audits that are trained and accredited by the FSC (see Appendix C). The bid from Scientific Certification Systems (SCS), one of these companies, was accepted.

2) Pre-audit Consulting (approx. Jan 2005): As part of the contract and bid, SCS assisted in analyzing current MN DNR forest management policies and procedures to prepare for the FSC certification process. MN DNR staff conducted a "gap analysis" to determine what was lacking in management policy, procedures, standards, indicators, and documentation. This process was considered very useful in helping the MN DNR staff to focus on preparation for the FSC certification process.

ii FSC Pre-Assessment (July 2005): This was a preliminary visit to the state by the lead FSC auditors to familiarize the auditors with the state's forests and to assist the Forest Division staff prepare for the actual audit. This visit is a normal service included in the contract between the FSC accredited professional auditors and the forest management agency. Not only does it familiarize the auditors with the forest character, but it also helps them plan the logistics of the actual audit, which will occur several months later. Pre-assessment took about three days and cost approximately \$6K. In the process of preparing for the audit, the lead auditors identified areas that they felt the Forest Division needed to address in order to properly prepare for the initial audit. This pre-assessment, thus, initiated the auditor-agency dialogue that was integral to the certification process.

iii FSC Initial Audit (Oct 2005): The FSC initial audit took about two weeks and cost about \$100,000. The FSC auditing team (there was also a separate Sustainable Forest Initiative [SFI] team) divided itself into two sub-groups that visited different locations and performed different tasks. The audit team consisted of both national forest silviculture authorities and local or regional silviculture and ecology subject matter experts. It also included a social scientist that focused on the impact of the forests and forest economy on local communities and forest workers. The social scientist was also responsible for examining the impact on and relationship between indigenous societies (e.g., Native Americans) and the subject forest lands. The audit included a detailed examination of twelve (12) separate areas (overlapping with three [3] Wildlife Management Areas (WMAs) in the Division of Forestry's managed forests. Additionally, they examined, in considerable detail, three separate timber sales, specific clusters of forest management activity, three planting projects, use of herbicides and other chemicals, road and culvert construction, and recreation management. Each day the auditors met with the DNR foresters and planned the day's travels and activities. The audit resulted in about twenty minor *Corrective Action Requests* or *CARs* that required corrective action by the MN-DNR within a six month to two year time period. Although no major *CARs* were issued, a major *CAR* would have required action within 3 months of receipt of the final audit report. Failure to meet *CARS* within the allotted timeframe would have resulted in the certification being denied or revoked (see paragraph 4.g. above).

c. Stakeholder Experience: All interviewees expressed considerable support for the benefits with the FSC third party accreditation audits. They believed that the audits

brought about a business culture of continual improvement in their management; it added validity (i.e., credibility due to FSC's more rigorous standards supported by a wider spectrum of stakeholders) to DNR forest management practices. Though the management practices of MN DNR were traditionally open and inclusive of stakeholders, the FSC auditing process further expanded this transparency and highlighted the DNR planning and consultation process.

CASE 2: WISCONSIN



Figure 9. Kettle Moraine State Forest - Loew Lake Unit, Erin, Wisconsin
Wisconsin Department of Natural Resources (2012), *Wisconsin State Park System*

1. *Wisconsin Forest Description and Facts:*

a. Forest Description:

- i. Total: 16,274,600 acres ii. State: 1,138,222 or 7 % iii. Federal: 1,627,460 or 10 %
- iv. County/municipal: 2,441,190 acres or 15 %
- v. Private: 11,117,000 acres (National Woodlands Owners' Survey, 2008) vi. Certified lands:

Category of Lands	Certification Standard				
	FSC Only	Dual FSC/SF	ISFI Only	Dual ATFS/FSC	ATFS (PEFC)
Wisconsin State Forests (DNR)		517,734			
DNR Lands (Parks, Wildlife Areas, Natural Areas, etc.)		1,023,453	57,225		
Wisconsin County Forests (DNR)	165,958	1,464,167	723,772		
Wisconsin Managed Forest Law Group (DNR)				2,239,205	
Plum Creek			486,414		
Stora Enso		5,411			
Community Forestry Resources Center - IATP	2,690				
Potlatch	76,000				
Menominee Tribal Enterprises	220,000				
CF/FIA Holding, LLC	62,945				
Traditional (Non-MFL Group) Tree Farms					194,427
Total by Standard	527,594	3,010,765	1,267,411	2,239,205	194,427
<i>Wisconsin DNR (2009) Wisconsin State Park System</i>					

b. Forest Facts:

i. Timber Harvested: public forests: 51,912 acres ii. Federal forests: 9,683 acres (.07%)

iii. State forests: 10,750 acres (1.1%) (57,802, (.05%) (FSI Annual Report, 2007) iv.

County forests: 31,479 acres (1.3%)

v. Average Stumpage Sale: State: 133.5 acres; County 68.3 acres vi. Native Tree

Species: 132 vii. Forest Products Annual Economic Impact: \$ 20,206,744,443

(Wisconsin

Department of Natural Resources, 2005) viii. Wildfires fought annually: 1,500 (5,000 acres burned) ix. State Land Reforestation:

- 1) Natural: 40,439 acres
- 2) Planting: 2,972 acres
- 3) Seedling: 1,083 (Approx. 2 million per annum planted on state forestlands; state nurseries produce approx. 20 million seedlings per annum)
- 4) Trees Planted: 20 million seedlings grown per year; 10% planted.

(Wisconsin Department of Natural Resources, 2008)

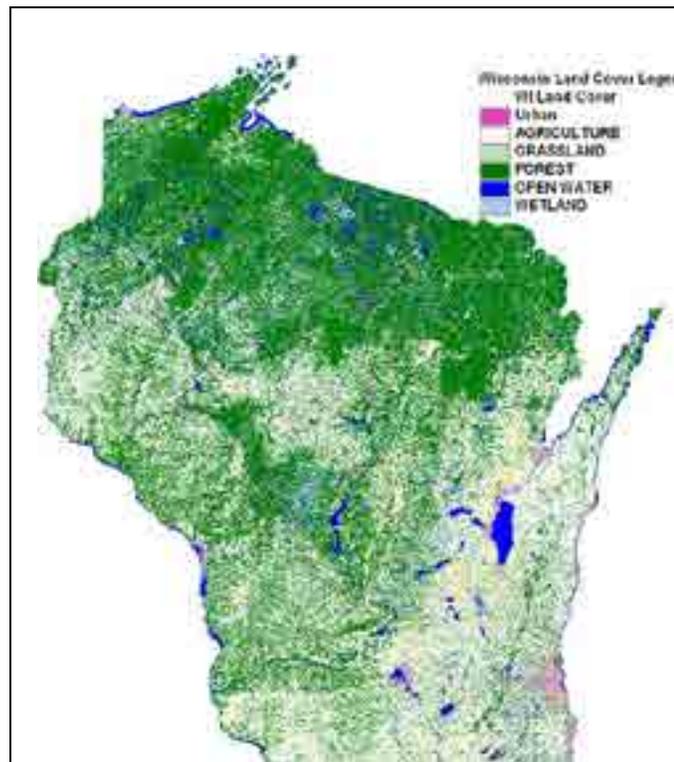


Figure 10: Wisconsin Land Cover Categories
Wisconsin DNR (2009) *Wisconsin State Park System*

c. Forest Management Organization: The Wisconsin Department of Natural Resources (WDNR) was a state cabinet office administered by the Secretary of the

DNR who was appointed by and reported to the State Governor. Additionally, the Wisconsin Natural Resources Board (NR Board) set policy for the WDNR and exercised authority in accordance with its statutory authority. The members of the board were proportioned from the regions of the state and were appointed by the governor.

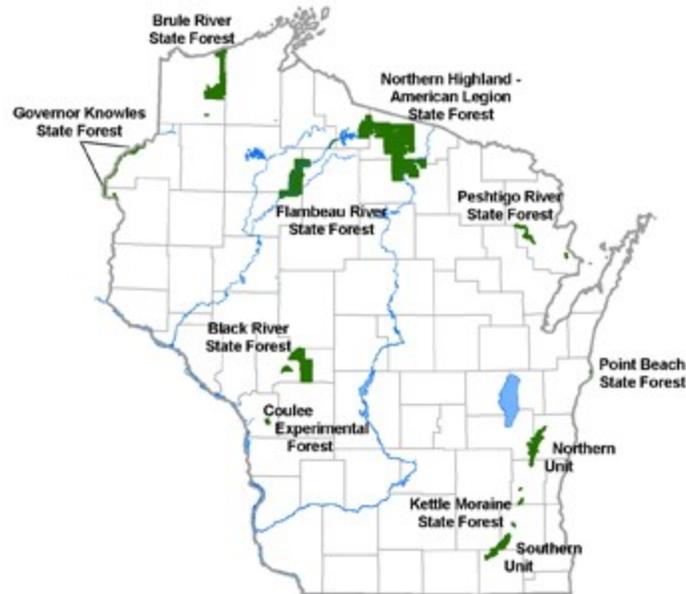


Figure 11. Wisconsin state park system map (Wisconsin DNR (2009) *Wisconsin State Park System*)

d. Forest Description: Wisconsin vegetation is divided into two major regions or floristic provinces. The southern half of the state is called the prairie-forest province, and the northern half is called the northern hardwoods province, or the Laurentian Mixed Forest (LMF) Province. These two provinces are separated by a narrow region, labeled the tension zone (see Figure 13), which contains plants from each province band.



Figure 13. Location of the “Tension Area” where the two forest provinces overlap (see dark green area). (Wisconsin DNR website, *State Park System* 2009)

e. Forest Management: The DNR practiced a full array of even-aged and uneven-aged silvicultural systems on the State Forest System. With general guidance found in the DNR *Silviculture and Forest Aesthetics Handbook* (HB 2431.5), silvicultural systems are defined by forest cover type, of which there are 22 different cover types found on the State Forests. Regardless of the specific system employed, on any given cover type within any of the State Forests, the following general objectives applied to Wisconsin at the time of this study:

- i. Encourage stands containing the greatest quality and quantity of timber.
- ii. Encourage vigor within all developmental stages of forest stands.

iii. Through modification of silvicultural prescriptions and practices, accomplish desired aesthetic management objectives. (Wisconsin Department of Natural Resources, , 2004)

f. Harvesting: Harvests are not dictated by “top down” production targets, rather they are “regulated” at the forest level using area control methods. In this situation the annual allowable harvest, measured in acres per year, is disaggregated to forest cover types. The harvest is computed as the total available area occupied by a cover type within a State Forest divided by the planned “rotation age.” Rotation lengths are generally 15 to 20 years longer than commercial farms.

For over the past decade, actual harvests on the Wisconsin State Forests have been well below allowable levels... The “under harvest” varies considerably by State Forest but, in total, actual harvests are roughly 60% of allowable levels. The principal reasons for the shortfall are staff shortages as well as ecological considerations and constraints that have not been fully integrated into the reconnaissance database. Total, actual harvests are roughly 60% of allowable levels. (Wisconsin State Forests, SCS Certification Evaluation Report, 2004).

3. Wisconsin FSC Certification Experience:

a. Background: The first interest in FSC certification in Wisconsin occurred in 1997 when the Pinchot Institute for Conservation approached several state forestry divisions in an effort to promote forest certification. However, there was little interest in the idea of third party certification in the state of Wisconsin for two general reasons. First, the wood products industry was an exceedingly powerful constituency with an economic sector, currently at around 20 billion in revenue, has been very influential in the state as an employer and as generator of tax revenues. There was no incentive to disrupt or change relationships in this sector at that time. Secondly, forest certification was perceived as an immature concept with little marketplace demand. Nevertheless, a

significant change began to emerge in this status quo: as a result of globalization many of the older paper companies were bought out by foreign companies that had wholly different perspectives on forest management. Moreover, as the older generation of foresters retired, younger graduates from U.S. forestry schools were introducing new approaches to understanding forestry and were more influenced by community and population ecology in their studies. A major impetus for forest certification came from David Refkin, CEO of TI-Paperco, the Time Warner paper procurement subsidiary; TI-Paperco was the largest pulp wood customer in the United States and the United Kingdom. Refkin announced beginning in 2006 Time-Warner would buy 80% of its paper made with wood pulp originating in forests certified by third parties as being sustainably managed. Seeing this shift in perspective and a possible threat to the multibillion dollar wood products industry in Wisconsin, state policy makers recognized that forest certification offered economic benefits; forest certification suddenly became a bipartisan issue that was supported by all forest stakeholders, save some elements of the Sierra Club. It seemed that the latter's resistance was centered on the belief that third party certification would not be necessary since public statutes already mandated sound forest and ecosystem management. "Why pay someone else to do what the law requires the SDNR to do." (Statement of senior forest service manager during an interview).

An additional incentive for FSC certification of public and private forests in Wisconsin was related to the concept of the *Eco-efficiency Anomaly*. This was the perception of many business and investment analysts that companies that integrate environmentally sensitive values and life cycle precepts into their long term business strategy will

perform better in terms of their profits and equity performance when compared to the Standards and Poor's 500 Index of stocks. Eco-efficiency refers to a process that seeks to maximize the effectiveness of business processes while minimizing their impacts on the environment. Fundamental to eco-efficiency is adoption of a management philosophy that stimulates the search for environmental improvements that yield parallel economic benefits (President's Council on Sustainable Development, 1996).

The pulp wood industry, an exceedingly powerful constituency whose economic sector, currently at around 20 billion in revenue, has been very influential in the state as an employer and generator of tax revenues. There was no incentive to disrupt or change relationships in this sector at that time. Secondly, forest certification was perceived as an immature concept with little marketplace demand. Nevertheless, a very significant change began to emerge in this status quo: As a result of globalization many of the older paper companies were bought out by foreign companies which had a wholly different perspective on forest management. Moreover, as the older generation of foresters retired younger graduates from U.S. forestry schools were introducing new approaches to understanding forestry and were more influenced by community and population ecology in their studies. A major impetus for forest certification came from David Refkin, CEO of the Time Warner paper procurement subsidiary, TI-Paperco, the largest pulp wood customer in the United States and the United Kingdom. Refkin announced beginning in 2006 Time Warner would buy 80% of its paper made with wood pulp originating in forests certified by third parties as being sustainably managed. Seeing this shift in perspective and a possible threat to the multibillion dollar wood products industry in Wisconsin, state policy makers recognized that forest certification

offered economic benefits and suddenly became a bi-partisan issue which was supported by all forest stakeholders, save some elements of the Sierra Club. It seems that the latter's resistance was centered on the belief that third party certification would not be necessary since public statutes already mandated sound forest and ecosystem management. "Why pay someone else to do what the law requires the SDNR to do." (Quotation from forest service manager during interview).

i. Eco-efficiency is increased by activities that create economic value while continuously reducing ecological impacts and the use of natural resources (DeSimone, L., Popoff, F., 1997). This study empirically examines the proposition that implementation of ecoefficient business strategies is associated with higher firm value. This concept which is increasingly supported with empirical studies posits that firms which adopt eco-efficient business strategies and, as a consequence, achieve reduced costs and increased profits should be more highly valued by the market than similar firms that do not adopt eco-efficient business strategies (Sinkin, C., Wright, C., & Burnett, R. 2008)). In harmony with this concept is the belief that the next generation will begin peak spending over the next 10-20 years. Due to shifts in secondary school curriculum, public awareness of global warming concerns, and decline in fossil fuel based energy, this new generation of consumers will be far more aware of the environmental impact of their everyday choices. Thus, they will more readily acquire products and services that are intentionally and demonstratively eco-efficient. Thus, it is reasonable to presuppose that buying wood products originating from a forest that is certified as being sustainably managed will have a growing value in the consumption choices of the emerging generation. (This *eco-efficiency input* concept was initially received during source

interviews. It was further expanded here for the benefit of the researcher and the reader of this report using secondary sources).

b. Certification Chronology: The following chronology outlines the events and experiences of FSC certification in the State of Wisconsin as perceived from interviewees' responses and official written reports.

i. Request for Proposals (Fall 2002): The Wisconsin Department of Natural Resources (WNDNR) published requests for proposals to conduct FSC certification. At that time, there were six companies that conducted audits and were accredited by the FSC. The bid from Scientific Certification Systems (SCS), an FSC trained and accredited third party inspection company, was accepted.

ii. FSC Pre-assessment: There was no pre-assessment visit to the state by the FSC accredited audit team.

iii. FSC Initial Audit: (Oct/Nov 2003): The FSC initial audit took 8 days spread over two periods, October 15-16 and November 10-15, 2003; the initial audit required 22 man hours and cost about \$70K. The FSC auditing team consisted of three natural resource management specialists, "collectively possessing recognized expertise, credentials and experience in forest management, forest economics, wildlife management, logging systems and experience in forest ecology." (Hrubes, R.J., 2004, p 15). They were Dr. Robert J. Hrubes, Team Leader and registered forester and forest economist with 28 years of professional experience; Dr. Michael Ferrucci, President of Interforest, a land management company and lecturer on forest resource management at Yale University; and Mr. Gary Zimmer, a certified wildlife biologist with 21 years professional experience in forest management, both public

and private The audit team's assessment process was focused on the objective of enabling the audit team to make an informed judgment "as to the degree to which the DNR's management of the Wisconsin State Forests conforms to the FSC Principles and Criteria, as elaborated by the FSC Lake States Regional Standard." (Hrubes, 2004, p 15) To accomplish this goal, the audit team reviewed pertinent WDNR documents, interviewed WDNR personnel at all levels of the organization, consulted with individuals and organization that consider themselves to be forest "stakeholders, and "conducted on-site inspections of forest conditions and operations" based on stratified random sample of properties and based on a strategic selection of sites within each sampled property" (Hrubes, 2004). Upon signing the contract between WDNR and SCS, the WDNR began submitting official documents to the SCS audit team for their study. It should be noted that this effort was greatly enhanced by delivery of a searchable CD containing numerous WNDR documents to the audit team by the WNDR Forest Certification Coordinator, Mr. Paul Pingrey, soon after signing the contract. Stakeholder consultation began 30 days prior to the field assessment via a written notice that was sent to a broad cross section of forest stakeholders. Additionally, the members of the audit team began one-on-one contacts with stakeholders in Wisconsin and the Great Lake States. For a detailed day-by-day description of audit team activity see the SCS report, p19. The audit included a detailed examination of forest management in four of the nine state forests with visits to 27 separate locations that included, but was not limited to, research and analysis of cutting locations, on-going planting operations, snow mobile paths, and 15 timber sales. Interviews of 44 WDNR personnel included discussions of statutory and policy context for state land

management, staffing shortages, master planning, public involvement, insect problems, invasive species, wilderness management, monitoring activities, windstorm damage, forest research, Natural Areas program, Forest Health Program, compartment reconnaissance system (RECON), allowable tree harvest planning, training, management strategy for private within holdings, law enforcement activities, snag, den, and reserve tree recommendations.

1. A list of stakeholder groups and individuals was compiled from numerous sources to include a list maintained by the forestry service that is informally titled the “20 most active WDNR stakeholders”. Participants also included those who responded to the public notices sent out by the audit team, from soliciting names from regional contacts, and from consulting with FSC-US as to possible stakeholders. The final list was categorized into the three FSC chambers: social, environmental, and economic. Contact was made by telephone, email, and personal interviews. All interviews followed a general script prepared by the Team Leader, and both negative and positive comments were invited. Stakeholder concerns included shortcomings in forest management and in master planning, undue political influence on the WDNR, the deleterious effect of all terrain vehicle (ATV) use, over grazing due to large deer populations, tribal concerns over sacred sites, tensions between sportsmen and preservation groups regarding the use of natural resources, over-harvesting of public forests, insufficient logger training, and questions regarding how budget priorities are decided. All issues were recorded and addressed in the final Audit

Team Assessment Report (Hrubes, 2004).

1) The audit report included a lengthy section on strengths and weaknesses. The SCS/FSC scoring was documented within this section. SCS used a point system directly tied to the FSC-US ten (10) Principles and Regional Forest Standards Criteria in order to score the performance of the WDNR's forest management. Based on this scoring system, a decision was made on two issues: 1) the certification of the state forests, and 2) the Corrective Action Requests (CARs), both major and minor. The scoring was done through a consensus of the SCS audit team members who assigned a numeric value for each criterion assigned to each of the ten (10) Principles. These criteria scores were then averaged for each of the ten (10) principles. A one hundred (100) point scale was used. Any criterion in which the consensus score was below eighty (80) required that a CAR be issued. If the average scores of all Criteria assigned to one of the ten (10) principles averaged to below eighty (80), then FSC certification could not be awarded and the audit team would have needed to issue one or more major CARs. These major CARs would have needed to be satisfied before FSC certification could have been awarded. The team might have also issued Minor CARs for deficiencies that they felt did not prevent certification, but nevertheless would have required some form of corrective action, usually expected to be satisfied in one year or less from the time the final report of evaluation was completed and before the first surveillance audit commenced. In the case of this assessment, the audit team recommended that the WDNR be awarded FSC certification with nine specified minor Corrective Action Requests (Hrubes, 2004). The list of CARs and their explanations can be found at [DNR State Forests Certification Report-Final 4-9-04.pdf](#) pp. 31-40.

2) FSC Surveillance Audits (Yearly): To date, there have been three surveillance audits, 2004-200 by SCS with no major CARs found. Issues that have been dealt with during these surveillance audits have included improving logger training, updating forest master plans, ameliorating budget shortfalls, and clarifying and improving chain-of-custody policies and procedures. In addition, detailed answers were provided in response to auditor criticism for failing to satisfy Minor CARs from earlier audits.

Table 6. Wisconsin DNR Certification programs, .

WI DNR Program	Date First Certified	2009 Acreage Certified
State Forests (SFI-FSC) 3-May-04 517,734 County Forests (SFI-FSC) 11-Mar-05 2,353,897		
Managed Forest Law (ATFS)	3-Jun-05	2,239,205
Managed Forest Law (FSC)	4-Dec-08	2,239,205
State Parks & Wildlife Areas (SFI-FSC)	4-Jan-09	1,080,678
Wisconsin DNR website (2010), "Forest Certification"		

CASE 3: MICHIGAN



Figure 12. Eastern Upper Peninsula forestland

1. Michigan Forest Description and Facts:

a. Forest Land:

- i. Total: Approx. 19,300,000 acres (56 % of MI landmass is forestland ii. State: 4,053,000 acres or 21 % iii. Federal: 2,800,000 acres or 15 % iv. County/municipal: Less than 1 %
- v. Private (non-industrial): Approx. 10,640,000 acres or 56 % (384,700 private owners) vi. Forest Industry: Approx. 1,484,000 or 8% vii. FSC Certifies: 3,900,000 acres (state forests) (Wager, 2005)

b. Forest Facts:

- i. Timber Harvested: State forests: 52,434 acres (1.1%) (Approx. annual allowable cut 750,000 cords)
- ii. Main Commercial Tree Species: 6 (aspen, sugar maple, red maple, red oak,

white pine, jack pine, oak) iii. Forest Related Annual Economic Impact: Approx. \$12,000,000,000 iv. Forest Products: Approx. \$9,000,000,000 (pulpwood, sawlogs and veneer)

(Michigan Department of Natural Resources, 2006)

v. Wildfires fought annually: (5,000 acres burned) vi. State Land Reforestation:

- 1) Natural: Approx. 2,000,000 acres
- 2) Planting: 500,000 acres (total area currently under regeneration)
- 3) Trees Planted: unknown (Michigan Department of Natural Resources, 2008)



Figure 13: Michigan Public Ownership of Forest Lands

DNR Michigan State Forest Plan (2008), p10, http://www.michigan.gov/documents/dnr/SFMP-Apr10-2008_236059_7.pdf

b. *Forest Management Organization:* The Michigan Department of Natural Resources (MIDNR), originally established as the Conservation Department in 1921, expanded its role to

encompass resource management and adopted its new name in 1964. The mission statement of MIDNR indicates that the organization is i “committed to the conservation, protection, management, use and enjoyment of the State’s natural resources for current and future generations” (MIDNR Website, 2008). This mission includes promoting outdoor recreational opportunities, wildlife and fisheries management, forest management, state lands and minerals, state parks and recreation areas, conservation, and law enforcement. Rebecca A. Humphries, the Director of MIDNR since 1998, works directly under the policy guidance of the Natural Resources Commission; the Natural Resources Commission’s seven (7) members are appointed by the governor with the advice and consent of the Michigan State Senate. The MIDNR has about 1,600 permanent employees and 1,200 seasonal employees who oversee about 70 separate programs. The MIDNR manages more public land than any other agency east of the Mississippi River, which includes 97 state parks, 70 state game and wildlife areas, 11,000 inland lakes, 36,000 miles of rivers and streams, 3,000 miles of freshwater shoreline. MIDNR also oversees harbor development, marine safety enforcement and education, wildlife and fisheries habitat and development, and campground operation of Michigan’s 138 state forest campgrounds. The most recent annual budget was \$282.2 million. Part of this funding comes from the Natural Resources Trust Fund, which receives a portion of its revenues from the oil and gas royalties and lease sales on state lands (MIDNR Website, 2008).



Figure 14. Michigan DNR Map of State Forest Lands

(Michigan DNR website (2012) http://www.michigan.gov/dnr/0,4570,7-15330301_30505_54967-66516--,00.html)

c. *Forest Description:* As with all lake states, Michigan forests are classified as temperate. They are divided into two major regions: the upper or northern half of the Lower Peninsula (LP), and the Upper Peninsula (UP). Many of the seventy-five species of trees found in Michigan are located in the state forests. The two dominant forest cover types are northern hardwood (maple, beech, birch) and aspen. The coniferous species found in the state forests are predominantly red, white, and jack pine, spruce-fir, and northern white cedar (Wager, 2008).

d. *Forest Management:* MIDNR has fifteen (15) Forest Management Units, eight (8) in the NLP and seven (7) in the UP. A wide variety of monitoring systems existed at the time of the 2004 Initial Assessment that met the following objectives required by forest certification:

- i. Yield of all forest products harvested
- ii. Growth rates, yield, and condition of the forest
- iii. Composition and observed changes in flora and fauna
- iv. Environmental and social impacts of harvesting and other operations
- v. Cost, productivity and efficiency of forest management.

Due to the significant land area covered in forests and the wide variety of forest cover, nearly all silviculture systems applicable to managing northern temperate forests are employed. Selection silviculture is applied for much of the hardwood, shade tolerant species. With much of the coniferous cover an even-aged silviculture is employed, including clear cutting (with retention), seed tree and shelter wood (Wager, 2008).

b. *Harvesting:* Approximately 10% of the State Forests (390,000 acres) is inventoried each year, but fewer than 60,000 acres are prepared for timber sale. The MIDNR identifies stand-specific limiting factors for timber harvest. This is a “bottom-up” approach and assures that annual harvest targets are achievable and sustainable (Wager, 2008).

4. Michigan FSC Certification Experience:

a. Background:

i. The first interest in FSC certification occurred in the early 2000’s, driven primarily by the forest industry with strong environmentalist interest as well. This finally led to state legislative action. On May 28, 2004, Act Number 125, the Public Acts of 2004, was

signed into law by Governor Granholm. The "Sustainable Forestry Act" requires that by January 1, 2006, the Department of Natural Resources shall seek and maintain forestry certification by at least one credible, non-profit, non-governmental certification program (MIDNR Web Site, Overview of Michigan's Certification Program, 2008). At that time, it was decided that Michigan state forests would be certified under two separate standards: Forest Stewardship Council (FSC) and the Sustainable Forest Initiative (SFI).

ii. To implement this statutory requirement the MDNR created the Forest Certification Implementation Team (FCIT). The FCIT, which had members drawn from many elements of the MIDNR, was advised by a contract consultant, Bio Forestry Technologies, an organization that had substantial experience in forest certification. FCIT formed work groups to address different categories of work procedures that either needed to be revised or to be created to satisfy the 260 or more separate forest management indicators identified in the SFI and FSC standards. Due to a strong topdown management focus, these work procedures were completed in 4-5 months, which included unit-wide, division-wide, and state-wide MDNR review.

c. *Certification Chronology:* The following chronology outlines the events and experiences of FSC certification in the State of Michigan as perceived from interviewees' responses and official written reports.

i. Request for Proposals (Spring 2004): A request for proposals was developed and advertized for Forest Certification Assessment. The following services were sought:

1) Conduct an FSC scoping according to, and in compliance with, FSC standards.

2) Conduct an FSC audit according to, and in compliance with, FSC standards.

3) Conduct an SFI assessment.

4) Conduct an SFI audit according to, and in compliance with, SFI standards.

5) Certification Preparation Consultant to assist and consult in training staff in certification procedures prior to the internal FSC and SFI audits, beginning after the FSC scoping and the SFI assessment.

ii. Two contracts were awarded. The first contract was awarded to NSF International Strategic Registrations (NSF-ISR), an accredited SFI third party auditing company, and NSF-ISR's partner firm, Scientific Certification Systems (SCS), a FSC trained and accredited third party auditing company, for the joint pre-assessment and certification audits. A second contract was awarded to BioForest Technologies to act as the DNR certification preparation consultant.

d. FSC Pre-assessment or Scoping Audit: In late 2004, SCS conducted a scoping audit in which a team visited 8 out of 15 forest management units. During this visit, gaps between current practices and FSC standards were noted that included the following areas of interest: updating statewide and regional forest plans, introducing best management practices, reviewing ATV policies, fully integrating bio-diversity into forest planning, better define and monitor high conservation value areas, increase the monitoring of forest regeneration and the use of toxic chemicals, reorganize and update timber sale contracts administration, improve understanding of tribal needs and concerns, and improve the management review system. After this scoping audit,

MIDNR took action to address all issues noted in preparation for the FSC/SFI Initial

Audit. This preliminary visit greatly helped in speeding up the revision of forest plans and management procedures as it engendered department wide support. One of the outcomes of this preparatory activity was the origination of internal audits within MDNR; this practice of internal audits has now become a regular management tool. Since 2005 there have been between four and eight internal audits a year. These audits function like an “internal consultants review.” Third party auditors have lauded this management initiative.

i. FSC Certification Audit (Sept 2005): The FSC initial certification audit occurred during September 18-30, 2005, and took 11 days. The FSC auditing team consisted of four natural resource management specialists, “collectively possessing recognized expertise, credentials and experience in forest management, forest economics, wildlife management, logging systems and experience in forest ecology.” (Hrubes, 2005, p 15) They included the following team members: Dr. Robert J, Hrubes, Team Leader, a registered forester and forest economist with 28 years of professional experience; Dr. David Capen, a Research Professor at the Rubenstein School of Environment and Natural Resources at the University of Vermont, with approximately 30 years professional experience, both public and private, in forestry management and research; Mr. Michael Ferrucci, President of Interforests, LLC, a specialist in forest management and silviculture, who has served private landowners in southern New England for 17 years; Ms. Jodi Kaiser, the former Executive Director of Michigan Forest Resource Alliance, who is a specialist in forest management and wildlife management. Additionally, the audits’ authors’ report was peer reviewed by Dr. Larry Leefers, Associate Professor of Forest Economics and Planning at Michigan State University,

and by Dr. Jon Haufler, Executive Director, Ecosystem Management Research Institute (Hrubes, 2005).

1) The audit team's assessment process was focused on the objective of enabling the audit team to make an informed judgment "as to the degree to which the DNR's management of the Michigan State Forests conforms to the FSC Principles and Criteria, as elaborated by the FSC Lake States Regional Standard" (Hrubes, 2005). To accomplish this goal, the audit team reviewed pertinent MIDNR documents, interviewed MIDNR personnel at all levels of the organization, consulted with individuals and organization members who consider themselves to be forest "stakeholders," conducted "field reconnaissance of forest conditions and past and present management activities." (Hrubes, 2005, p 23) The team visited all forests management units that they had not visited during the scoping audit in 2004; thus, by the end of this process they had visited all MIDNR forest units (Hrubes, 2005). For a detailed day-by-day description of audit team activity see the SCS report (Hrubes, 2005, p.19).

2) Interviews of forty-four (44) MIDNR personnel by auditors included discussions of statutory and policy context for state land management, staffing levels, master planning, public involvement, insect problems, invasive species, wilderness management, monitoring activities, windstorm damage, forest research, Natural Areas program, Forest Health Program, compartment reconnaissance system (RECON), allowable tree harvest planning, training, management strategy for private within holdings, law enforcement activities, and snag, den, and reserve tree recommendations.

3) A list of several hundred stakeholder groups and individuals was compiled from numerous sources, and included was a list of twenty (20) "most active" state-wide

stakeholders from the MIDNR. Public notices were sent out by the audit team, including names from regional contacts, and contacts known by the FSC Team Leader. A 2 hour meeting occurred with 10 key stakeholders at the MIDNR headquarters in Lansing, MI at the beginning of the audit. Additionally, two separate public meetings, advertised in advance, were held during the field audit to which all stakeholders were invited. The audit team received and reviewed numerous stakeholder written comments received before, during and after the audit (Hrubes, 2005).

4) The audit report included a lengthy section on strengths and weaknesses. It was within this section that the SCS/FSC scoring was documented. SCS used a point system directly tied to the FSC-US ten (10) Principles and Lake States Regional Forest Standards Criteria in order to score the performance of the WDNR's forest management. Based on this scoring system a decision was made on two issues: 1) the certification of the state forests, and 2) the Corrective Action Requests (CARs), both major and minor. The scoring was done through a consensus of the SCS Audit Team Members who assign a numerical value for each Criteria assigned to each of the ten (10) Principles. These Criterion scores are then averaged for each of the ten (10) principles. A one hundred (100) point scale is used. Any criterion in which the consensus score is below eighty (80) requires that a CAR be issued. If the average scores of all Criteria assigned to one of the ten (10) principles averages to below eighty (80) then FSC certification cannot be awarded and the audit team must issue one or more Major CARs. These Major CARs must be satisfied before FSC certification can be awarded. The team may also issue Minor CARs for deficiencies which they feel do not prevent certification, but nevertheless require some form of corrective action, usually

expected to be satisfied in one year or less from the time the final report of evaluation is completed and before the first surveillance audit commences. In the case of this certification audit the Audit Team recommended the MIDNR be awarded FSC certification after two (2) Major CARS were addressed. One of these was promptly cleared and the other was addressed and downgraded to a Minor CAR prior to certification being issued. Eleven other minor CARs were issued. The two Major CARs included 1) the need to establish written chain of custody procedures which comply with FSC Principles and 2) the identification and management of areas meeting the FSC's definition of "high conservation value forests" guided by the FSC Lake State Regional Standard (Hrubes, 2005) The list of CARs and their explanations can be found at [http://www.michigan.gov/documents/dnr/FSC-CertificationEval AuditReport 175738 7.pdf](http://www.michigan.gov/documents/dnr/FSC-CertificationEval%20AuditReport%20175738_7.pdf), p36-37.

ii. FSC Surveillance Audits (Yearly): To date there have been three (3) annual surveillance audits conducted by SCS in 2006, 2007, and 2008. There was also a Special Surveillance Audit in March of 2006 to follow up on the CARs from the Initial Audit in September 2005. During 2006 the Sierra Club took concerted action to challenge the certification of MIDNR; this resulted in an Audit Surveillance by FSC International in Germany using a German third party auditing company, Accrediting Services International (GMBH) to audit the 2006 Surveillance Audit of MIDNR conducted by SCS. As a result of the dialogue among representatives from the Sierra Club, SCS and ASI auditing teams, some Sierra Club concerns were dismissed and others were affirmed. Those concerns which were affirmed were then addressed by

issuing Minor CARs. The MIDNR FSC certifications were not overturned. All forest certification Minor CARs have been successfully addressed by MIDNR to date.

CASE 4: OHIO



Figure 15. Ohio Mohican-Memorial State Forest

Northern hardwoods, snag and large downed woody debris; photo by Steven Katovich, U.S. Forest Service, acquired from

Ohio Forests 2006 at http://www.nrs.fs.fed.us/pubs/rb/rb_nrs36.pdf

1. *Ohio Forest Description and Facts*

a. *Forest Land*

i. Total: Approx. 8,100,000 acres (Approx. 30% of OH landmass is forested) ii. State 450,000 acres or 6 % (185,000 acres directly managed by the Ohio

Division of Forestry) iii. Federal: : 270,000 acres or 4 % iv. Other Public: 239,000 acres or 3 %

v. Private/family (non-industrial): Approx. 6,200,000 acres or Approx. 76 %

(397,000 families are forest owners)

vi. Forest Industry: Approx. 930,000 acres or 12% vii. FSC Certifies: Approx. 1,600 acres of OH forestland



Figure 16. Ohio Map of State Forests

Ohio DNR website (2012), <http://www.ohiodnr.com/tabid/5158/Default.aspx>

b. Forest Facts:

i. Timber Harvested:

- 1) Federal forests: Not known
- 2) State forests: 52,434 acres (1.1%) (Approx. annual 2500 acres)
- 3) County/municipal forests: Not known
- 4) Private forests: Not known

ii. Average Stumpage Sale: State: 72 acres
iii. Main Commercial Tree Species: All oak species, maple species, yellow poplar, black walnut, black cherry.

iv. Forest Related Annual Economic Impact:

- 1) Total: Approx. \$15,105,000,000
 - 2) Forest Products: Approx. \$12,000,000,000 (Pulpwood, lumber, veneer, furniture, cabinets, pallets, and containers) (Ohio Division of Forestry, 2006)
- v. Wildfires fought annually: 4500 acres burned vi. State Land Reforestation:
- 1) Natural: Approx. 600 acres
 - 2) Planting: 0 acres
 - 3) Trees Planted: 0 (Ohio Division of Forestry, 2008)
- c. Forest Management: The Ohio Department of Natural Resources (ODNR), founded by law in 1949, was chartered with long term resource planning and for developing a program that would insure “wise use of the natural resources of the state” (ODNR, 2008). ODNR has a unique portfolio of resource assets to manage. It includes 559,000 acres of land on which there are 74 state parks, 20 state forests, 133 nature preserves, and 139 wildlife areas. Additionally, ODNR supervises 120,000 acres of inland water, 7000 miles of streams, 481 miles of the Ohio River, and 2.25 million acres of Lake Erie. As with many other DNRs, it is also responsible for licensing all hunting, fishing, and watercraft. Other duties include overseeing mineral extraction, monitoring dam safety, managing water resources, coordinating the 88 county soil and conservation districts, mapping all state natural resources, and promoting recycling and litter prevention.
- i. Sean D. Logan was appointed Director of ODNR by Governor Ted Strickland in January 2007. ODNR has 124 funded programs that are organized into 17 divisions that are, in turn, overseen by three separate directorates, each headed by a Deputy

Director. The Forestry Division was managed by David Lytle, the State Forester, who reported to the ODNR Director through Tony Celebrezze III, Deputy Director for Recreation and Resource Management; Tony Celebrezze oversaw about 70 separate programs (ODNR Website, 2008).

ii. ODNR-Division of Forestry managed 20 state forests that were organized and managed with eight separate units. These eight units are grouped into two districts. Forests are multiple use: timber, recreation, and minerals. Please see attached Strategic Plan-Draft (2008), Appendix C, for Ohio forest management priorities. In the current plan, certification criteria and standards are driving Ohio forest policies. To help facilitate the execution of these policies, Ohio was in the process of building a central forest information system that will include an exhaustive inventory of state forests using “growth and yield” modeling.

d. Forest Description: Representing 31% of the state landmass, Ohio forests are generally classified as temperate with hardwoods, 96% of the tree cover, dominating the forest landscape; the remainder of trees are conifers of several varieties. The forestlands are considered by many forest advocates and scientists to be some of the most diverse in North America. Additionally, Ohio has four identifiable ecological zones and forty-three (43) differentiated sub-classifications of forestlands such as oak-hickory, beech-maple, oak-gum, etc. with over one hundred (100) species of hardwoods and 25 species of softwood (ODNR, 2008). However, there are ten (10) to twenty (20) species which dominate nearly all forest canopy in Ohio, with red and white oak being the most abundant, making up about 25% of the total tree volume. Red (soft) and sugar (hard)

maple comprise 18% of the forests; yellow poplar and hickory comprise another 18%, and white ash accounting for 8% (Ohio Department of Forestry, 2006).

e. Harvesting and Wood Products Industry: Of the 8.1 million acres of forest cover in Ohio, about 300-400 million board feet of timber is harvested per annum. The ratio of net growth to removals is 2.4 trees planted or seeded to every 1 tree removed through timber harvesting. This means that Ohio is growing over twice as many trees each year than it is harvesting. Ohio's total wood products industry contributes \$15.1 billion to the state's economy and employs 119,000 people with an annual payroll of \$4 billion. Ohio harvests are area-based/controlled based on a 20-year compartment review cycle.

Compartments are reviewed and recommendations for harvests are made.

Approximately 30 timber sales containing 2000 acres of select harvests and 600 acres of clear-cut harvest occur each year. These harvests total approximately 10 million board feet. ODNR-Division of Forestry is currently changing this approach by commissioning a complete inventory of their state forests. With this inventory method shift forest managers anticipate using a "growth and yield" modeling to calculate our anticipated harvest level. Ohio is very much in transition with new certification-driven forest management policy and procedures and by profoundly changing depth of forest data acquisition and surveillance. The breakdown of subsectors of the wood products industry follows:

i. Primary Wood Products Industry: This contributes \$803.6 million to Ohio's economy in the form of outputs. It employs over 5,500 people and generates annual payrolls of over \$103 million.

ii. Secondary Wood Products Industry: This contributes \$4 billion to Ohio's economy in the form of industry outputs. It employs over 43,000 people and generates annual payrolls of \$1.3 billion.

iii. Paper Industry: This contributes \$7.5 billion to Ohio's economy. It employs over 29,000 people and generates annual payrolls of more than \$1.4 billion (Ohio Division of Forestry, 2006).

2. *Ohio FSC Certification Experience*

a. Background: The Ohio Division of Forestry (ODF) originated the initiative of certifying the state forestland that it manages with the Forest Stewardship Council (FSC). ODF leadership presented the idea to Governor Strickland in 2007, and he subsequently endorsed the program initiative, which provided the proclamation needed to direct the program's institution.. The Governor decided that there will be dual auditing by both FSC and FSI. Half of the cost of the program will come from general state revenues and the other half will come from personnel savings from within ODF. The reasons why this program will be initiated by ODF are as follows:

i. To enhance the Ohio forestry and wood products economic sector through certified sustainable forest management ii. To provide a needed local source of FSC certified wood (avoiding the necessity of buying FSC certified wood outside of Ohio) iii. To enhance the internal ODF organization and management regime through improved policy development, process and procedures, planning, training, communications, and program transparency

b. Certification Chronology: The State of Ohio is at the early stages of the certification process. One of the barriers faced by Ohio in successfully completing the

certification process is the lack of usable data to offer as evidence for harvest levels and forest planning. Realizing the need for more robust management systems and tools, Ohio has invested nearly \$750,000 in the last 2 years to procure and customize a central forest information system with a “growth and yield” component and to commission and complete an inventory of state forests. Ohio feels that these systems and tools need to be operational before attempting to be certified by a third party. Simultaneously, Ohio has been implementing both the FSC and the SFI standards, anticipating dual certification. It is anticipated that Ohio will be able to advertise a request for proposals for a certification audit in calendar year in 2009.

c. Public Participation: There has been support for forest certification from the general public, forest advocacy and environmental organizations, wood products associations and businesses which are involved in the forestry and wood products sector. The Ohio Environmental Council and the Ohio state chapter of the Nature Conservancy have supported the ODF certification initiative. However, the Buckeye Forest Council, affiliated with the forest advocacy group Heartwood, has taken a position opposing forest certification. This organization has taken this position believing that certification will lead to more harvesting of trees than is now occurring. This organization supports a silviculture that is passive and advocates that cutting trees and having preventive fires are not conducive to a healthy forest. The Ohio state chapter of the Sierra Club has not taken a formal position, but is not actively opposing certification. Its leadership has provided positive feedback during consultations with ODF staff.

CASE 5: PENNSYLVANIA



Figure 17. Tioga State Forest

Pennsylvania Department of Conservation and Natural Resources website (2012) *State Forests*.

1. *Pennsylvania Forest Description and Facts:*

a. Forest Lands:

i. Total: Approx. 16,600,000 acres (59 % of PA landmass is forestland) ii. Federal:

611,100 acres or 4 %.

iii. State: 3,813,500 acres or 23 % (State Forest System: 2.1 million acres or 12 % of PA forestlands).

iv. Local: 413,700 or 2 %.

v. Private (families/individuals): Approx. 8,906,000 acres or 54 % (501,500 private owners).

vi. Non-corporate/non-family: 698,100 or 4 %. vii. Forest Industry: Approx.

2,139,300 or 13 %.

viii. FSC Certifies: 2.1 million acres (Entire PA State Forest System)

(McWilliams et al., 2004).

b. Forest Facts:

i. Timber Harvested: State forests (2006): 14,337 acres (less than .05%; 87,214,952 board feet equivalent) ii. Average Stumpage Sale: Approx. \$200,000 (\$37,000,000 on 186 sales

(PADCNR/BOF, 2006)

iii. Main Commercial Tree Species: white and red oak, red maple, sugar maple, black cherry, chestnut oak iv. Forest Related Annual Economic Impact: Approx. \$ 27,000,000,000

v. Forest Products: Approx. \$16,000,000,000 (pulpwood, sawlogs, veneer, furniture (PADCNR/BOF, 2007)

vi. Wildfires fought annually: 2007: 1,140 acres burned of which 425 were on public lands. (Source: reported to researcher by a PA State Forest manager, 2/18/2009).

vii. State Land Reforestation:

1) Natural: Most regeneration of State Forests is through natural regeneration using even-aged management techniques (shelterwood harvests promote the establishment of advanced regeneration which is followed by an overstory removal or regeneration harvest).

2) Tree Planting: Planting is considered supplemental and is completed on a limited basis (500-1000 acres per year). Approximately 16,000 acres of PA State Forest Land received silviculture (harvesting) treatment per year (PA State Forest manager, personal communication, February 18, 2009).

c. Forest Management:

i. Organization: Established in 1995, the Pennsylvania Department of Conservation and Natural Resources (PADCNR) is charged with managing the state park system, which includes 117 separate parks and 2.1 million acres of state forestland. Currently overseen by Secretary Michael DiBerardinis, PADCNR has 1,407 salaried employees and a budget of \$341.1 million. The Pennsylvania Bureau of Forestry (PABOF) is currently managed by the Director/State Forester, Daniel Devlin. In addition to forestry, the PADCNR is responsible for state parks, environmental education, facility design and construction, management services, community recreation assistance, river conservation, trails and greenways, topographic and geologic survey, and the Conservation and Natural Resources Advisory Council. In addition to the executive staff of approximately 300 persons located in Harrisburg, there are nine subordinate units that manage programs related to the above noted functions.

ii. Funding is derived from the following sources:

- a) General Fund: \$109.1 million
- b) Federal Funds: \$47 million
- c) Augmentations: \$59.4 million
- d) Special Funds: \$73.8 million
- e) Other: \$51.8 million

(PADCNR Overview, 2008)

iii. Mission: The mission of the Bureau of Forestry (PABOF) is "to insure the longterm health, viability and productivity of the Commonwealth's forests and to conserve native wild plants" (PADCNR/BOF, 2008). To accomplish this mission

PABOF has ten divisions or subordinate units to manage its programs. These divisions include

Resource Planning and Inventory, Forest Fire Protection, Forest Health, Operations, Recreation, Ecological Services, Minerals, Rural and Community Forestry, Silviculture, Field Operations, and the Penn Nursery.

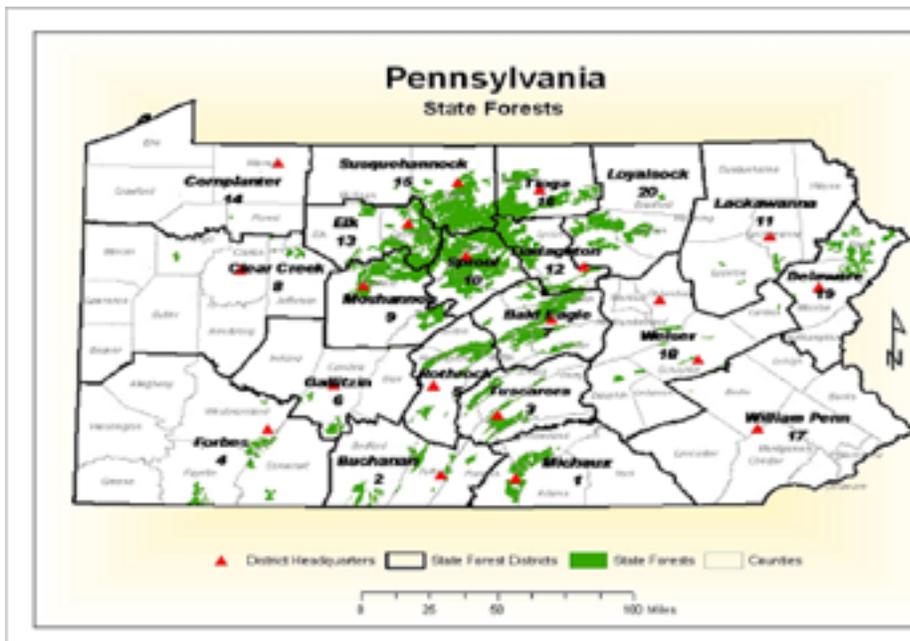


Figure 18. Pennsylvania State Forests Map

(Pennsylvania Department of Conservation and Natural Resources website (2012) *State Forests*)

d. Forest Description:

i. In the early 17th century, it is estimated that 95%% of Pennsylvania was covered by forest. Due in part to Pennsylvania's close proximity to important centers of the American industrial revolution and, in particular, the burgeoning rail transportation system, an inordinate volume of lumber was in demand resulting in much of Pennsylvania's forests disappearing by the mid 1800s. The all time low for forested

lands in Pennsylvania occurred in 1907 when only 30% of the original forestland still remained. Substantial recovery occurred in the 20th century, and now about 16.8 million acres or about 58% of Pennsylvania's land mass has been returned to forestland. The largest portion of this forest land is located in the north central area of the state. In much of the southern part of the state the landscape is characterized by farmland in the valleys and forestland along the ridgelines. Most of the regeneration of the forest occurred naturally. Unfortunately, due to an overabundance of white tail deer that cause over browsing in many areas of the state, natural regeneration is limited.

ii. With 2.1 million acres of forestland in 48 of Pennsylvania's 67 counties, % the Pennsylvania state forest system is one of the largest expanses of public forestland in the eastern United States. In addition to the abundance of high quality forest products the state forest system plays a significant role in the state's tourism industry. Not only do the Pennsylvania state forest lands provide world renowned vistas, there are numerous well developed tourist destination locations for diverse forms of recreation throughout the state forests (PADCNR/BOF State Forest Resource Management Plan, 2007).

iii. In this temperate hardwood biome, there are over 100 varieties of trees. Black cherry, red oak, and sugar maple are highly valued and play an important part in Pennsylvania's vibrant wood products industry. There are, however, 20 Northern/Alleghany hardwoods that are common in the Pennsylvania forest landscapes and play an essential part of the state wood products industry. There are two major forest types in PA: northern hardwoods and oak hickory. Of these forests types, there are approximately 20 different species that are preferred by the wood products industry.

The forests of Pennsylvania are generally *even aged*, ranging from 80-120 years old. The focus of the wood products industry, which contributes about \$6 billion to the state economy, is furniture, cabinets, hardwood flooring, and pulp wood for paper products.

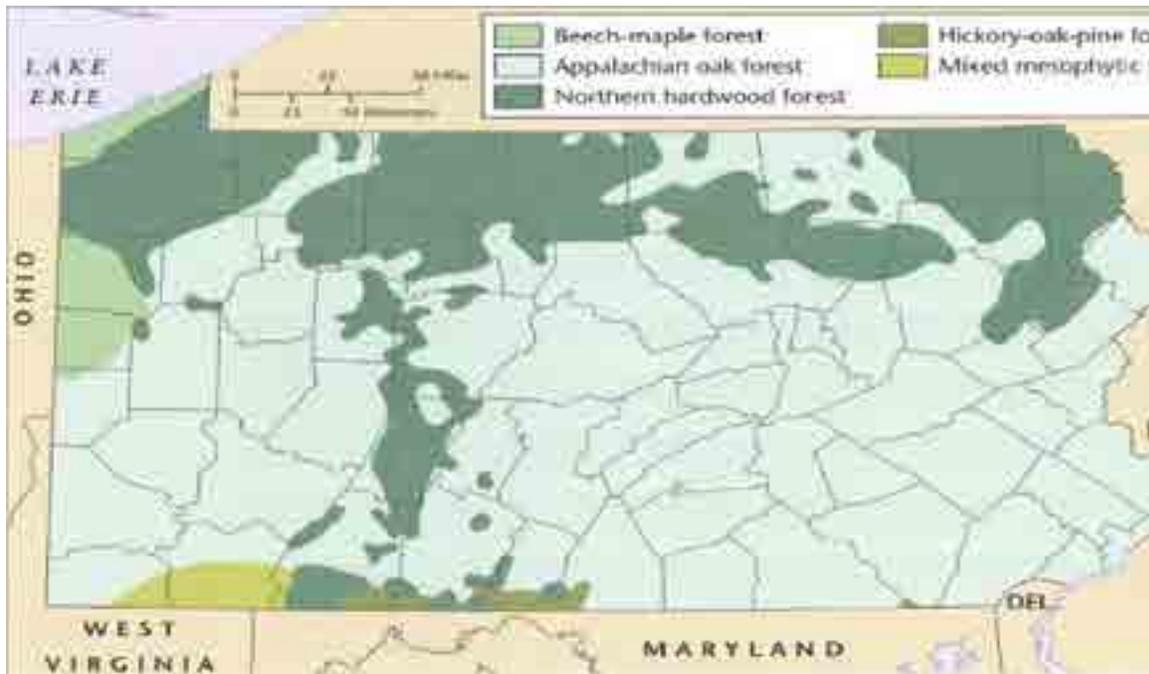


Figure 19. Major forest types of Pennsylvania

Pennsylvania Department of Conservation and Natural Resources website (2012) *State*

e. Forest Management: As with many state forest service's approaches to forest management, PABOF's approach is centered on a state-wide plan that is periodically updated. Their initial plan, written in 1955, focused on timber management and watershed protection. It has subsequently been revised several times to reflect the evolution of both forest science and management science. In 2003 there was a distinctive shift in business culture when the management plan appropriated an ecosystem approach to forestry "where all aspects of an ecosystem are considered important, and decisions are made based on the best understanding of ecological interactions and processes necessary to sustain the ecosystem's composition,

structure, and function over the long term.” (PADCNR/BOF State Forest Resource Management Plan, 2007). This approach was expanded by incorporating systematic public input into the planning process and by integrating a third party certification regime in 1998 based on the Forest Stewardship Council’s (FSC) management principles. (PADCNR/BOF State Forest Resource Management Plan, 2007). Following are the distinctives PA State Forest Resource Management Plan (SFRMP) at the time of this research:

- i. A land-management system based on digitized eco-regions, landscapes, and forest community classification layers.
- ii. A landscape examination and management process to generate meaningful data that can be used to establish and monitor ecosystem function and management goals at a statewide, eco-regional, and landscape level..:
- iii. An annualized five-year forest inventory cycle, and permanent crews to conduct the Inventory.
- iv. New technologies, such as Global Positioning Systems (GPS),
- v. Geographic Information Systems (GIS), web-based management and reporting systems, and computer-based modeling to aid in data and information management, resource planning, and management decisions.
- vi. A timber harvest allocation model that promotes a sustained supply of timber, a balanced mosaic of age-classes and community types, and varied stand rotation ages.
- vii. Expanded acreage in Wild Areas, Natural Areas, Wild Plant Sanctuaries, and other special use areas.
- viii. The development of a Bioreserve and Old Growth Systems for the State Forest.

ix. A five-year planning and public input cycle to provide a more rapidly iterative, interactive, and adaptive update and revision process for the SFRMP 2007”

(PADCNR/BOF SFRMP 2007).

f. Silviculture and Harvesting: Prior to 1960 PABOF used selection cutting as the silvicultural system to manage timber and forest resources. In 1960 the silvicultural system changed to diameter limit cutting to “...facilitate the enormous salvage operation created by insect-caused mortality.” In 1965 the system changed a second time to even-aged management, which was considered necessary due to the overabundant deer herd located in the state forestlands. The PABOF silvicultural systems and management prescriptions are based on comprehensive evaluations and analysis ecological conditions and economic characteristics. They use comprehensive modeling that considers desired future conditions, market conditions, current age class distribution, desired balanced age class distribution, and consideration for old-growth (Seymour et al., 2004).

i. Harvesting allocation goals have been issued to each forest district and are focused on helping to balance the age-class distribution of the forest. The SFRP with the 2007 updates reports, “Implementing the goals will also help promote sustainable timber harvesting levels by regulating the forest, harvesting a consistent level of wood volume, sustaining workloads, and stabilizing revenues.”(PADCNR/BOF SFRMP, 2007).

ii. The summary of PABOF timber harvests on state owned forest land for 2004-2006:

1) 2004: 15,917 acres treated (55,824 MBF)

2) 2005: 14,359 acres treated (68,374 MBF)

3) 2006: 14,961 acres treated (69,109 MBF)

(PADCNR/BOF SFRMP, 2007)

2. Pennsylvania FSC Certification Experience:

a. Background: The first interest in forest certification began in the early 1990s and originated partially from younger PABOF foresters and partially from environmental organizations within the state. There was a growing consensus that this was the direction that common forestry practice was headed and that Pennsylvania should stay ahead of the power curve. There was resistance, however, from senior MIDNR managers who questioned why an “outsider” should be telling PABOF how policy should be set for the state forest lands. Conversely, many individuals in the industry saw certification as a great opportunity to have outside experts access PABOF management and to build confidence that what they were doing was indeed correct. In 1995 a commitment was made by PADCNR/BOF for a small pilot project, and the Rockefeller Foundation offered to pay for its cost. However, the in-state Heinz Foundation decided it was more appropriate that a Pennsylvania based non-profit pay for the initial certification audit. The pilot project cost about \$50,000, and this included the initial audit and two follow-on audits. The last two surveillance audits were paid for by the state. PABOF decided to commit one million acres to the initial pilot project in an area popularly known as the Pennsylvania Wilds located in north central Pennsylvania. There was no stakeholder resistance, though the Sierra Club and other stakeholders took an active interest in the process. An advisory committee was organized that included the Hardwood Development Council and the Pennsylvania Environmental Council. The audit produced mixed results: Though certification unfortunately was not granted due to the severe problem of overbrowsing by a badly swollen deer population,

a chronic unresolved issue for many years, nevertheless, this audit caused the deer overbrowsing issue to be directly confronted by state public policy officials for the first time. The genesis of the deer overbrowsing problem was that the deer population was not under the control of the PABOF. Pennsylvania deer and other wildlife are the responsibility of the independent Pennsylvania State Game Commission over which PADCNR had no control. The PADCNR was responsible for forest management, but had not influence over the size of the deer population which the Game Commission purposefully kept as large as possible to be of service to Pennsylvania hunters and had no reason to be concerned with the possible deleterious effect on forest health and regeneration. This led to a protracted bureaucratic conflict that lasted for several years. There was also a problem with the “paper trail” or chain-of-custody for logs taken to mills and for mills transferring their products to end users. Finally, due in part to pressure from the pulp wood and paper sector for a source of certified lumber, a full scale FSC certification audit of all Pennsylvania state owned forest land was authorized. Thus, the following certification chronology represents the second generation of certification audits for the state forest lands of Pennsylvania.

b. **Certification Chronology:** The following chronology outlines the events and experiences of FSC certification evaluation in the State of Pennsylvania during its second iteration of being audited by a third party. This information is based on interviews of knowledge experts and official written reports.

i. Request for Proposals (Spring 2003): PABOF published requests for proposals in 2003 to conduct the second iteration of FSC certification evaluation. The bid from

Scientific Certification Systems (SCS), an FSC trained and accredited third party auditing company, was accepted.

ii. FSC Pre-assessment or Scoping Audit: A pre-assessment or scoping audit was not required since SCS was already familiar with Pennsylvania state forest system from previous certification work.

iii. FSC Initial Audit (Sept 2005):

1) SCS empanelled an interdisciplinary team of natural resource specialists in August 2003. The 7 day field audit occurred by this team from August 4–10, 2003.

The team consisted of Dr. Robert Seymour, the Curtis Hutchins Professor of Silviculture, in the Department of Forest Ecosystem Science at the University of Maine; Dr. David de Calesta, a certified Wildlife Biologist and Adjunct Professor of Forestry at SUNY College of Environmental Science and Forestry-Syracuse (PhD granted by Colorado State University); Dave Wager, SCS Director of Forest Management Certification, an experienced forest certification evaluator with an M.S. in Forest Ecology from Utah State University.

2) The following steps were undertaken to complete this audit:

a) Project initiation (development of a work order, formation of a team of regionally-relevant experts, 30-day prior public notice, etc.).

b) Preliminary discussions with Bureau of Forestry senior personnel for the purpose of fixing a date for the field audit and beginning the process of compiling and conveying to the audit team update data, documents, and related information about BOF management; the bulk of the documentary information was provided to the audit team members in the form of a comprehensive CD.

- c) Tactical planning by the audit team and initiation of stakeholder outreach
 - d) Review of information supplied by BOF.
 - e) Completion of the field audit and stakeholder consultations.
 - f) Synthesis of findings, and scoring of performance relative to the Appalachia Regional Standard.
 - g) Preparation of the written certification evaluation report, and this public summary (Seymour et al., 2004)
- 3) The audit team's assessment process was focused on the objective of evaluating the PABOF's management of the Pennsylvania state forest lands to determine if they conformed to the FSC Principles and Criteria and regional standards. To accomplish this goal the audit team reviewed pertinent PADCNR/BOF documents, interviewed PABOF personnel at all levels of the organization, consulted with individuals and organization which consider themselves to be Pennsylvania forest stakeholders, and conducted a seven day field and office audit. For a detailed day-by-day description of audit team activity see Seymour et al, p21-23, at http://www.scscertified.com/PDFS/forest_statepenn.pdf.
- 4) The field audit included interviews with fifty (50) PABOF field, planning and administrative personnel from five (5) forest districts and from the Harrisburg PABOF main office; and it "included a broad array of field sites designated to illustrate a cross-section of stand types and treatments, focusing on harvests and other site disturbing activities conducted within the last few years" (Seymour et al., 2008).

5) A list of 200 stakeholder groups and individuals was compiled from PABOF information and all were contacted by mail and invited to provide input. Less than 10% of people contacted responded. Stakeholders included FSC staff personnel, government and non-government organizations involved in forest management, local citizens, employees, contractors, and others. Interviewed sources in the Bureau of Forestry believed that many forest stakeholders did not respond as they felt they had already established good communication directly with PABOF's staff and planning process. This perception appears to be based on personal observation and is not based on systematic data collection and analysis.

6) The audit report includes a lengthy section on strengths and weaknesses. It is within this section that the SCS/FSC scoring was documented. SCS used a point system directly tied to the FSC ten (10) Principles, Criteria and Regional Forest Standards in order to score the performance of the PABOF's forest management. Based on this scoring system a decision is made on two issues: 1) the certification of the state forests, and 2) the Corrective Action Requests (CARs), both major and minor. The scoring was done through a consensus of the SCS Audit Team Members who assign a numerical value for each Criterion assigned to each of the ten (10) Principles. These Criteria scores are then averaged for each of the ten (10) principles. A one hundred (100) point scale is used. Any criterion in which the consensus score is below eighty (80) requires that a CAR be issued. If the average scores of all Criteria assigned to one of the ten (10) principles averages to below eighty (80) then FSC certification cannot be awarded and the audit team must issue one or more Major CARs. These Major CARs must be satisfied before FSC certification can

be awarded. The team may also issued Minor CARs for deficiencies which they feel do not prevent certification, but nevertheless require some form of corrective action, usually expected to be satisfied in one year or less from the time the final report of evaluation is completed and before the first surveillance audit commences.

7) In the case of this assessment the SCS Audit Team recommended the PADCNR/BOF be awarded FSC certification with no Major CARS and 12 Minor CARs. The Minor CARs included improving communication with native tribes that have a vested interest in PA forest lands and the Pennsylvania Historic and Museum Commission; addressing safety issues in timber sales contracts; further addressing the chronic white tail deer over-browsing issue; increasing scientific and public input into finalizing the bio-reserve areas; expanding the management plan template to all District Forests; improving training and supervision of contractors to reduce logging damage to soil and biological reserves; improving training to state foresters on sensitive plant and animal species and animal habitats; covering issues of forest road system and local jobs in the management plan; developing a process for monitoring indicators provided to the public; reviewing management zoning system; and expanding planning for reducing impact of deer on HCVF attributes (Seymour et al., 2004). The list of CARs and their explanations can be found at http://www.scscertified.com/PDFS/forest_statepenn.pdf , p. 36-39.

iv. FSC Annual Audits: In most contracts with third party certification evaluators. four follow-on annual audits (sometimes called yearly surveillance audits) are included to ensure previous CARs have been satisfied and to continue monitoring

forest management to insure the state forest service complies with FSC criteria and standards. To date, there have been four annual audits: 2004, 2005, 2006, and 2007.

1) 2004 Annual Audit, November 8-10, 2004: A substantial effort was made during the 2004 annual audit to ensure PABOF complied with the CARs from the 2003 initial audit. All CARs were complied with or substantial effort towards their completion had been accomplished. Some CARs suggested planning, which was accomplished. . However, SCS kept the CAR “open” (not completely satisfied) because the plans had not been fully executed and results had not been fully measured and documented. One additional CAR was added in this audit and concerned improving measurements of the results of the state Deer Management Assistance Program (DMAP). The following general tasks were accomplished as part of the 2004 annual audit conducted by Dave Wager and Dr. Michael Keyes:

- a) Review of prior year certification report.
- b) Preliminary discussions with BOF senior personnel for the purpose of fixing a date for the field audit and beginning the process of compiling and conveying to the audit team updated data, documents and related information about BOF management.
- c) Review of information supplied by BOF.
- d) Completion of the field audit and stakeholder consultations.
- e) Synthesis of findings, and scoring of performance relative to the Appalachia Regional Standard.
- f) Preparation of the written certification evaluation report, and this public summary (Keyes & Wager, 2004).

2) 2005 Annual Audit, July 18-21, 2005: This was conducted in the same

manner as noted for the 2004 audit, and the audit team consisted of Dave Wager and Dr. Michael Keyes. This was a far more comprehensive audit than the audit conducted in 2004; the 2005 dealt with several new issues. Substantial time was spent on reviewing CARs from previous two years to monitor progress in satisfying FSC criteria and standards. In addition, four new Minor CARs were added: improve understanding in each district of the Appalachian Standard, update the Deer Management Assistance Program, ensure new watercourse standard is implemented, develop a revised procedure for chemical applications on state forests that complies with FSC Principles and Criteria, Criterion 6.6. The following list of additional issues were identified from this audit:

- a) Deer fencing costs, benefits, and the state-wide forest regeneration fund.
- b) Policies and procedures for herbicide use.
- c) Regeneration surveys and updates for forest management plans and procedures, and methods.
- d) FSC Criteria 5.3 and PA state forest practices regarding woody debris left on landings.
- e) Operability issues as related to fencing, harvesting equipment, and herbicides
- f) Exceptional value streams and BOF policies.
- g) FSC Criteria 6.6 and Indicators for aerial spraying; possible non-compliance on airstrip salvage.
- h) Bureau of Forestry live tree retention policies and contracts; use of herbicides.

- i) Wildlife assessments; food chains for big cats and bears.
- j) Use of PNDI database by BOF foresters.
- k) BOF training for rare and endangered species; rattlesnake needs and Silviculture prescriptions.
- l) Road decommissioning; additional BOF measures to assure road closures for ATVs
- m) New road construction; costs, benefits, minimum and optimum specifications.
- n) Use of aesthetic buffers and Silviculture limitations; tree marking guidelines.
- o) Salvage sales using group selection.
- p) Use of pre-harvest herbicides for eradication of ferns and exotics.
- q) Silviculture decision-making using the SILVAH program.
- r) PA Game Commission input for Silviculture prescriptions and creation of Ruffed Grouse habitat.
- s) Adjustments of District 20 timber harvesting targets to favor wildlife species.
- t) BOF and community-based efforts to preserve wetlands.
- u) Episodic events and changes to forest management plans.
- v) Recreational use and trends.
- w) Re-districting and BOF staff assignments.
- x) Regional geology and trail wear.
- y) Guidelines for horseback rider safety.
- z) User participation in BOF projects. (Keyes & Wager, 2005)

- 3) 2006 Annual Audit, October 2-4, 2006: A similar set of tasks as noted in the 2004 annual audit were completed by the auditors, Dr. Robert Hrubes and Mr. Jim Furnish. Much of the effort of this audit was focused on updating and monitoring progress on previous CARs. Only one new CAR was surfaced and that dealt with the chronic white tail deer problem in which the auditors stressed the need to update the Deer Management Assistance Program 2007-2008. (Hubres & Furnish, 2006)
- 4) 2007 Annual Audit, September 26-28, 2007: This annual audit accomplished the same general tasks as noted in the 2004 annual audit above and was completed by Mr. Dave Wager and Mr. Sterling Griffen. It also reviewed progress on previous unclosed CARs and identified one new CAR: a need to create a “current, integrated, and easily accessible system to memorialize and communicate silviculture guidance.” (Griffen & Wager, 2007). A list of topics covered during field visits to Districts included the following: “Harvest allocation goals, lease camps, acid mine drainage reclamation, invasive species, estimated deer densities, DMAP, fencing, landscape exams, landscape narratives, recreation programs, OHV enforcement, watercourse protection, use of SILVA, designating skid trails, road and bridge work” (*Jack Dents*), “herbicide treatment of striped maple, oak regeneration, shift of oak to red maple in some stands, gypsy moth outbreak and ineffective Bt treatment.” (Griffen & Wager, 2007).

3. *Benefits of FSC Certification to the PA Bureau of Forests:*

- a. Outside review is good for the BOF organization:
- i. Provides a technical review of operations.
 - ii. Provides recommendation for improvement.
 - iii. Facilitates internal communication.

- b. Additional Benefits for FSC certification:
 - i. Provides leverage and justification for policies and programs.
 - ii. Generates support for needed resources. iii. Provides recognition and credibility.
 - iv. PA participation in the FSC certified pulp wood market which is experiencing strong demand.

- c. Future benefit may be realized as PA develops wood products to meet the growing demand of green builders for the U.S. Green Build Council (USGBC) Leadership in Energy and Environmental Design (LEED) certified wood products.

B: HUMAN SUBJECT REVIEW



Notice of Approval for Human Research

COPY

Research Integrity & Compliance Review Office
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553
FAX: (970) 491-2293

Principal Investigator: Angela Guggemos, Construction Management, 1584
Co – Investigator: Peter Means, Construction Management
Title: Applying Forest Stewardship Council Management Principles, Criteria, and Standards to Publicly Owned Forests in the United States
Protocol #: 08-239H **Funding Source:** n/a
Number of Participants/Records: Maximum of 30 interviews
Board Action: **Approval Date:** September 5, 2008 **Expires:** August 18, 2009

IRB Administrator: Janell Barker 

Consent Process:

The above-referenced project was approved by the Institutional Review Board with the condition that the attached consent form is signed by the subjects and each subject is given a copy of the form. *NO changes may be made to this document without first obtaining the approval of the IRB.*

Investigator Responsibilities:

- It is the PI's responsibility to obtain this consent form from all subjects.
- It is the responsibility of the PI to immediately inform the IRB of any serious complications, unexpected risks, or injuries resulting from this research.
- It is also the PI's responsibility to notify the IRB of any changes in experimental design, participant population, consent procedures or documents. This can be done with a memo describing the changes and submitting any altered documents.
- Students serving as Co-Principal Investigators must obtain PI approval for any changes prior to submitting the proposed changes to the IRB for review and approval.
- The PI is ultimately responsible for the conduct of the project.
- A status report of this project will be required within a 12-month period from the date of review. Renewal is the PI's responsibility, but as a courtesy, a reminder will be sent approximately two months before the protocol expires. The PI will be asked to report on the numbers of subjects who have participated this year and project-to-date, problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary continuation form (H-101) is available from the RICRO web page <http://ricro.research.colostate.edu>.
- Upon completion of the project, an H-101 should be submitted as a close-out report.
- If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.
- **Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.**

This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647. Please direct any questions about the IRB's action on this project to me for routing to the IRB.

Attachment Date of Correspondence: 9/5/08

**Consent to Participate in a Research Study
Colorado State University**

TITLE OF STUDY: *Applying Forest Stewardship Council Management Principles, Criteria, and Standards to Publicly Owned Forests in the United States.*

PRINCIPAL INVESTIGATOR:

*Dr. Angela Acree Guggemos
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CO-PRINCIPAL INVESTIGATOR:

*Peter Means, Co-Investigator
Graduate Student
Department of Construction Management
Guggenheim Hall
Fort Collins, CO 80523-1584
(970) 492-9987, (703) 244-5656
ptmeans@gmail.com*

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH?

You have been invited to participate in this study due to your experience with certifying, testing, auditing, studying, managing or otherwise working with a Forest Stewardship Council (FSC) certified publicly owned forest. You may also have been invited to participate in this study because you are involved in the formulation and/or advocacy of public policy and/or legislation related to FSC certified public forests.

WHO IS DOING THE STUDY?

The research team includes Dr. Angela Acree Guggemos, Principal Investigator; Peter Means, Co-Investigator; Dr. Kurt Mackes, CSU, Department of Forestry; and Dr. Mary Nobe, CSU, Department of Construction Management.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to research the history, decision making process and experience of five state departments of natural resources and/or forestry divisions who oversee FSC certified publicly owned forests. The states include Minnesota, Michigan, Pennsylvania, Ohio and Wisconsin. In the case of Ohio the state has recently committed itself to certifying its state owned public forests with the FSC, but has not yet completed the certification process. In the case of Ohio this study will focus on why the public policy makers chose to certify their forests with FSC and how they foresee the certification process unfolding in their state.

Page 1 of 3 Participant's initials _____ Date _____

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?

The study will take place through personal interviews with federal, state and county/municipal foresters, natural resource managers, and policy makers/advocates in their offices/work places located in the states of Minnesota, Michigan, Ohio, Pennsylvania, Wisconsin and Washington, DC. It is anticipated that each interview will last from 45 minutes to 1 hour.

WHAT WILL I BE ASKED TO DO?

To respond to a series of questions related to your organization's history, decision making process and experience in choosing to manage publicly owned forests in accordance with FSC principles, criteria and standards.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY?

No, there are no known reasons not to take part in this study. By partaking in this study you will help foresters and public policy makers in the State of Colorado better understand the benefit and problems associated with certifying their public forests with the FSC.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

There are no known risks associated with the interview. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

ARE THERE ANY BENEFITS FROM TAKING PART IN THIS STUDY?

There are no direct benefits to you. It is hoped that this research will aid foresters in other states who are considering FSC certification for public forests.

DO I HAVE TO TAKE PART IN THE STUDY?

Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

WHAT WILL IT COST ME TO PARTICIPATE?

There is no cost to you to participate in this study.

WHO WILL SEE THE INFORMATION THAT I GIVE?

We will keep private all research records that identify you, to the extent allowed by law.

Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however, we will keep your name and other identifying information private.

APPENDIX C: INTERVIEW QUESTIONS

Applying Forest Stewardship Council Management Principles, Criteria, and Standards to Publicly Owned Forests in the United States

Interview Questions:

1. Identification of interviewee (numerical code linked to identity list) _____.
(Name, profession, phone number, & email address will be kept on separate sealed list)

2. Position of interviewee: _____
3. Organization: _____
4. Date and time of interview: _____
5. Location of interview: _____
6. Can you describe the role you have played in the FSC certification of public forests?
7. When did you first become involved in the FSC certification of public forests?
8. Did you voluntarily seek a position in which you could work on the FSC certification of public forests?
9. How did you receive this assignment?
10. When did your state/county/municipality decide to certify forests with the FSC?
11. Where did the impetus/motivation to certify public forests with the FSC originate? Was it public organization or citizen advocacy groups outside of government?
12. Please describe the unfolding events which led to the FSC certification of forests in your state/county/municipality?
13. Can you describe the step-by-step decision making process which authorized the certification of public forest in your state/county/municipality?
14. Were there citizen advocacy groups which supported this effort? What were their names, do they still exist today and do you have a point of contact in that group? If not how can I make contact with this group?

15. What were their reasons to support FSC certification? Do they still support this effort today?
16. Were there citizen advocacy groups which **opposed** this effort? What were their names, do they still exist today and do you have a point of contact in that group? If not how can I make contact with this group?
17. What were their reasons for opposing FSC certification? Do they still take the same position today?
18. Approximately when did you begin communicating with FSC regarding the certification process?
19. Can you describe the step by step process that your state/county/municipality followed in order to certify your first publicly owned forest with FSC?
20. How large was this forest in acres? Can you describe the type and character of this forest and how it was being used prior to FSC certification?
21. What processes or protocols did the FSC request from the state in order to complete your first certification?
22. Can you describe how your state/county/municipality worked with FSC, forest advocacy groups and the public to develop standards by which the forest was to be managed?
23. In what year was that certification completed?
24. How much did the certification process cost? Can you describe in detail what the cost paid for and did this create any problems with the state forestry budget? Do you have yearly fees which you must pay to FSC? Can you describe what these are and how much they are?
25. Do you consider the cost to have been appropriate?
26. Have there been any audits of that forest since the certification date? If so, how much did it cost and how long did it take? If not, when will the next audit occur and who will conduct it? How much will it cost?
27. How many acres of forest land are currently FSC certified in your state/county/municipal area of area of responsibility?
28. How many separate certification events occurred in your jurisdiction or was there only one event which covered all of your state/county/municipality owned forests?
29. Please describe the benefits of having FSC certified publicly owned forests?
30. Are there tangible benefits to having FSC certified publicly owned forests? If so what are they?
31. Do you permit harvesting of trees from your FSC certified publicly owned forests?

- 32.If so, what %age of your forests is harvestable in a given year?
- 33.Do your FSC standards permit harvesting, under what circumstances and by whom?
- 34.Can you tell me how many board feet were harvested in each FSC certified forest since the date of certification?
- 35.What are the methods used for harvesting which are permitted by FSC? Does this include targeted, selective tree harvesting, or is clear cutting permitted? If clear cutting is permitted how large of a cut is permitted? What is the perceived affect of this type of harvesting?
- 36.Who conducts the harvesting?
- 37.How soon after harvesting is tree replanting done? Who performs this service? How far in advance do you begin growing your seedlings? Who provides this service?
- 38.Is this harvesting supported or opposed by the citizens and forest advocacy groups? If so what are their reasons for opposing harvesting?
- 39.Do you anticipate that harvesting of timber will continue or do you anticipate changes in the harvesting? If so, what would those changes be and why?
- 40.How has the harvesting of trees in your forest affected the health of your FSC certified forests? 41.Do you have any studies or reports to which I may have access which assess and analyze the condition of your FSC certified public forests?
- 42.Please characterize the uses of the trees which are harvested from your FSC certified forests.
- 43.Who typically buys and processes these trees?
- 44.Is there a Wood Products Trade Association, or an equivalent group, in your area which represents the wood products manufacturers? If so, do you have a point of contact and phone number?
- 45.What types of wood products manufacturing occur in your state/county/municipality? Are trees from FSC certified public forests in demand by these commercial interests? If not, why not?
- 46.How many active lumber mills exist in your state? How many mill dimensional lumber? What other products do they typically produce?
- 47.How many mill FSC certified trees into FSC certified dimensional lumber, or other FSC certified wood products? Where is the FSC certified lumber marketed/distributed? Can you characterize the demand for FSC certified wood?

48.Can you characterize the wood pulp industry in your state?

49.Does the state/county/municipality actively promote its FSC certified wood to the commercial end user? If not why not?

50.What problems have been encountered by your organization in the certification and management of FSC certified public forests?

51.What are the benefits of certifying and managing public forest by FSC standards?

52.What recommendations can you make to the State of Colorado foresters and public policy/forestry advocates regarding the FSC certification of public forests?

53.Do you have the names and phone numbers of other points of contact either in federal, state or local government organizations or forestry advocacy groups who are subject matters experts on FSC certification of public forests?

APPENDIX D: FSC PRINCIPALS AND CRITERIA

PRINCIPLES AND CRITERIA For Forest Stewardship

Approved 1996 — Amended 1998, 1999, 2000

INTRODUCTION

It is widely accepted that forest resources and associated lands should be managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. Furthermore, growing public awareness of forest destruction and degradation has led consumers to demand that their purchases of wood and other forest products will not contribute to the destruction of natural habitats or to forest practices that threaten, in response to these demands, certification and other forest management programs of wood products have proliferated in the marketplace.

The Forest Stewardship Council (FSC) is an international body which accredits certification organizations in order to guarantee the credibility of their claims. In all cases the process of certification will be initiated voluntarily by forest owners and managers who have the objective of a FSC certification. The goal of the FSC is to promote environmentally responsible, socially beneficial and economically viable management of the world's forests, by establishing a worldwide standard of accepted and respected principles of forest stewardship.

The FSC Principles and Criteria apply to all natural resources and forest lands, as defined in Principle 10 and the accompanying criteria. Many of these Principles apply also to plantations and partially replanted forests. Some detailed standards for these and other vegetation types developed at national or local level. The FSC also to be incorporated into the activities, systems and standards of all certification organizations seeking accreditation by the FSC. While the FSC is primarily designed for forests managed for the production of wood products, they are also relevant, to varying degrees, to forests managed for non-wood products and other services. The FSC is a complete package to be considered as a whole, and this remains true for relevant as ordering of priority. The document shall be used in conjunction with the FSC Standard, Procedures for Accreditation and Guidelines for entities.

FSC and FSC accredited certification organizations will not seek to participate in certifying the FSC. However, they follow in any individual Principles and criteria directly a standards from certification, or will lead to certification.



These decisions will be taken by national entities and guided by the spirit in which each Principle is stated, and by the importance and consequences of failure. Some flexibility will be allowed to cope with local circumstances.

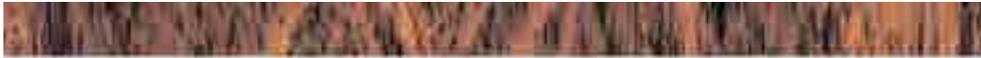
The scale and intensity of forest management operations, the frequency of the effects of logging, and the biological fragility of the forest will be considered as a contributory assessment. Different sets of principles or adaptations of the FSC will be addressed in national and local forest stewardship standards. These standards are to be developed in each country at a local level, and will be evaluated for purposes of certification, by national and other involved and affected parties on a case by case basis. If necessary, FSC design national standards may also be called upon during the course of assessment. More information and guidance about

the definition and implementation process is to be found in the FSC Standard Accreditation Procedures and Guidelines for Entities.

The FSC should be used in conjunction with national and international laws and regulations. FSC needs to complement, not replace, other activities that support responsible forest management worldwide.

The FSC will conduct additional activities to enhance public awareness of the importance of the following: (1) promoting forest management and responsible forest management and protection, (2) the preservation of forest products, (3) promoting the highest and best use of forest resources, (4) reducing damage and waste, and (5) promoting transparency and accountability. FSC will also promote guidance to policy makers on these issues, including promoting forest management legislation and policies.

The FSC Standard for Wood and Wood-based Products (Principle 1) is effective 1996.
The FSC Standard for Non-Wood Forest Products (Principle 10) is effective 1998.
The criteria for Principles 1 and 10 will be revised in 2000 and will be subject to the FSC Accreditation and Guidelines for Entities (Principle 10).
The standard for Accreditation Procedures and Guidelines for Entities (Principle 10) is effective 1999.



PRINCIPLE 1

COMPLIANCE WITH LAWS AND FSC PRINCIPLES

Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.

- 11. Forest management shall respect all national and local laws and administrative measures.
- 12. All operators and suppliers shall comply with applicable laws and administrative measures.
- 13. All operators, suppliers, processors and traders shall comply with applicable laws and administrative measures.
- 14. Forest management shall respect all applicable laws and administrative measures.
- 15. Forest management shall respect all applicable laws and administrative measures.
- 16. Forest management shall respect all applicable laws and administrative measures.

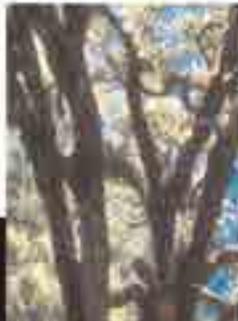


PRINCIPLE 2

TERRITORY AND SITE RIGHTS AND RESTORATION

Land tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.

- 11. The owner of the land shall be clearly defined, documented and legally established.
- 12. The owner of the land shall be clearly defined, documented and legally established.
- 13. The owner of the land shall be clearly defined, documented and legally established.



PRINCIPLE 3

INDIGENOUS PEOPLE'S RIGHTS

The legal and customary rights of indigenous peoples to own, use and manage their lands, territories and resources shall be recognized and respected.

- 11. Indigenous peoples shall be recognized and respected.
- 12. Indigenous peoples shall be recognized and respected.
- 13. Indigenous peoples shall be recognized and respected.
- 14. Indigenous peoples shall be recognized and respected.



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PRINCIPLE 4

COMMUNITY RELATIONS AND WORKER'S RIGHTS

Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.

- 4.1 The commercial value of timber to the forest management plan should be given appropriate weight in employment, training, and other activities.
- 4.2 Forest management should meet or exceed all applicable laws and/or regulatory standards and safety standards and best practices.
- 4.3 The rights of workers to organize and collectively negotiate with their employer shall be guaranteed as outlined in applicable laws and/or in the International Labour Organization (ILO) Conventions.
- 4.4 Employment practices and procedures shall consider the safety and health of all workers. Investments shall be directed to well-paid and good jobs that are not unduly affected by management practices.
- 4.5 Appropriate mechanisms shall be employed to resolve grievances and to provide for consultation in the case of loss or damage affecting the life or economic rights, property, resources, or well-being of local people. Measures shall be taken to avoid such loss or damage.



PRINCIPLE 5

BENEFITS FROM THE FOREST

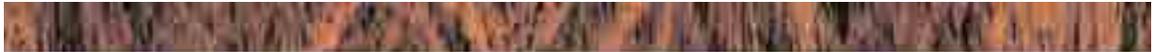
Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.

- 5.1 Forest management shall strive to ensure economic viability while being ecologically and environmentally sound and socially responsible to provide and maximize the economic benefits to realize the ecological productivity of the forest.
- 5.2 Forest management and activities conditions shall encourage the efficient and full productivity of the forest's multiple products.
- 5.3 Forest management shall involve stakeholders with knowledge and/or economic operations and value chains to the forest resource.
- 5.4 Forest management shall strive to improve and expand the local economy, making investments in other local sectors.



- 5.5 Invest in programs and systems that improve markets and allow operators to realize the value of forest products throughout their activities and lifetimes.
- 5.6 The type of harvest of forest products shall not exceed harvest levels that are ecologically sustained.





PRINCIPLE 6

ENVIRONMENTAL IMPACT

Forest Management shall conserve biological values by and its associated waters, water resources, soils, and unique and fragile ecosystems and landscapes; and, by so doing, maintain the ecological functions and the integrity of the forest.

- 6.1 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.2 Riparian habitat shall be protected, restored, and enhanced to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.



- 6.3 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.4 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.5 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.6 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.7 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.8 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.

- 6.9 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.10 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.11 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.
- 6.12 Management shall conserve riparian habitat by providing riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible and shall provide riparian habitat to the extent feasible.





PRINCIPLE 7

MANAGEMENT PLAN

A management plan—appropriate to the scale and intensity of the operations—shall be written, implemented, and kept up to date. The long-term objectives of management, and the means of achieving them, shall be clearly stated.

- 7.1 The management plan and supporting documents shall provide:
 - a Management objective;
 - b Description of the forest resources to be managed, natural resource limitations, and soil and climatic data, 1000–15000-ft conditions, and a profile of adjacent lands;
 - c Description of silvicultural and/or other management system, based on the ecology of the forest in question and information gathered through resource inventories;



- d Schedule for use of annual harvest and other activities;
- e Process for monitoring of forest growth and dynamics;
- f Environmental safeguards based on environmental assessment;
- g Plan for the identification and protection of rare, threatened and endangered species;
- h Map depicting the forest resource base including protected areas, planned management activities and land ownership;
- i Description and utilization of harvesting techniques and equipment to be used.

7.2 The management plan shall be periodically revised to incorporate the results of monitoring or new scientific and technical information, as well as to respond to changing environmental, social and economic circumstances.

7.3 Forest owners shall receive adequate training and support to ensure proper implementation of the management plan.

7.4 While recognizing the confidentiality of information, forest managers shall make publicly available a summary of the primary elements of the management plan, including those listed in Criteria 7.1.





PRINCIPLE 8

MONITORING AND ASSESSMENT

Monitoring shall be conducted—appropriate to the scale and intensity of forest management—to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.

- 8.1. The frequency, scope and intensity of monitoring shall be determined by the scale and intensity of forest management activities as well as the social, ecological and health of the affected environment. Monitoring procedures shall be established and regularly reviewed to ensure consistent or adaptive and assessment of change.



- 8.2. Monitoring systems should include the overall and discrete or specific monitoring activities to be carried out including:
 - a) Health of forest products harvested
 - b) Forest area, operations and condition of the forest
 - c) Changes to management design in the forest and forest
 - d) Environmental and social impacts of harvesting and forest activities
 - e) Cost, productivity and efficiency of forest management
- 8.3. Supervision shall be provided by the forest manager or a suitably qualified and certified supervisor or other duly qualified person.
- 8.4. The results of monitoring shall be recorded and be appropriate to the intensity of the management.
- 8.5. With respect to sustainability of harvesting, forest managers should provide a regular update report of monitoring results, including their own assessment of L2.

PRINCIPLE 9

MAINTENANCE OF HIGH CONSERVATION VALUE FORESTS

Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.

- 9.1. Assessments to determine the presence of high conservation value forests shall be completed prior to the start of forest management.
- 9.2. The presence or absence of the attributes which define high conservation value forests shall be identified through monitoring activities and plans for the management thereof.
- 9.3. The management plan shall include adaptive management systems to ensure the sustainability of high conservation value forests consistent with the precautionary approach. These measures shall be regularly updated if the risk to valuable natural assets increases.
- 9.4. An assessment of the sustainability of areas for the preservation of the natural attributes shall be carried out where the applicable conservation objectives



APPENDIX E: AUTHOR'S NOTES

My family's heritage is rooted in Colorado farming and Texas ranching from the 1800s until recent years. In the summer months much of my free time in my youth was spent helping on my Uncle's wheat farm or camping and trekking in Colorado's forests. This early life experience taught me to value our natural resources and to protect them through sound stewardship.

During my career as a soldier and federal civil servant I lived, worked, and traveled widely overseas where I experienced firsthand profound environmental destruction and the resulting social and political instability. This included the use of Agent Orange in Vietnam, the deforestation of the Sahel and of Haiti, the illegal dumping of toxic waste from the cocaine industry in Colombia, the destruction of the local fishing industry on the West Coast of Africa by Japanese factory boats, and the destruction of the Nigerian coastal ecology by the local oil industry's accidents and illegal dumping of waste products. These experiences brought home the clear nexus between the state of the environment, its impact on social and political stability, and the emotional and physical health of local communities.

An understanding of how construction and urban planning impacts on the health of our environment and social behavior occurred during the eighteen years I devoted to inner city development of properties in historic districts. This also provided an awareness of how building design and materials can have significant impacts on embedded energy, carbon emissions, and healthy living environments.

All of these life experiences together gave me a desire to explore how communities, industries, and the built environment can be made more sustainable through science

based research, policy studies, and decisionmaking. In particular, I wished to pursue how sustainable design, materials, and construction methods can make buildings and communities healthy places to live and work; and then to better integrate a more sustainable built environment with the local eco-system in a way which nurtures and does not destroy or degrade nature. Upon retirement these experiences influenced my decision to return to my home state to pursue studies in sustainable construction, or green building, in the Department of Construction Management at Colorado State University (CSU).

It was during this academic program that I became familiar with the U.S.

Green Build Council and its Leadership in Energy and Environmental Design (LEED) green building certification program. Desiring to be a green builder of residential homes using renewable resources such as wood, I soon discovered that the available forests certified as sustainable ranged from 900 to 1,500 miles from CSU. To transport certified wood from this long distance would create a far larger carbon signature than the sequestration of carbon in the wood itself, thus undermining the aim of greater sustainability intended by using wood products from sustainably grown forests.

Moreover, the LEED program encouraged the development of a local building materials industry, which raised the question of how to develop a local source for FSC certified wood products. These experiences led to this study and initiated my desire to determine the feasibility of certifying Colorado forests as sustainably managed.