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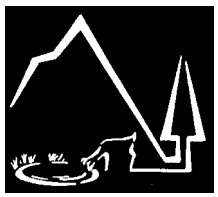

Toward Sustainable Forest Management:

Part I – Certification Programs

by

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- The Idaho Forest, Wildlife and Range Policy Analysis Group was established by the Idaho Legislature in 1989 to provide objective analysis of the impacts of natural resource proposals (see Idaho Code § 38-714).
- The Policy Analysis Group is administered through the University of Idaho's College of Natural Resources, Charles R. Hatch, Dean.

Policy Analysis Group Reports

1. Idaho's endowment lands: a matter of sacred trust. *J. O'Laughlin* (March 1990).
2. BLM riparian policy in Idaho: analysis of public comment on a proposed policy statement. *K.L. Johnson, C. Mosley, J.C. Mosley, and J. O'Laughlin* (June 1990).
3. Idaho Department of Fish and Game's land acquisition and land management program. *C. Wise and J. O'Laughlin* (October 1990).
4. Wolf recovery in central Idaho: alternative strategies and impacts. *C. Wise, J.J. Yeo, D. Goble, J.M. Peek, and J. O'Laughlin* (February 1991).
5. State agency roles in Idaho water quality policy. *A.C. Turner and J. O'Laughlin* (February 1991, with separate Executive Summary).
6. Silver Valley resource analysis for pulp and paper mill feasibility. *J.G. MacCracken and J. O'Laughlin*, editors (October 1991).
7. A national park in Idaho? Proposals and possibilities. *J.G. MacCracken and J. O'Laughlin* (June 1992).
8. Design of forest riparian buffer strips for the protection of water quality: analysis of scientific literature. *G.H. Belt, J. O'Laughlin, and T. Merrill* (June 1992).
9. Analysis of methods for determining minimum instream flows for recreation. *T. Merrill and J. O'Laughlin* (March 1993).
10. Idaho roadless areas and wilderness proposals. *J.G. MacCracken, J. O'Laughlin, and T. Merrill* (July 1993).
11. Forest health conditions in Idaho. *J. O'Laughlin, J.G. MacCracken, D.L. Adams, S.C. Bunting, K.A. Blatner, and C.E. Keegan, III* (December 1993, with separate Executive Summary).
12. Grizzly bear recovery in Idaho. *J.G. MacCracken, D. Goble, and J. O'Laughlin* (November 1994).
13. Endangered Species Act at the crossroads: new directions from Idaho case studies. *J. O'Laughlin and P.S. Cook* (October 1995, with separate Executive Summary).
14. Idaho water quality policy for nonpoint source pollution: a manual for decision-makers. *J. O'Laughlin* (December 1996, with separate Executive Summary).
15. Guidelines for managing cattle grazing in riparian areas to protect water quality: review of research and best management practices policy. *J.C. Mosley, P.S. Cook, A.J. Griffis, and J. O'Laughlin* (December 1997).
16. History and analysis of federally administered lands in Idaho. *J. O'Laughlin, W.R. Hundrup, and P.S. Cook* (June 1998).
17. Public opinion of water quality issues and funding options in Idaho. *J. O'Laughlin, K. McGuire, and J. Carlson* (December 1998).

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About the Policy Analysis Group (PAG)

Role and Mission. The Idaho Legislature created the Policy Analysis Group (or "PAG") in 1989 as a way for the University of Idaho to respond quickly to requests for information and analysis about current natural resource issues. The PAG's formal mission is to provide timely, scientific and objective data and analysis, and analytical and information services, on resource and land use questions of general interest to the people of Idaho.

PAG Reports. This is the eighteenth report of the Policy Analysis Group (see inside cover). The PAG is required by law to report the findings of all its work, whether tentative or conclusive, and make them freely available. PAG reports are primarily policy education documents, as one would expect from a state university program funded by legislative appropriation. The PAG identifies and analyzes scientific and institutional problems associated with natural resource policy issues. In keeping with the PAG's mandate, several alternative policy options are developed and their potential benefits and detrimental effects are analyzed. As an operational policy the PAG does not recommend an alternative.

Advisory Committee. A standing Advisory Committee (see inside cover) has specific functions assigned by the PAG's enabling legislation. The committee's main charge is to review current issues and suggest topics for analysis. Based on those suggestions, the dean of the College of Natural Resources works closely with the PAG director to design analysis projects. The Advisory Committee has a responsibility to suggest the appropriate focus of the analysis. This is done iteratively, until an outline for the project is mutually agreed upon by the committee and the PAG. The outline is usually organized as a series of focus questions, and the PAG's analytical tasks are to develop replies to the questions. The PAG uses the resources of the university and other public and private organizations as needed. When the PAG becomes active on a project, the committee receives periodic oral progress reports. This process defines the scope of PAG report content and provides freedom for the PAG to conduct unbiased analysis.

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* Authors of the report have carefully considered each comment on the review draft. In this way the reviewers have contributed substantially to the form and content of the report. However, the reviewers have not approved the contents of this report.

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EXECUTIVE SUMMARY

Sustainable forestry may be defined as forest management that is ecologically sound, economically viable, and socially desirable. Programs certifying that landowners practice sustainable forest management, or that wood-based products come from sustainably managed forests, are in the early stages of development. Certification relies on a voluntary approach and sets of *criteria* reflecting forest conditions or processes and *indicators* measuring some aspects of the criteria. Although a 1998 Idaho field test of internationally developed criteria and indicators (C&I) encountered difficulties, the test team did find some appropriate indicators for which data are available. Certification programs develop *standards* for C&I against which measured indicator values can be compared. Neutral third-party certifiers are recognized as the most credible way to do this. At least two forest industry companies in Idaho are in the process of third-party certification of sustainable forestry. Forest landowners and forest products manufacturers weigh the costs of certification against perceived benefits derived from public confidence that forest management is not environmentally harmful. Certification programs are likely to evolve as current problems are worked out. The Idaho landscape is dominated by federal lands on which public policy and public trust pose barriers to certification. Restoring trust by modifying federal land management policies to allow third-party certification of forest stewardship may be a path to sustainable forest management on these public lands.

This report is the first in a two-part effort to analyze issues associated with sustainable forest management in Idaho. Programs for certifying that forest lands are sustainably managed, or that forest products come from such lands, offer some promise and present some pitfalls for forest landowners, forest products manufacturers, and consumers. This report focuses on how certification programs are being implemented as a means to assess and evaluate sustainable forestry. Part II, to be published separately at a later date, will analyze policies designed to ensure that Idaho's forest landowners are managing forest lands to sustain the diverse benefits society desires from forests.

Forest certification is the subject of this report. Topics are presented in 9 chapters. **Chapter 1** is a basic introduction to the concept of what people mean by sustainable forest management. Because of the broad scope of interests involved and different interpretations of what forests should sustain, sustainable forestry is difficult to implement. But it is important to try, as sustainable patterns of resource use have become one of the core values of an environmental perspective.

"Criteria and indicator" (C&I) frameworks are described in **Chapter 2**. These tools have been developed internationally for the purpose of national level assessments of sustainable forest management. The United States is a party to the "Montreal Process" and has affirmed the nation's commitment to that set of C&I in the "Santiago Declaration." The 12 countries involved in this agreement together represent 60% of the world's forests.

Applying a set of international C&I at the local level poses several problems and policy issues. C&I not only serve to organize information about sustainable forestry, but also provide the basis for certification programs. **Chapter 3** summarizes the results of a 1998 field test of the potential application of C&I for assessing sustainable forest management at the local level. The test was conducted in southwestern Idaho by an international forestry research organization. The purpose was not to judge whether Idaho forest lands are sustainably managed, but to determine what the appropriate C&I for making such judgments might be throughout North America, and whether data are available. There are a number of appropriate indicators. Data are available for some of them but lacking for many others.

Certifying sustainable forest management is introduced in **Chapter 4,** which explains the fundamental differences between various certification programs. Certification programs operating in the United States are presented in **Chapter 5**. Stakeholder reactions to certification in general and preferences for particular programs are reviewed in **Chapter 6**. This sets the stage for analysis of certification policy issues in **Chapter 7**. General conclusions about forest certification are presented in **Chapter 8**.

Certification and Idaho forests, landowners and forest products manufacturers are featured in **Chapter 9**. Because almost 80% of Idaho's forests are in the National Forest System, U.S. Forest Service policies are a key consideration. Are these lands sustainably managed? According to what standards? Perhaps a C&I framework and independent certification could effectively address these questions.

SHORT SUMMARY

The following Short Summary highlights key findings from each chapter and spares the reader the citations to the literature included in the body of the report.

1. What is sustainable forest management?

Sustainable resource use has become a core environmental value. Because sustainability is a set of ideals more than a measurable concept, definitions of sustainable forest management are elusive, but include ecological, economic, and social considerations. Criteria and indicator (C&I) frameworks and certification programs are attempts to evaluate the different dimensions of sustainable forest management with some degree of consistency so that the public may have some confidence that forest management is not irreparably harming the environment. Such programs are less than a decade old, and can be expected to evolve.

2. Criteria and Indicators (C&I)

Several questions about the genesis and application of criteria and indicators (C&I) for sustainable forest management are posed.

! ***What are C&I?*** Criteria and indicators (C&I) provide a framework for describing, monitoring, and evaluating progress towards the goal of sustainable forest management. A *criterion* is a category of conditions or processes by which sustainable forest management may be assessed. An *indicator* is a measure of an aspect of a criterion. No single criterion can define a sustainable condition. There are numerous *criteria*, each characterized by one or more quantitative, qualitative, or descriptive *indicators*. By measuring and monitoring indicators, trends toward specific goals and objectives can be more effectively determined, and become a basis for judging if progress toward sustainable forest management is occurring.

! ***How can C&I be used?*** C&I have been assembled into various sets that are national level frameworks for gathering and analyzing information about the ecological conditions of forests and their contributions to economic and social well-being. The choice of C&I is often tied to principles espoused by the organization proposing to use them. In the future it may be possible that information about specific C&I can be used at the national level to develop and compare policies for sustainable forest management, and at the forest management unit level as a basis for making judgments about whether forests are sustainably managed.

! ***Where did C&I come from?*** Many countries, including the United States, identified sustainable forest management as a priority following the 1992 United Nation's "Earth Summit" in Rio de Janeiro, Brazil. Various sets of C&I have been developed along with international agreements on their use. The U.S. participates in the Montreal Process, a working group that created a set of C&I for temperate and boreal forests. The U.S. affirmed its commitment to using this set of C&I in the Santiago Declaration. The Montreal Process C&I set is not legally binding on the 12 member countries and includes 7 criteria and 67 indicators. (These are listed in **Appendix A**, which also identifies the 18 indicators for which there is adequate data available for Idaho.)

! ***Who is using C&I in North America?*** Several institutions and organizations in North America are developing or adapting existing sets of C&I in frameworks appropriate for particular geographic scales and ecological, economic, and social conditions. For example, the Canadian Council of Forest Ministers has developed a set of C&I. In the U.S., the National Association of State Foresters has endorsed the Montreal Process C&I and is currently working to determine how state forestry agencies can provide information in a nationwide forest resource assessment based on C&I for sustainable forest management. The Oregon Department of Forestry is using the Montreal Process C&I to begin assessing progress toward sustainable forest management.

! ***C &I Policy Issues.*** There are many issues associated with the use of C&I to evaluate forest management, including:

- Development of standards associated with C&I,
- Lack of compatible terminology and assessment methods between various frameworks,
- Attaining flexibility in implementation and interpretation,
- Unclear geographic scale relationships,
- Lack of information about some forest resources,
- Practicality in data collection, and
- Field testing at different scales to confirm C&I relevance.

As field tests are conducted, these problems will need to be addressed. Then it may be possible to

modify C&I sets developed for national-level assessments for use in local management situations to evaluate sustainable forestry while maintaining some consistency with national goals.

! ***Conclusions.*** Sustainable resource management is an important worldwide concern. Criteria and indicator (C&I) frameworks offer some promise as a basis for comparative evaluation of forest management over time. In the future it may become possible to use C&I as a tool for comparative policy analysis.

3. Field Testing C&I in Idaho

In southwestern Idaho during the summer of 1998 the applicability of criteria and indicators (C&I) for local assessment was field tested by a team of resource specialists (identified in **Appendix B**). The test was part of a larger project by the Center for International Forestry Research (CIFOR) to develop locally appropriate sets of C&I at the forest management unit level, where key decisions are made. The U.S. Forest Service sponsored the project, selecting the Boise, Idaho, area as the North American test site because there is a sophisticated level of forest management and a high level of stakeholder involvement. Forests in the Boise area are valued for a wide range of uses as well as providing refuge for many animals and plants. The project was hosted by the Boise National Forest, with active participation by Boise Cascade Corporation and the Idaho Department of Lands.

! ***Objectives and Results.*** The purpose of the CIFOR test project was to evaluate the usefulness of various C&I. The project was not designed to determine if the Boise National Forest and neighboring forest lands were being managed sustainably, nor to develop standards for making that judgment. The project team examined the theoretical basis for C&I and availability of data. The team evaluated 207 C&I in detail and scanned another 200 from previously defined C&I sets. Of those C&I examined in detail, 65 were rejected due to conceptual weakness, impossibility of using operationally, or irrelevance in the North American context. The team accepted 71 C&I, most of them with suggested changes. Another 71 C&I had some merit, but could be combined with others. The team also proposed 5 new indicators to help round out the set of C&I. (Acceptable C&I are identified in **Appendix C**.)

! ***Problems with C&I.*** According to the CIFOR evaluation team, the use of C&I is still in the development phase, with considerable difficulties to overcome. Problems stem from conceptual as well as measurement difficulties. A major problem in testing the indicator sets was often the lack of supporting evidence or explanatory material in support of the concept. Integration of indicators from the different dimensions of sustainability is also difficult.

! ***Conclusions.*** According to the CIFOR evaluation team, the concept of sustainable forest management has unfulfilled potential. The idea is in its early development stages, and there is much work yet to be done to overcome some of the conceptual and operational problems. The lessons that can be learned from the CIFOR test evaluation in Idaho relate first to the difficulty of defining sustainability, second to general problems operationalizing the sustainability concept with criteria and indicators (C&I), and third to practical considerations of data availability and measurement.

4. What is certification?

Certification is an assurance that forests are managed sustainably, according to verified *standards* established by the certifying organization. It is a new area of forest management policy that is dependent to some extent on criteria and indicators (C&I) as tools. Certification programs can be described by considering questions of ***what***, ***who***, and ***how***.

! ***What is being certified?*** Programs vary as to whether it is the forest land condition, the forest manager, the forest practices, or the manufactured forest product that is certified. To date, programs are voluntary, with two main objectives we call forest land and forest product certification.

• *Forest Land Certification*. Sustainable forest land management is the end goal of any certification program. A related purpose is to assure the public that forests are being managed so that environmental concerns and values have been addressed and that timber harvesting and other silvicultural activities do not harm the environment irreparably.

• *Forest Product Certification*. Certification of manufactured wood-based products is an optional feature of some certification programs. Product certification is dependent upon and linked to forest land certification. This linkage is called a “chain of custody” and may or may not result in awarding an “eco-label” to affix to a wood-based product so consumers will recognize that the product has been sustainably produced. Forest products manufacturers

need to consider on the one hand the market opportunities for labeled products, and on the other the desire of society to know that patterns of resource use are sustainable.

! ***Who is doing the certification?*** There are three types of "parties" involved in verifying that certification standards are being met. First-party schemes are initiated by forest management companies in the business of owning and managing forests. Second-party certification is an assessment by either a firm's customer or a forest products trade association. Third-party certification involves an assessment by a neutral third-party based on a set of agreed-upon standards, and is recognized as the most credible approach.

! ***How is certification approached?*** Certification can be based on specific performance parameters or on a more flexible systems-based approach, or a combination of the two. Examples are provided in **Chapter 5**.

! ***How are certification and the C&I framework related?*** Certification and the C&I framework both attempt to define, measure, and promote sustainable forest management. The C&I framework identifies data to be assembled for assessment purposes and does not have explicit *standards* that must be met, whereas certification does. The C&I framework identifies ecological, economic, and social characteristics of forests and their management. Certification programs develop *standards* by which the management of forest units can be evaluated with C&I.

5. Certification Programs

Certification has been proposed as a means to improve management of forest resources. Programs were conceived as voluntary and remain so. Forest certification includes two different considerations: land management and manufactured wood-based products. There are a number of certification organizations and programs. Those operating in the United States are best known as ISO, SFI, FSC, American Tree Farm System, and Green Tag Forestry.

! ***International Organization for Standardization (ISO)***. ISO is a third-party, systems-based approach for certifying that an organization has adopted systematic processes for managing quality control that are consistent and repeatable. ISO has developed guidelines for applying environmental standards to forest management operations. The eastern region of International Paper Co. has been certified as meeting ISO standards, and the company is seeking to have its other regions certified.

! ***Sustainable Forestry Initiative (SFI)***. This program is operated by the American Forest & Paper Association (AF&PA), the forest products industry's trade association. SFI is a performance-based program with either first-, second-, or third-party verification that forest management practices are sustainable. AF&PA member companies must participate, and they own 56.5 million acres, or 80% of the industrial timberlands in the country. Several large companies are currently pursuing third-party verification. (Program objectives and performance measures are listed in **Appendix D**.)

! ***Forest Stewardship Council (FSC)***. The FSC was founded in 1993 by a diverse group of conservation organizations, manufacturing companies, and other representatives from 25 countries. FSC is basically a "certifier of certifiers," with two organizations in the U.S. (SmartWood and Scientific Certification Systems) accredited to perform third-party certification using the FSC's performance-based standards. FSC certification features an "eco-label" that can be affixed to wood-based products certifying they were sustainably produced. In the U.S., 65 certificates covering more than 5 million acres of private, state, and tribal lands have been issued, and more than 200 "chain of custody" operations have been certified. FSC standards for the Rocky Mountain region are currently under development, and are being refined following a 1999 field test on tribal lands in the Flathead Reservation in Montana. (FSC Principles and Criteria are listed in **Appendix E**.)

! ***American Tree Farm System***. This program is almost 60 years old and counts 70,000 tree farms covering 90 million acres across the United States. Approximately two-thirds of the acreage is on forest industry company timberlands, the remainder is non-industrial private forest (NIPF). The program is operated by the non-profit American Forest Foundation. Although the program has always focused on water, wildlife, and recreation as well as wood, certification standards are currently being revised to more rigorous standards.

! ***Green Tag Forestry***. This program was initiated in 1998 specifically for NIPF landowners. It is based in Washington, D.C., and affiliated with the National Woodland Owners Association. The Green Tag can be used an "eco-label" but that feature has not yet been market tested. The program is available

in a limited number of states. Idaho is not one of them. Approximately 16,000 acres of land Oregon and Washington state have been Green Tag certified.

6. Stakeholders' Reactions to Certification

Stakeholders include forest products manufacturers, forest landowners, governments, environmental groups, local communities, and professional foresters. Their reactions, as best we could determine from published sources, are as follows. We also compare certification program preferences based on what has been published.

! ***Forest Products Manufacturers.*** U.S. forest industry companies have varied reactions. Certified forest products require a "chain of custody" audit, tracing wood-based products from origin to destination. This can be difficult for large-scale operations where wood arrives from not only company-owned lands but also hundreds of other landowners and mills. In general, companies are concerned about costs, and many of them feel weak consumer demand for certified products will not offset costs of product certification.

! ***Private Forest Landowners.*** Whether they are industrial companies that own wood-processing facilities or non-industrial individuals or entities, private forest landowners are concerned about costs of certification. Although some owners are skeptical about having independent parties certify what "sustainable" forest practices or "well managed" forests might be, others have pursued third-party forest land certification in the belief that costs are outweighed by other benefits, primarily validation of stewardship and public acceptance of their forest land management practices. If the management goals of an individual landowner match the goals of a certifying organization and the landowner believes the benefits of certification are worthwhile, the additional cost of certification may be justifiable. The key factor would be the landowner's desire to demonstrate to others that his or her stewardship is consistent with the set of *standards* used by the certifying program.

! ***Governments.*** There are varying levels of support for certification from different governmental organizations around the world. Some believe that certification, or something like it involving third-party verification of forestry activities, is inevitable. Others tend to have fundamental doubts about certification. In the U.S., some state and county public forests have been certified or are embarking on certification pilot projects. Most of these programs are in the midwestern and northeastern states. Certification for forests on U.S. federal public lands forests has not been attempted. Current U.S. Forest Service policy is that the national forests will not pursue third-party certification.

! ***Environmental Organizations.*** Citizen conservation groups and other environmental organizations are generally supportive of certification, but views are quite varied. Some groups support certification as a way to affect positive change in forest management and forest conditions. Other groups believe certification may divert attention away from what they perceive as a need for government regulation and institutional change. Still other groups believe certification may work if it is part of a regulatory approach rather than a purely voluntary program.

! ***Communities.*** Some people living in the vicinity of forests view them as a source of employment as well as recreation opportunity. They may express concerns that private landowner rights and aspirations of economic development will be ignored by the certification process.

! ***Professional Foresters.*** As represented by a 1999 Society of American Foresters task force report, forest land management professionals have a positive outlook on certification. Members of the SAF are encouraged to learn about certification and educate others. However, the task force report discouraged the SAF from either developing its own independent certification program or attempting to critically evaluate existing certification programs. The SAF takes a science-based approach to forestry issues, and does not want to judge the values of the different certifying organizations that are reflected in their programs.

! ***Certification Program Comparison.*** Each certification approach has its proponents and detractors. To avoid making judgments about the values of different certifying organizations, we review published materials about the preferences of stakeholders toward different certification programs. In general, environmental groups favor the FSC with its performance-based standards and independent audit. We are not aware of any FSC-certified lands in Idaho. Forest industry companies generally prefer the lower cost SFI program, which is also a condition of membership in the industry trade association. The SFI now offers an option for independent audit, which has been undertaken by two companies

operating in Idaho (Plum Creek Timber and Boise Cascade). Both the FSC and SFI are revising their programs to accommodate non-industrial private forest (NIPF) landowners. These owners have diverse objectives. Those choosing certification are likely to select a program with *standards* consistent with their management objectives and viewpoints on forest stewardship responsibilities. Some state and county government forests in the midwestern and northeastern states have chosen to be FSC-certified.

7. Certification Policy Issues

There are several dimensions of sustainable forest management policy and related issues that need to be addressed in the context of certification programs. These include environmental values, costs of certification, market-related factors, governance, and several technical issues. The issue analysis begins with a consideration of the problem forest certification is attempting to address.

! ***Problem Analysis.*** Forest certification was triggered in the mid-1980s by public concern over tropical deforestation. Although originally promoted by non-governmental conservation organizations, forest products manufacturers and landowners are now interested because certification may validate forest stewardship and public acceptance through a non-governmental voluntary policy approach.

! ***Environmental Values.*** Research has shown that environmentalists, forest industry managers, and U.S. Forest Service managers all recognize the prominence of environmental values in defining "appropriate" land management. These diverse groups agree that maintenance of biological diversity, water quality, soil, and riparian and wetland protection are important values, but may disagree on the means to maintain them. Environmental values may not offer tangible benefits for a landowner or forest manager. Society in general receives more benefits from "sustainable" forest management than will individual forest owners and managers. These societal objectives need to be considered in sustainability assessments, but at the appropriate scale at which the benefits are recognized. This may not be at the forest management unit level for some environmental values.

Instead of evaluating sustainable forest management, most certification protocols tend to certify that landowners comport with the goals or values of the certifying organization. Certifiers rely on standards for judging whether forest management is sustainable. However, it is the goals of forest owners and managers that will determine what the land will sustain, and these vary by landowner and sites within an ownership.

! ***Costs of Certification.*** Forest landowners are concerned about whether the financial costs of certification are justifiable. Paying a forest land certifier may pose particular problems for the non-industrial forest owners who together own almost half of U.S. forest lands. The "chain of custody" audit also can be a problem and is not likely to be pursued unless the purpose of certification is to place an "eco-label" on consumer products. The likelihood of that depends on markets for labeled products.

! ***Market-related Factors.*** The original concept of certification was that non-governmental programs could influence forest practices and forest use only if there were an effective demand for certified wood products. Recent experience shows there are certification benefits to forest managers and wood products manufacturers other than markets for certified products. Nevertheless, labeling a product as "certified" has the potential to differentiate it from others and improve market share for a product.

Mass markets for certified forest products have yet to emerge, but niche and regional markets in both the U.S. and Europe exist. Market tests of consumers' willingness to actually pay more for certified products have produced mixed results that depend largely on the products.

The relationship between certification and international trade in forest products is not completely settled. On balance, there will almost certainly be a very large market for non-certified wood-based products into the foreseeable future, especially if non-certified wood is less expensive.

! ***Governance.*** Two key issues in this category are government regulations and the potential certification of public forest lands, especially U.S. federal forests.

• *Government Regulation*. These issues encompass two related concerns. First, government regulation is one way to encourage landowners to meet goals in society's interests that individuals otherwise might not pursue. If an individual landowner is following all the relevant laws, rules, and regulations of the federal, state, and local jurisdictions, should that be sufficient to certify the land as being sustainably managed? Or should certification programs require more than the government does? This

issue has to do with the sufficiency of government regulations, both in their design and implementation.

The second concern is about government regulation of certification programs. The certification movement arose because government efforts may not be adequate to promote sustainable forest management that forest landowners on their own initiative might undertake, given the appropriate incentives.

• *Public Land Certification*. Some state and county forests have been certified, but not as far as we know in the Pacific Northwest or northern Rocky Mountain states.

Federal land certification raises several issues. According to the Forest Stewardship Council (FSC), three policy-related obstacles will need to be overcome before the organization would consider certifying national forest lands. First and foremost, public consensus does not exist as to whether, where, and how much timber harvesting should occur on national forests. Resolution of this fundamental land-use allocation question is a forest policy concern reflected in statutory law, agency regulations, and other processes, and will be addressed in Part II of this report, published separately. Second, national level indicators do not exist that can address the special legal, technical, procedural and governance issues for federal lands. Third, the U.S. Forest Service has not yet demonstrated a willingness to have its forest stewardship responsibilities independently verified.

! ***Technical Considerations.*** Choosing appropriate indicators that match the scale of assessment has only been recently addressed by field tests of C&I at the local level. The key technical consideration is determining what *standards* will be used to assess whether forest management is sustainable. For some indicators, establishing appropriate levels as standards can be established scientifically, but others are likely to remain value judgments. The determination of appropriate standards has had little scientific attention.

Another issue is inconsistent terminology used by different certification programs. The use of principles, criteria and indicators has been established by international forestry research organizations. This terminology is used consistently by forest scientists, but not by certifying organizations in the frameworks that underlie their standards. Landowners need to be able to understand and compare the goals and values of certifying organizations that are reflected in their standards, and the potential for confusion exists without consistent terminology.

The selection of standards is related to the issue of credibility. For certification to be credible, these points need to be addressed:

- Avoid being trapped in debate on what "sustainability" means,
- Develop a working framework that has justifiable standards that are not exclusively value-laden,
- Show clearly for each standard what condition is being aimed for as part of certification,
- Use feedback loops between the ecological and social and economic components of the system framework,
- Identify how both the overarching and local-level mechanisms for promoting certification are precluding different types of forest landowners from pursuing the certification initiative, and
- Evaluate the procedures and standards used to evaluate forest management operations.

Landowners in particular need to consider what the standards are and the procedures certifiers will use to verify them.

8. General Conclusions

Sustainable management is an expectation the public has for all forests, regardless of ownership category. Criteria and indicator (C&I) frameworks are tools for evaluating sustainable forest management. They are relatively new, and only now being put to practical tests.

The experimental test of C&I frameworks in Idaho in 1998 revealed shortcomings with applying C&I at the forest management unit level. Other tests, using different methods, may show different results.

Standards for defining and evaluating sustainable forest management are related to the C&I framework. A consideration for certifying organizations and those who would be certified is the development of clear and relevant standards that reflect the social desirability of sustainable forest use as much as they reflect the goals of the certifying organizations.

Certification is becoming more accepted and more widespread, and that trend can be expected to continue if for no other reason than the public insists that forests be managed sustainably. Certification offers the promise that the public may have some confidence that harvesting and growing timber for wood-based products neither diminishes the long-

term productive capability of forest lands, nor irreparably harms environmental values. The pitfalls lie in the design of certification protocols and programs.

Certification, whether focused on forest land management or forest products in the market, represents a way of demonstrating that forest management is "sustainable" or that forests are "well managed." Rather than relying on government regulation, certification relies on private organizations and, to some extent, on market operations. Costs of becoming certified and continuing to comply with the standards of the certifying organization will always be an issue, and there will always be landowners reluctant to undertake certification regardless of the benefits to them and to society.

9. Sustainable Forest Management in Idaho

Are we making progress toward the goal of sustainable forest management in Idaho? We would hope so, but a definitive reply depends on some agreement as to what this means, an information base, and protocols for making assessments. None of these are well developed at this time. There is a role for a criteria and indicators (C&I) framework to assemble information at the state level, and possibly a role for voluntary non-governmental assessments through certification programs.

The state of Idaho is cooperating with the National Association of State Foresters in assessing the availability of data for various criteria and indicators (C&I). Information about these C&I can be used to assess trends in resource use and resource conditions. In this way the C&I framework contributes information as a basis for making judgments about forest management at the local level. Standards for relevant indicators are a necessary component of certification programs.

Because C&I and certification are in early development stages, direct evidence of the effects of certification on Idaho's forest landowners and forest products manufacturers is lacking. Based on what we know about forest landownership and the structure of the forest products industry in Idaho, and what we have learned in the literature, we can speculate only a little.

Some of the forest industry companies operating in Idaho have recently agreed to have their land management operations certified by a third-party auditor. We know that Boise Cascade and Plum Creek Timber have made this commitment, but we don't know how people will react to this, or whether other companies might make the same commitment. Except for some non-industrial private forests that are in the American Tree Farm System, we are not aware that other NIPF owners have been certified. Nor are we aware that any western states are undergoing certification of state lands at this time.

The forest land ownership pattern in Idaho makes the question of certification of federal lands vital in any consideration of the effects of certification on Idaho's forests as a whole. Almost 80% of the 22.3 million acres of forest land in Idaho is owned by the federal government. Almost all of the federal forest land is in the National Forest System managed by the U.S. Forest Service.

In Idaho the big question is whether certification of national forest lands makes sense. If these lands are to continue to provide timber, the public will expect management for timber production to be done sustainably. The two interrelated policy barriers for certification of federal lands are public policy and public trust. Restoring public trust through third-party certification may be a good reason for changing federal land management policy. This is the focus of Part II of the analysis, the subject of another PAG report.

Chapter 1. What is "sustainable" forest management?

"Sustainability" and "sustainable development" are terms used frequently in the context of natural resources management. (See the **Glossary** for these and other technical terms.) In the 1990s, the idea of establishing sustainable patterns of resource use has become one of the three core values of an environmental perspective, along with minimization of negative impacts on human health and the protection of biodiversity, ecological systems, and wilderness (Paehlke 2000). Although there is widespread acceptance of the need to manage resources "sustainably" and provide for "sustainable development" of human communities, these concepts have proven difficult to define and operationalize, particularly with respect to forests (USFS 1993).

Forest sustainability has become the focus of a number of international and domestic government actions as well as private efforts that have followed the 1992 United Nations "Earth Summit" in Rio de Janeiro, Brazil. These actions include numerous dialogues, some nonbinding international agreements, and the creation of several strategies to promote sustainable forestry through management standards, professional associations, and third-party certification. There have also been policy changes in many countries with the United States being a notable exception (Sedjo et al. 1998).

What does "sustainable" forest management mean? How do we know if "sustainable forestry" is being practiced? There are no short, or easy, answers to these questions. Through much of the twentieth century, sustainable forest management in the United States was equated with sustained yield of timber. However, peoples' expectations about forests, particularly publicly-owned forests, have changed, and sustainable forest management also includes concerns about ecological conditions and processes, clean water, endangered species, recreation opportunities, aesthetics, human communities, and an expanded variety of commodities such as ornamental and edible plants in addition to traditional outputs such as timber, forage, and minerals.

Sustainable forest management is a contentious issue in environmental management (Ferguson 1996) and sustainable forest management requires more than just a definition of sustainability. Sustainability is a set of ideals more than a concrete, measurable concept (Ferguson 1996, Vogt et al. 1999). Probably the closest we can get to a definition of sustainable forest management is to recognize that it must be ecologically sound, economically viable, and socially desirable (Aplet et al. 1993). A comprehensive assessment of sustainable forest management would attempt to assess each of these dimensions. Vogt et al. (1999) suggest programs for certifying sustainable forest management need also to consider silvicultural sustainability as a fourth dimension.

Sustainable forestry is a social process of innovation in forest use and management (Romm 1999). It arises in response to social, economic, ecologic, and cultural conditions that exist for a particular forest at a point in time and responds with a process of adaptive learning that depends on spontaneous innovation, investment, and institutional reform. It requires a commitment to the long term. To make progress, sustainable forestry needs enterprising individuals and organizations that reward appropriate actions (Romm 1999). It requires not only effective legal, administrative, and market-based institutions, but also management of supply and demand for forest products, and public participation. Sustainable forest management will not be achieved quickly or inexpensively. The challenge is to balance the global scale of the problem with appropriately structured institutional mechanisms to administer the process (Ferguson 1996).

"Sustainability" can be a semantic trap (Vogt et al. 1999) promoting tiresome debate about what the term means. In spite of that we will use the term "sustainable" forest management in this report, recognizing its problems. Others have struggled trying to determine what this term means, and we likely could not improve on their efforts. The Forest Stewardship Council (FSC, featured in **Chapter 5**) has attempted to sidestep controversies over the term "sustainably-managed" forests by focusing instead on "well-managed" forests (Sedjo et al. 1998, Bernstein and Cashore 1999). To avoid the semantic trap, the terms "good" forest management or forest stewardship have been suggested instead of "sustainability" to frame the discussion (Vogt et al. 1999).

Unlike sustainability, more agreement exists about what "good" forest management means (Vogt et al. 1999). It is forest management that maintains or increases the capacity of an area to produce forest goods and services (Côté 1999). The idea of "good" management has broad acceptance both scientifically and non-scientifically, and it can be measured (Vogt et al. 1999). Good forest

management can be defined as the application of forestry principles and practices to retain the health of the forest while also satisfying a landowner's goals. These goals are tied to the landowner's value systems and economic situation, as well as how the owner wants to interface with his or her land. Good stewardship can be defined as landowners obtaining higher value from their land by using knowledge and skills to address "good" forest management by using "better" forest practices on their land (Vogt et al. 1999).

"Appropriate" forest management is another related term. Part of the conflict in U.S. Pacific Northwest forests arises from divergent perspectives on "appropriate" forest management (Kearney et al. 1999). Although the conflict is driven by conservation efforts for species protected under the Endangered Species Act accompanied by a significant drop in timber harvest levels from public lands in the region, issues have arisen from changing perceptions and expectations of the people involved. Divergent value orientations and environmental perspectives among forest management stakeholders have been well researched, often with the implicit assumption that value differences account for the conflict over environmental issues. It is possible, however, that *divergent knowledge systems* about forest management may be as much a source of conflict as *divergent values* about forest use (Kearney et al. 1999).

To determine what "appropriate" forest management might be from different perspectives, Kearney et al. (1999) conducted a study in the state of Washington among 3 stakeholder groups—U.S. Forest Service, timber industry, and environmentalists. The first step was identifying the issues, or themes, that help define the conceptual space of "appropriate" forest management. Results indicate the existence of a wide range of concerns about the focus, setting, and process of forest management. The 11 themes identified by stakeholders fall into four categories:

- Environmental factors
  - Wildlife and habitat
  - Other environmental concerns (water quality, soil, riparian and wetland protection)
- Land management
  - Management approach
  - Timber management
  - Roads and access
- Policy and administration
  - Economics
  - Appropriate knowledge
  - Legal and political issue
- Human factors
  - Traditional intangible benefits (aesthetics, recreation, cultural resources)
  - Values and expectations
  - Processes used in decision making

Stakeholders' perceptions of these issues revealed some commonalities and some differences among them, generally described as complex patterns that deviated substantially from common stereotypes (Kearney et al. 1999). For the purposes of helping define "good" or "sustainable" forest management, the areas of agreement among the stakeholders regarding "appropriate" forest management are perhaps more useful than their differences.

There were no differences among stakeholders regarding the salience or prominence of the two environmental themes in the above list. The nine other themes were regarded differently by the stakeholders. These differences have implications for improving stakeholders' understanding of one another's perspectives, which through collaborative process may facilitate agreement on the nature of the problem itself (Kearney et al. 1999).

The key finding is that there was common ground among the three groups on the prominence of environmental issues associated with wildlife and habitat, soil, and riparian and wetland area protection. These are the indisputably prominent factors for defining "appropriate" forest management to the three stakeholder groups. These key environmental values will also be involved in determinations of "sustainable" forest management.

A conclusion drawn by Carlton Owen, vice president for forest policy, Champion International Corp., serves our purpose. He said that although the goal of sustainability remains elusive, sustainable forest management issues will eventually be resolved. "Sustainability is a journey, not a destination," said Owen. "You will never get to a point where you say this is a sustainable forest" (Jenkins and Smith 1999). One avenue whereby many of the issues surrounding sustainable forest management can be approached is third-party certification of forest management, which depends on the selection of appropriate criteria and indicators (see **Chapter 2**) and establishment of standards and their use in a certification program to assess whether sustainable forestry is being practiced (see **Chapter 5**).

Chapter 2. Criteria and Indicators (C&I)

During the last five years, the concept of "criteria and indicators" (C&I) has emerged as a way to not only define but also to implement the concepts of sustainable forest management. We reply to five questions about C&I in the sustainable forestry context—what are they, how can they be used, where did C&I come from, who is using them, and what are C&I policy issues? Then we present some general conclusions about C&I.

What are criteria and indicators?

Criteria and indicators (C&I) is the shortened name given to a type of hierarchical framework for addressing a complex issue, including sustainable forest management. In addition to the component criteria and indicators, elements of such frameworks can include goals, principles, standards, guidelines, norms, and verifiers. People commonly use the term C&I to refer to these frameworks. C&I frameworks in the sustainable forestry context describe, monitor, and evaluate progress towards the goal of sustainable forest resource use (USFS 1995, FAO 1997, van Bueren and Blom 1997, Woodley et al. 1998).

Topics associated with principles, as well as C&I, have been the focus of considerable attention by certifying organizations, non-governmental organizations, forest industry associations and companies, and the scientific community (Vogt et al. 1999). The various C&I frameworks are each grounded in a different set of principles (Vogt et al. 1999). Principles are the overarching ethical/philosophical guidelines that define sustainable forest management. C&I frameworks have become the unquestioned mechanism for defining how sustainable forest management should be conducted and evaluated (Vogt et al. 1999).

A *criterion* is a category of conditions or processes by which sustainable forest management may be assessed (USFS 1994). For example, the criterion "conservation and maintenance of soil and water resources" is one of seven criteria adopted by the Montreal Process, an important international C&I initiative that the U.S. is a party to.

An *indicator* is a measure of an aspect of the criterion (USFS 1994). Each criterion is characterized by one or more quantitative, qualitative, or descriptive indicators. For example, the above criterion has eight corresponding indicators. One of them is "area and percent of forest land with significantly diminished soil organic matter and/or changes in other soil chemical properties" (Others are listed in **Appendix A.)** Through the measurement and monitoring of such indicators, the overall effects of forest management actions can be assessed, and management actions can be adjusted to meet stated management goals and objectives more effectively (Lowe 1995, USFS 1995, IPF 1996*a*, FAO 1997, IFF 1999).

An indicator by itself does not measure a "sustainable" condition. There must be a *standard* or "norm" representing a value against which the measured indicator value can be compared. Development of such standards is a current policy issue addressed in the **C&I Policy Issues** section on page 15. No single criterion or indicator defines a sustainable condition. Criteria must be looked at as a set that when taken together suggests an implicit, generally accepted definition for the concept of sustainable forest management (USFS 1994, 1995; IPF 1996*a*, IPF 1996*b*; FAO 1997).

How can C&I be used?

Two types of potential uses for C&I are mentioned in the literature. One is to assemble C&I into a framework for gathering and analyzing information about the ecological conditions of forests and their contributions to economic and social well-being. An agreed-upon set of C&I provides a framework for data collection, reporting, and monitoring (IPF 1996*a*, Woodley et al. 1998). Thus a set of C&I can improve the quantity and quality of information available to decision makers and the public (IPF 1996*a*, FAO 1997, Woodley et al. 1998).

The second use of C&I involves applying information about specific C&I to the development and comparison of policies for sustainable forest management. The use of the C&I framework can encourage meaningful public and legislative debate about forest policies (USFS 1994, Lowe 1995, Woodley et al. 1998). C&I data can serve as a reference on the status and trends of forests for formulating policies (IPF 1996*a*, FAO 1997, Woodley et al. 1998). Sets of C&I can be used to compare performance of countries in sustainable forest management (Lowe 1995) and facilitate international cooperation and assistance (IPF 1996*a*). Sets of C&I may also help clarify issues related to certification of forest lands or forest products (IPF 1996*a*), although

such use of international C&I protocols is controversial (Hillman, review comments).

So far, sets of C&I are only being used for information-gathering purposes in voluntary situations. There are no legally-binding mandates for developing or using C&I. The intent behind the C&I concept is to reduce the need for forest management regulations (Vogt, review comments). However, someday C&I may be used for comparative purposes by governments and non-governmental institutions in deliberations over such issues as trade and financial assistance.

Where did C&I come from?

Early development of the C&I concept for sustainable forest management took place in the international arena. Agreements arising from the 1992 United Nation's "Earth Summit"—more formally, the United Nations Conference on Environment and Development (UNCED)—held in Rio de Janeiro, Brazil, recognized and emphasized the need to reconcile the productive functions of forests, such as timber and fuelwood, with the protective, environmental, and social roles of forests. In accordance with calls for action in the international arena, governments agreed to pursue, in cooperation with interest groups and international organizations, "the formation of scientifically-sound criteria and guidelines for the management, conservation and sustainable development of all types of forests" (FAO 1997). Although words such as "conservation" and "sustainable development" mean different things to different people, it seems clear that the C&I concept is allied with developing and using resources in a sustainable manner.

In 1993 following UNCED, the majority of European nations endorsed the Helsinki Process, which defined six criteria for characterizing sustainable forests (Sedjo et al. 1998). A working group for non-European countries was formed in 1994, which led to a series of discussions known as the Montreal Process and the Santiago Declaration of February 1995 endorsing seven criteria for characterizing sustainable forest management. According to Sedjo et al. (1998), President Clinton committed the U.S. to implementing the C&I endorsed in the Santiago Declaration by the year 2000, and designated the U.S. Forest Service as the lead agency. The Forest Service has attempted to quantify the objectives defined by the C&I, and has further identified areas where data do not exist or need to be collected (Sedjo et al. 1998, see ***U.S. "First Approximation" Report*** section on page 13).

Currently, more than 100 countries are engaged in formulating and field testing sets of C&I for temperate, boreal, and tropical forests (IFF 1999). A review of ongoing international initiatives shows that the criteria in all of them include six elements:

- Extent of forest resources,
- Biological diversity,
- Health and vitality,
- Productive functions,
- Protective and environmental functions, and
- Development and social needs (IPF 1996*a*).

Montreal Process. The most important international effort to develop a set of C&I for forest management in the United States is the Montreal Process. It began in 1994 and includes a working group of 12 member countries focused on C&I for the conservation and sustainable management of temperate and boreal forests (see Box 2.1). These countries represent about 90% of the world's temperate and boreal forests, or 60% of all the world's forests (NASF 1999), including some areas of tropical forests. At its February 1995 meeting in Chile, the participating countries endorsed the Santiago Declaration, including a set of seven non-legally binding criteria and 67 indicators for use by the member countries at the national level (IPF 1996*a*, Nordin 1996, FAO 1997). These criteria and associated indicators are provided as **Appendix A**.

The first step in the implementation of the Montreal Process C&I was an initial survey by each of the 12 countries to determine the current availability of data for the 67 indicators and the capacity of the countries to report such information. A consolidated "first approximation" report on this was presented at the Eleventh World Forestry Congress in Antalya, Turkey in October 1997 (WFC 1997). The report stated that although data availability and reporting capacity vary greatly, most of the countries have data for and could report on at least half of the 67 indicators. The two criteria for which data are most available are indicators for productive capacity of forest ecosystems (Criterion 2) and policy framework (Criterion 7). Least available are data for forest ecosystem health and vitality (Criterion 3) and soil and water resources (Criterion 4) (WFC 1997).

The differences in data availability and reporting capacity in the "first approximation" report reflect

Box 2.1. Major Events Leading to the Montreal Process and Santiago Declaration

June 1992. The United Nations' Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil, focused world attention on the importance of sustainable forest management as a key component of sustainable development. UNCED is also popularly known as the "Earth Summit" or the "Rio Summit." UNCED adopted the Statement of Forest Principles and Chapter 11 of Agenda 21, which recognize the importance of sustainably managing all types of forests, including temperate and boreal forests, to meet the needs of present and future generations.

September 1993. The United Nations Conference on Security and Cooperation in Europe (CSCE) sponsored an international seminar in Montreal, Canada on Sustainable Development of Boreal and Temperate Forests. This conference provided the conceptual basis for subsequent regional and international initiatives to develop C&I for sustainable forest management.

June 1994. Canada took the lead in launching an initiative among other temperate and boreal countries, with the specific purpose of developing and implementing internationally agreed C&I for sustainable forest management. This initiative led to the formation the Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests, now known as the "Montreal Process." The Montreal Process Working Group presently includes 12 countries: Argentina, Australia, Canada, Chile, China, Japan, the Republic of Korea, Mexico, New Zealand, the Russian Federation, United States of America, and Uruguay. These countries cover five continents and together represent 90 percent of the world's temperate and boreal forests (as well as areas of tropical forests) and 60 percent of all forests on the globe. They also account for 45 percent of world trade in wood and wood products and 35 percent of the world's population.

February 1995. The Montreal Process countries endorsed a statement of political commitment known as the "Santiago Declaration," together with a comprehensive set of seven criteria and 67 indicators for the conservation and sustainable management of temperate and boreal forests for use by their respective policy makers at the national level (see **Appendix A**).

Sources: USFS 1993, 1997.

the wide differences among the 12 Montreal Process countries in terms of forest character, land ownership, population, economic development status, and system and structure of government. One of the strengths of the Montreal Process is the diversity of the countries involved, resulting in a set of C&I that could be useful in other countries (USFS 1997).

The Montreal Process is now turning its attention to the relationship between C&I at the national level and operational practicality at the forest management unit level. At the 13th meeting of the Montreal Process held in October 1998, participating countries agreed to consider the potential utility of C&I at the forest management unit level (IFF 1999).

U.S. "First Approximation" Report. The U.S. Forest Service was responsible for preparing the "first approximation" report for the United States. The Forest Service obtained data from federal land and natural resource management agencies and consulted with an extensive array of stakeholders, including state forestry agencies, the forest products industry, nonindustrial forest landowners, Native Americans, environmental organizations, and forestry-related professional societies. Results showed there was a tremendous amount of data and information for some indicators, but for others data was almost completely lacking. Some existing data could not feasiblely be incorporated into the report (USFS 1997).

According to the Forest Service (USFS 1997), contributors to the report identified several key problems with C&I, including:

- Much of the biological and physical data for forests was available for timberlands but was not available for forest land not classified as timberlands (see **Glossary**). Approximately one-

third of the U.S. land area is forested, and approximately two-thirds of that is timberland (Powell et al. 1993).

- In many cases, definitions, methodologies, and protocols for various elements were inconsistent across the country, resulting in questionable conclusions about the trends and conditions on a national basis.
- Where basic forest inventories have been conducted periodically over time, the time between inventories is sometimes so long that information is not available to provide timely warning that problematic ecosystem conditions are developing.
- The majority of forest land in the U.S. is privately owned, and information about private property is afforded a high degree of protection. In most cases forest industry firms have adequate data to support their forest management needs, but in the U.S. data are generally considered proprietary and therefore not available to the public (USFS 1997).

Technical solutions and funding strategies are currently being sought to resolve some of these problems. For example, the national Forest Inventory and Analysis program of the U.S. Forest Service is changing from a multi-year inventory frequency to an annual system in response to congressional direction in the Farm Bill of 1998, as has long been advocated by many members of the forestry profession (see *Journal of Forestry*, December 1999).

Center for International Forestry Research (CIFOR). The Center for International Forestry Research (CIFOR), headquartered in Bogor, Indonesia, focuses on aspects of C&I related to research. It is funded by a variety of governmental and private organizations (see CIFOR 1999). CIFOR is actively engaged in the identification and testing of sets of C&I at the forest management unit level. Work is carried out in collaboration with government and non-governmental organizations. The aim of CIFOR is to identify C&I that are objective, scientifically sound, cost-effective, practical, and relevant in the assessment of the sustainability of locally prevailing forest management practices (FAO 1997, IFF 1999). CIFOR projects include field trials in a number of developing and developed countries worldwide. In the summer of 1998, CIFOR conducted a North American test of several sets of C&I, selecting southwestern Idaho as the test site (Woodley et al. 1998). **Chapter 3** reports results of the CIFOR field test in Idaho.

Who is using C&I in North America?

Although international initiatives provided the impetus for the development of sets of C&I for forests, other levels of government and non-governmental organizations have seen potential in the use of the C&I framework. In North America, several organizations are developing sets of C&I, or adapting existing sets, that will be appropriate for specific geographic scales and ecological, economic, and social conditions. A brief overview of some of those programs follows.

Canadian Council of Forest Ministers. Canada has been a leader in the development of C&I at the national level. In 1995, the Canadian Council of Forest Ministers (CCFM) approved a national framework of six criteria and 83 indicators that was developed through a comprehensive consultation process involving governments, industry, environmental organizations, aboriginal agencies, universities, and other interest groups (Nordin 1996, CCFM 1997). The CCFM created a science panel to ensure that the indicators are scientifically sound and reflect the best knowledge available (Nordin 1996). Canada has also created a Model Forest Program, an initiative in building partnerships locally, nationally, and internationally to generate new ideas and on-the-ground solutions to sustainable forest management issues (Canadian Forest Service 1999).

U.S. Forest Service. The U.S. Forest Service has been the lead agency in developing and assessing the Montreal Process set of C&I for all forest land ownerships in the U.S. (USFS 1993, 1995). As discussed on page 13, the agency compiled the U.S. "first approximation" report. The Forest Service has an Interdeputy Sustainable Development Team, which along with other agency personnel brings the agency's technical expertise to bear on C&I issues. To our knowledge, the Forest Service has made no effort to apply any set of C&I to the management of individual national forests, national forest regions, or to the National Forest System as a whole.

National Association of State Foresters. The National Association of State Foresters (NASF) represents the state forestry agencies from all 50

U.S. states, seven U.S. territories, and the District of Columbia. In 1997, the NASF endorsed the seven criteria established by the Montreal Process as a framework for integrating and measuring sustainable forest management on all U.S. forest lands (NASF 1997). The NASF has reviewed the U.S. "first approximation" report and surveyed state forestry agencies to determine additional data that state forestry agencies can readily provide to assist with the development of a nationwide Montreal Process C&I-based forest assessment. The NASF has developed a database and online clearinghouse to report state-gathered C&I-related data (see NASF 1999). Idaho has reported that the state has adequate data for 18 of the 67 Montreal Process indicators. These indicators are marked in **Appendix A**.

Oregon Department of Forestry. Oregon is a leader in the application of the C&I framework at the state level. Since 1993, the Oregon Department of Forestry has been required by legislation to produce information on the cumulative effects of forest practices on Oregon's soil, air, water, fish, and wildlife resources. Building on the cumulative effects efforts, the department decided to undertake a forest assessment project comprised of three components: [1] an Oregon "first approximation" report, [2] an integrated assessment of Oregon's forests based on the first approximation report, and [3] continued development of more advanced and integrated tools for answering policy questions (ODF 1998).

Oregon used the set of C&I from the Montreal Process as the basis for their assessment and recently released their "first approximation" report. The report indicates that Oregon has extensive information about many of the C&I, but also has gaps in available data similar to those reported in the "first approximation" report for the entire U.S. (ODF 1999).

Roundtable on Sustainable Forests. The Roundtable on Sustainable Forests was formed in July 1998. It is a national forum of federal, tribal, state and local governments, and private landowner, academic, professional, environmental and industrial organizations that promotes shared leadership and responsibility in achieving sustainable forests on public and private lands throughout the United States (RSF 1999). Roundtable members include the National Association of State Foresters, Society of American Foresters, World Wildlife Fund, National Audubon Society, American Forest & Paper Association, and Global Forest Policy Project. Federal agencies participating in the Roundtable include the Environmental Protection Agency, the Department of Agriculture's Natural Resources Conservation Service and Forest Service, and, in the Department of the Interior, the Bureau of Land Management, U.S. Geological Survey, and the National Park Service. The Roundtable's initial focus is to implement and promote utilization of the Montreal Process C&I (RSF 1999).

C&I Policy Issues

A number of C&I issues are discussed in the literature. These include development of standards or norms, compatible assessment methods, flexibility in implementation, appropriate geographic scale, incomplete information, and testing. Each of these issues is briefly reviewed below. Most of these issues would be characteristic of any new process in a development stage.

Development of Standards or Norms. Perhaps the largest unresolved question in C&I initiatives is what level of a particular indicator indicates a sustainable condition. These levels or values are variously called either "norms" (van Bueren and Blom 1997) or "standards" (Ervin and Elliott 1996) (see **Glossary**). We use the term "standard" to include "norm." International C&I initiatives, such as the Montreal Process, do not include standards, yet standards are essential for defining sustainable conditions.

Some researchers (e.g., USFS 1993) suggest that the task of determining appropriate standards should remain distinct from identifying C&I. Others suggest that the task of setting standards must be integrated with identifying C&I in order for them to be useful (Vogt, review comments; see Vogt et al. 1999). Performance-based certification requires the establishment and application of standards, and this issue will be revisited in **Chapter 7**.

Compatible Assessment Methods. The lack of compatible assessment methodologies between the various C&I initiatives worldwide is a key issue (USFS 1997, IFF 1999). Most C&I frameworks agree on similar general concepts of what needs to be measured to assess sustainable forest management. For example, there is agreement that extent of forest resources, biological diversity, and social

needs are important considerations. However, the operational details are neither as clear nor as compatible between processes as they might be. Recent developments have pointed to the need for further clarification and streamlining of assessment methodologies (IFF 1999). Compatible sets of C&I containing data collected in the same, consistent manner will be useful tools for decision makers at all levels of forest management (IFF 1998).

A lack of universally agreed-upon terminology in C&I initiatives also could hamper future progress, especially in implementation of sets of C&I (IPF 1996*b*). Practically all recent forums have stressed the need to continue to intensify efforts to reach consensus on key concepts and terms used in the international discussion of the C&I framework (IPF 1996*b*, FAO 1997).

Appropriate Flexibility. The need for compatibility between C&I initiatives must be balanced with the need for some flexibility in implementation and interpretation. Experience has shown that indicators developed by the international initiatives represent an "ideal" rather than absolute final set. Some flexibility that allows selectivity of appropriate indicators is needed in the application of any set of C&I at the national level, even among countries operating under same international initiative (IPF 1996*b*).

The relative importance and priority assigned to specific C&I will vary between countries and reflect the different economic, environmental, social, cultural and religious values and needs that operate within the legal and policy frameworks of different countries. Individual C&I are closely related to the conditions, significance, and functions of forests, and these parameters vary from country to country. Although it is necessary to consider specific, national characteristics in the implementation of the C&I framework and implications are still being clarified, there is general consensus that some differences need to be accommodated (IPF 1996*b*).

Relationships Between Geographic Scales. Sets of C&I can be identified at various geographic scales from international to local (IPF 1996*a*). The local scale is often referred to as the forest management unit level. Linkages between different scales in the development and implementation of sets of C&I are not clear (Lowe 1995, IPF 1996*b*, IFF 1999). For example, the Montreal Process C&I are meant to be applied at the national level (USFS 1994), but some organizations are using them at other geographic scales. More specifically, the Oregon Department of Forestry and the North East State Foresters Association are using the Montreal Process C&I at the state level (Hillman, review comments). The CIFOR team that assessed C&I sets in southwestern Idaho (see **Chapter 4**) found some national level indicators were difficult to apply at the forest management unit level (Woodley et al. 1998).

Incomplete Information. As the "first approximation" reports of the U.S. and all other Montreal Process countries revealed, a lack of information about forest resources may slow down the implementation of that set of C&I (IPF 1996*b*, FAO 1997). Particularly scarce is information about non-wood forest products, maintenance of forest ecosystem health and vitality, biological diversity, and social indicators. Lack of past data also makes trends difficult to assess (IPF 1996*b*). These informational problems exist in both developing and developed countries.

Identification of appropriate C&I, however, cannot be restricted by the limitations of available data (USFS 1993). Policy decisions often have to be made with inadequate information, and this problem will not go away (Vogt, review comments). However, unless the lack of information about resources is adequately addressed, along with appropriate methodologies for collecting such information, there may be an accompanying loss of enthusiasm, momentum, commitments, and political credibility (IPF 1996*b*, FAO 1997).

The availability of reliable, regularly up-dated and comparable information related to specified sets of indicators is essential for meaningful debate. Adequate information is also a precondition for monitoring the impact of forest management actions as well as for evaluation of trends. Additional efforts will be needed in the future to ensure that such information is continually generated and regularly updated, and that it is scientifically sound, technically valid, and a cost-effective way to respond to specific questions and needs (IPF 1996*b*).

Practicality. A set of C&I needs to reflect the kind of data that can reasonably be collected and summarized (USFS 1993). The C&I need to be practical, and their application must be seen as both pertinent and cost-effective in the eyes of the general public, decision makers, and technical and scientific experts. Furthermore, indicators should directly or indirectly

help respond to peoples' questions about forest use and management. If trends in a given indicator do not reveal any thing of significance in assessing the sustainability of forest management, then the indicator is irrelevant, and probably does not need to be measured (IPF 1996*b*).

***Need for Testing*.** There is a well-recognized need for more field testing of sets of C&I at both the national and forest management unit level (IFF 1999). Testing is needed to confirm the relevance of defined C&I in the light of prevailing environmental, economic, social, and institutional realities (FAO 1997).

There is a need for continuing dialogue among the organizations involved in field testing. Periodic exchanges of experiences on successful implementation, difficulties in application, and possible ambiguities in interpretation of concepts and methodologies are essential for attaining a gradual improvement of forest management practices and for maintaining interest and commitment to implementation of a set of C&I (IPF 1996*b*). Such dialogue will occur at an international conference in France in March 2000 focused on the use of C&I at the forest management unit level.

Conclusions

The consequences of sustainable forestry depend on the specific criteria chosen as the "rules of the game," and these criteria are, at least to some extent, arbitrary or determined by political considerations (Sedjo et al. 1998). However, there seems to be a high degree of consistency between the criteria that have been chosen worldwide (IPF 1996*a*). The criteria and indicator (C&I) framework approach is not a panacea for measuring sustainable forest management (Lowe 1995), but it does offer some promise as a forest policy and management tool. The idea of measuring progress toward sustainable forest management with C&I is relatively new and still developing. Measures of success will be public support for the use of the C&I framework and real improvements in forestry occurring as a result of using C&I (Baker, review comments).

Criteria and indicators, and the relative importance applied to them, will change over time as knowledge, technology, and priorities evolve (USFS 1993). As long as sustainable forest management is an issue, there will be a continuing need to define and refine sets of C&I for measuring sustainability. All sets of C&I are intended to be reviewed and adjusted as appropriate to reflect:

- Improvement in scientific knowledge as to how forest ecosystems function and respond to human interventions,
- Increased experience in, and capacity to measure indicators,
- Advances in technology,
- Changing public demands for forest products and service, and
- Improved definition of indicators that measure significant and useful aspects of sustainability of forest management (Woodley et al. 1998).

Although it may not be possible to determine when a sustainable condition has been attained (see **Chapter 1**) it is possible to know whether or not we are moving in the right direction (USFS 1995). C&I provide a map and compass for heading in the direction of sustainable forest management. With these tools people can begin to differentiate many of the key elements of "good" and "bad" forest management, and begin to clearly see a path toward sustainability (Heaton and Donovan 1996).

Chapter 3. Field Testing C&I in Idaho

During the summer of 1998 in southwestern Idaho, a team of resource specialists tested the applicability of criteria and indicators (C&I) for sustainable forest management. The field test was part of a larger project by the Center for International Forestry Research (CIFOR) to develop sets of locally appropriate C&I at the forest management unit level, where key decisions are made. During the last 5 years, CIFOR has committed considerable resources to numerous field tests to refine existing C&I frameworks (Vogt et al. 1999). Earlier CIFOR evaluations of C&I were conducted in Germany, Indonesia, Cote d'Ivoire, Brazil, Austria, and Cameroon.

The development of principles and associated C&I has generally followed one of three processes: political, operational, or scientific (Vogt et al. 1999). The choice of approach depends on the types of actors at the forefront of different initiatives. Political processes are used by international organizations such as United Nations agencies and non-governmental organizations such as citizen conservation groups. Certifying organizations follow operational processes. CIFOR has been a leader and a focal point of scientific approaches to C&I (van Bueren and Blom 1997, cited by Vogt et al. 1999).

The Boise, Idaho area was recommended by the U.S. Forest Service for CIFOR's North American test site for several reasons. The area represents a forest management unit with a sophisticated level of forest management (Woodley et al. 1998). Most landholders maintain comprehensive resource management plans generally aimed towards long-term productivity and ecological health of the forest. The area also has a comprehensive database and a high level of stakeholder involvement. The forest represents a resource valued for a wide range of users, supplying local people with revenue from timber products, outdoor recreation opportunities, fuelwood, and other forest products. The Boise National Forest was at the core of the study area. This area also provides habitat and refuge for many animals and plants, and protects ecosystems and natural processes which may be declining on adjacent lands (Woodley et al. 1998).

The U.S. Forest Service was the sponsor and lead agency for the project with the Boise National Forest serving as host. The Idaho Department of Lands and the Boise Cascade Corporation supported the project by supplying data and information, staff time, and logistical support for field tours. Work facilities for the project team were provided by Boise State University. The Idaho Conservation League, the state's largest environmental organization, was made aware of the project by its sponsors, but chose not to participate due to other pressing concerns (John McCarthy, personal communication).

Most of the information in this chapter is distilled from the team's 600-page report *North American Test of Criteria and Indicators of Sustainable Forestry* (Woodley et al. 1998). Except for direct quotations, further citation of this CIFOR field test report is not provided.

Objectives

The purpose of the CIFOR test project was to evaluate the usefulness of various C&I, not to determine if the Boise National Forest and neighboring forest lands were being managed sustainably. The principal aim of the field testing was to identify C&I that are objective, cost-effective, and relevant to the sustainable management of forests in North America. The focus of the testing procedure was to identify the smallest number of C&I needed to reliably and cost-effectively assess forest management.

CIFOR has been moving toward clearer and more operational definitions of principles, criteria and indicators. According to CIFOR, a principle is "a fundamental truth or law as the basis for reasoning or action ... *criteria* are the intermediate points to which the information provided by *indicators* can be integrated" (Prabhu et al. 1996). This list of parameters for C&I is based on a good scientific background as well as common sense (Vogt et al. 1999). CIFOR has stated that 9 attributes must be present in a working set of C&I:

1. Relevance of the criteria and indicators,
2. Unambiguously related to the goal,
3. Precisely defined,
4. Diagnostically specific,
5. Easy to detect, record, and interpret,
6. Reliability, especially as indicated by replicability of results,
7. Sensitive to stress on the forest management, ecological, or social systems,
8. Provides a summary or integrative measure over space and/or time, and
9. Appealing to users (Vogt et al. 1999).

Methods and Results

The project team examined the theoretical basis for C&I and availability of data. The team was selected by the U.S. Forest Service to represent a wide range of disciplines from throughout the United States, Canada, and Mexico. The 9-member team consisted of three ecologists, a social scientist, an economist, three forest managers, and a forest geneticist. Additional specialists working with the team included a carbon biochemist, an anthropologist, a systems ecologist, and a forest ecologist. A list of team members and their affiliations is provided in **Appendix B**.

Selected Sets of C&I. The two main sets of C&I selected for evaluation during the Idaho test were C&I that have emerged from other CIFOR work, and C&I of the Canadian Council of Forest Ministers (CCFM 1997). The Canadian set is similar, but not the same as, the C&I from the Montreal Process. Two additional C&I sets were reviewed in less detail: local or regional indicators, including the Idaho Forest Practices Act; and the Greater Fundy Ecosystem guidelines developed for the Fundy Model Forest in northeastern Canada.

Which C&I are appropriate? The team evaluated 207 C&I in detail and scanned another 200 using methods prescribed by CIFOR (1996) with modifications to fit the site and the North American context. (For more detail on the evaluation methods see Woodley et al. 1998, pp. 21-24.) Of those C&I examined in detail, 65 were rejected due to conceptual weakness, impossibility of using operationally, or irrelevance in North America. The team accepted 71 C&I, most of them with suggested changes. The remaining 71 C&I were combined with others, meaning there was merit in the idea. The team also proposed 5 new indicators to help round out the set.

Appendix C presents the C&I the team found acceptable in North America. The C&I are arrayed under 3 principles distributing the criteria between ecological, social, or management categories. They are Principle 1 "Ecological Integrity is Maintained," with 7 criteria and 20 indicators; Principle 2 "Yield and Quantity of Forest Goods and Services are Sustainable," with 4 criteria and 17 indicators; and Principle 3 "Society Accepts Responsibility for Sustainability," with 5 associated criteria and 17 indicators. A fourth principle category refers to the enabling condition that "Policy, Planning and Institutional Frameworks are Conducive to Sustainable Forest Management," with one criterion and 3 indicators associated with this principle (Woodley et al. 1998, see **Appendix C** for specific C&I).

Problems with the C&I Framework

The evaluation team stated that the use of the C&I framework is still in the development phase, with considerable difficulties to overcome. Problems stem both from conceptual problems and measurement difficulties. A major problem in testing the indicator sets was often the lack of evidence or explanatory material in support of the concept. (Examples are provided in the ***Economic Indicators*** subsection below.) Sometimes measurements relied too heavily on available data sets, even if such data are only vaguely related to the criterion or indicator. Although practicality in data use is important, if available data are stretched to fit a particular indicator concept, the relationship of the indicator to sustainability can be weakened.

Some of the problems with indicators for the different dimensions of sustainability are summarized in the following subsections. Integration of these different indicators is also conceptually and operationally difficult.

Ecological Indicators. Ecological indicators have probably received more attention than economic or social indicators in C&I set development. Although the team stated that some good ecological indicators are being used throughout North America, two problems hinder their further development. First is the limitation in theoretical understanding of how ecosystems function. Second is devising practical measurements of complex ecological variables over the long term. Measuring ecological parameters can be costly and time consuming. According to the evaluation team, very few agencies or organizations have the staff expertise and financial resources to carry out a program over the long term. Most long-term monitoring programs fail because of budget cuts.

Economic Indicators. Economic indicators were particularly troublesome for the evaluation team, and economic C&I require further development. Many existing indicators focus on national economic parameters and were difficult to apply at the forest management unit level. Examples include

productivity capacity, nonmarket benefits, and contributions to gross national product.

Although several of the economic indicators are measurable at the regional or local scale, these indicators have no obvious links to sustainability. Whatever linkages exist are based on unstated or untested hypotheses. For example, the idea that economic diversity promotes economic sustainability has not been subjected to empirical testing.

Trying to incorporate the sustainability of economic and social systems into the context of forest sustainability raises difficult questions. For example, is sustainable forestry a sufficient condition for economic and social sustainability? To put it another way, forest ecosystems are widely accepted as fundamental to meeting human needs, but are forest ecosystems a necessary vehicle for assuring economic and social sustainability?

Static measures of dynamic systems presented a problem for the evaluation team. The tested set of economic C&I was limited because it was primarily diagnostic and focused on economic structure. These descriptive indicators have few dynamic aspects. Human systems are highly dynamic and adaptable. Because sustainability is inherently a dynamic concept, the team felt that economic indicators should encompass more of the dynamics of economic process, such as changes in the system variables over time.

Finally, on a more positive note, one theme the team found particularly useful is that it may be easier to find the negation of an indicator rather than the affirmation. For example, it is easier to determine if there is inequality rather than equality, or unfairness rather than fairness.

Social Indicators. As with economic indicators, it is difficult to adapt many of the national level social indicators to the local scale or forest management unit level. Many of the social indicators in the sets the team tested were developed in countries where people either dwell in the forest or are dependent on the forest for basic necessities—that is, forest-dependent peoples must obtain their food, clothing, and shelter directly from the forest. This situation does not fit Idaho, where people choose to build their homes in or near forested areas. The social indicators need to reflect the values of Idaho residents, and the values of people outside the state that influence values of state residents (Vogt, review comments).

Many of the countries where social indicators were developed are outside North America, where legal frameworks and property rights are less developed and more tenuous than they are here. As a result the sets of social indicators the team evaluated were relatively easy to monitor and assess, but did not provide useful measures of the satisfaction or dissatisfaction people may have with legal structures and property rights issues.

Variability of forest ownership created several problems. Social indicators also include such things as management objectives, which vary from one type or group of owners to another.

Although the evaluation team found a wealth of data related to C&I for sustainable forest management, the data tend to cover only forest areas managed for timber production. There is a lack of data relevant to C&I on lands where non-traditional forest products and non-timber products may be more important management objectives.

Non-industrial private forest (NIPF) owners were not systematically included in the study. In aggregate NIPF owners have the second largest amount of forest land in Idaho, exceeded only by the national forests managed by the U.S. Forest Service.

Management plans are also problematic. The team cautioned that while many areas of land in southwestern Idaho had management plans, the existence of a management plan is not a guarantee of sustainable management. The plan must be designed to effectively reflect sustainability concerns, and the plan must be implemented.

Integrating Different Indicators. A basic theory of sustainability that integrates across ecological, economic, and social lines is still lacking, not only in Idaho but everywhere else. The CIFOR evaluation team encountered difficulties integrating indicators across disciplines. Despite the best efforts of the evaluation team to work in an interdisciplinary manner, members of the team tended to work within their specialty.

Conclusions

The CIFOR team that evaluated C&I in southwestern Idaho offered several conclusions about the current state of the C&I framework for sustainable forest management. In general, the evaluation team seemed to say that the idea of sustainable forest management has promise that is as yet unfulfilled.

The problems lie more with pragmatic concerns people have than with voids in scientific knowledge. Because C&I for sustainable forest management is an idea in its early development stages, there is much work yet to be done to overcome some of the conceptual and operational problems. As the team put it,

> "It would seem to be a simple task to assess if we are living sustainably or not. In practice, however, assessing sustainability is confounded by a host of difficulties. Some of these are scientific, pointing to flaws in our basic understanding of systems. However, scientific issues seem minor compared to the problems that arise from different perspectives on the nature of sustainability" (Woodley et al. 1998).

Three major conclusions can be drawn from the CIFOR test evaluation in Idaho. First is the difficulty of defining sustainability; second, there are general problems putting the sustainability concept into operation with criteria and indicators; and third, there are practical considerations limiting the potential to assess sustainability.

Sustainability Remains an Elusive Concept. Sustainability has been rightly criticized as a "fuzzy idea." But notions such as honor, justice, and truth serve as guidelines for our daily affairs, even though their definitions are no more rigorous than sustainability.

Sustainability is an attempt to define a way of living on our planet that avoids bleak consequences. With all its flaws, the concept has gathered international currency, and there appears to be no other competing model.

Because it is inclusive as well as elusive, sustainability draws upon a wide range of sciences, each with its own complexities. The lack of a unified theoretical basis for sustainability means there is not a single comprehensive indicator. Managing for sustainability requires selecting an appropriate set of indicators, and paying attention to ***all*** of them. Any set of chosen indicators should be viewed as a work in progress, rather than an end product, because the indicator set can likely be improved upon.

The CIFOR evaluation team had some pointed advice on the perspective one should adopt towards integrating the ecological, economic, and social dimension of sustainability:

> "We continue to have difficulty with the concept of sustainability. Some view it as a way to limit development, others as a hoop to jump through to ensure development can occur. Both views operate from a perspective of minimum. In one view it is minimum development, from the other it is minimum level of interference with development. The team felt that sustainability will only be helpful when we look for optimum arrangement of the ecological, economic, and social values. As long as we stay in the argument of minimums, we have not changed the nature of the debate, only changed the words we use to argue. If we fail to look for the best allocation or set of conditions through time, we are likely not to find it" (Woodley et al. 1998).

General C&I Problems. In addition to the basic conceptual problems with defining sustainability, the CIFOR team summarized the implementation problems as follows:

- The tested indicators were developed at the national level, and did not translate well to the forest management unit. Indicators will work only when they inform management. If "management" means the people and groups making decisions at the forest management unit or local field level, then the indicators team tested fell short.
- Indicators will only work when they can be referenced against a target (norm or verifiers). Many indicators do not provide useful targets for indicators. This is a serious shortcoming in translating a national level C&I set to the field level.
- The development and use of a consistent set of terminology for what is a principle, criterion, and indicator is a serious challenge to overcome. Principles, criteria and indicators are often confused and overlapped between and within C&I sets.
- Indicator sets are generally poorly documented and referenced. The rationale for why a particular indicator would be a good measure of sustainability often is either weak or absent.
- The indicators do not address the operational issues surrounding their use. Issues of cost, replicability, data management, and quality control are not addressed. These are key issues at the field unit management level. They are also key to why the vast majority of monitoring programs fail. If sustainability is to be monitored using C&I, these issues must be addressed.

- There is not an accepted theoretical basis for the integration of ecological, social, and economic indicators (Woodley et al. 1998).

Sustainability and Practicality. Reflecting again on the idea that sustainability is more about the practical concerns that people have rather than an attempt to fill voids in our scientific understanding of the way the world works, the CIFOR evaluation team arrived at the following conclusion:

> "Despite these criticisms, the team felt that criteria and indicators can fill a critical role in assessing sustainability. There are many excellent ideas in the sets of C&I we tested. We accepted the majority of indicators as providing valuable understanding on the sustainability of actions in the forest. However, there is a long way to go to get these ideas operational and accepted at the field management unit. It is time to move the debate over C&I from national policy forums to the field management unit. At their heart, C&I are practical applications of knowledge. We must remember to focus on their practicality. Otherwise we will ignore many pressing and real problems while we 'get the science right'" (Woodley et al. 1998).

The CIFOR field test in Idaho pared several C&I lists down to those indicators that make sense in North America. The CIFOR test did not address the question how to assemble indicator data to make assessments of whether or not progress toward sustainable forest management is being made. Certification, introduced in **Chapter 4**, could be one approach for doing that.

Chapter 4. What is certification?

"Certification" is a new, rapidly-developing area of forest management policy. Because certification is a new idea, people talk about many different types of "certification" programs. Definitions range from general to specific approaches. A very general approach is "any program that promotes, encourages, and monitors sustainable forest management" (SAF 1995). A more specific approach is "a voluntary, market-driven initiative to provide an independent assessment of performance against agreed-upon standards" (Nordin 1996). Defining what one means by certification is key to discussing the merits and drawbacks of certification programs.

In the following discussion, we see certification as a logical companion to and extension of the C&I framework. What sets certification apart from C&I is the use of *standards*. As defined in **Chapter 2**, *standards* are measures for comparing existing management practices against the set of ideal principles or conditions that C&I identify (Ervin and Elliott 1996). Certification programs set the levels of compliance with C&I that must be attained in order to be considered sustainable. Certification is a programmatic approach for measuring C&I in the field at the forest management unit level to determine if *standards* are met.

What is being certified?

One way to classify certification programs is determining whether it is the forest land, the forest manager, the forest practices, or the forest product that is certified. Some certification programs base certification only on the management of timber in the forest. Some focus on environmental quality. Others certify not only the growing and harvesting of timber, but also manufacturing and marketing of a sustainably produced consumer good.

Certification has been proposed as a means to improve management of forest resources (Vogt et al. 1999). Certification programs were conceived as voluntary (Upton and Bass 1996) and remain so. Forest certification includes two different considerations. First, that lands are sustainably managed. Second, as an option, that consumer products come from sustainably managed forests.

We call these two approaches forest land and forest product certification. Forest land management certification is the goal of any certification program. The optional forest product certification is dependent upon and linked to forest land certification. This linkage is called a "chain of custody" and may or may not result in awarding an "eco-label" to affix to a wood-based product so consumers will recognize that the product has been sustainably produced.

Forest Land Certification. The idea of forest certification developed as a response to the perceived lack of sustainable management of the world's forest resources (Kiekens 1999). Society's perception of what constitutes acceptable forest management has been strongly influenced by the rapid increase in tropical deforestation and the cutting of old-growth forests on public lands, epitomized by the spotted owl controversy in the U.S. Pacific Northwest (Vogt et al. 1997, 1999). Another objective is to assure the public that forests are being managed so that environmental concerns and values have been addressed. These concerns extend to small-scale forests typical of most non-industrial private forest landowners (Vogt et al. 1999), and state and county lands in public ownership (Mater et al. 1999), as well as industrial timberlands owned by companies that manufacture wood-based products.

Involvement of a third-party certifier is the most credible approach (Viana et al. 1996). The third-party certification process for a forest landowner—either an individual or organization—begins with a voluntary request for an independent certifier to inspect forest land. The purpose is to determine whether land management meets clearly defined standards. Certifiers examine activities related to land management, and, depending on the program, may or may not certify that manufactured forest products have come from forests that are managed sustainably.

Forest Product Certification. Certification can also include conducting an audit of the manufacture of forest products, all the way from the forest to the log yard to the final point of sale. In some programs a label identifying the forest product as "certified" is awarded. Such an "eco-label" or "green label" is specifically designed to communicate to final consumers that the product originated from a sustainably managed forest (SAF 1995, Elliott and Donovan 1996, Forstbauer and Parker 1996, Nordin 1996, UN/ECE Timber Committee 1998).

Forest product, or wood product, certification is an approach for encouraging sustainable production

of a full range of forest outputs that relies on market forces (Baharuddin 1995, IPF 1996*b*, Gale and Burda 1998, NRC 1998). One objective is to improve market access and market share for the products of such management (Upton and Bass 1996); another is to encourage sustainable forest management by market forces rather than laws and regulations (Forstbauer and Parker 1996, Vogt et al. 1999). Although most certification programs have focused on timber and solid wood products, certification programs have expanded into non-timber forest products as well (see Pierce 1999).

Forest products manufacturers need to consider not only the market opportunities for labeled products, but also the desire of society to know that patterns of resource use are sustainable. In this case, that translates into a concern that harvesting timber and other silvicultural activities do not harm the environment irreparably.

"Eco-labeling" and the "Chain of Custody." Some programs for certifying manufactured wood products offer an "eco-label" and some do not. Those that do provide manufacturers of wood-based products with the option of labeling their products as having come from sustainably managed forests.

Certification that a forest is managed sustainably can carry over into the labeling of a product being made from "certified" wood only if a "chain of custody" is maintained (Sedjo et al. 1998). The "chain of custody" is the unbroken trail of accountability that ensures that products came from a specific source and were produced in a particular manner (Groves et al. 1996). A "chain of custody" system consists of physical evidence, such as documents, tags, and labels, that goods originate from a particular source. So that the trail can be audited, the system also includes data recording and communication components that run parallel with and link to the physical evidence. Links in a forest product chain of custody might include:

- Standing tree to log at the stump,
- Log transported from stump to roadside,
- Log at roadside transported to manufacturer's log yard,
- Processed goods transported to wholesaler, and
- Transfer of goods to retailer (Groves et al. 1996).

"Chain of custody" verification is often costly and in some cases infeasible (Sedjo et al. 1998). It is a problem for companies that buy wood and fiber from many sources (Jenkins and Smith 1999). Some companies have therefore undertaken certification of forest land management activities and not attempted to obtain an "eco-label" for wood-based products.

Who is doing the certifying?

Three basic forms exist, and are called first-, second, or third-party approaches. First-party schemes are initiated by forest management companies themselves and involve internal assessment of the company's systems and practices with regard to internally established guidelines or environmental objectives (Gale and Burda 1998, UN/ECE Timber Committee 1998). Second-party certification is a verification of standards by a customer or outside trade association (UN/ECE Timber Committee 1998). The Sustainable Forestry Initiative (SFI) of the American Forest & Paper Association offers the option of either first-, second-, or third-party certification.

Third-party certification is what many discussions of certification are about without explicitly saying so. Third-party certification involves verification of a set of accepted standards by a neutral third-party (UN/ECE Timber Committee 1998). The third-party requirement is supposed to assure that the certifier has no self interest in a specific forest activity, is not a stakeholder in the forest or forest manager being certified, and can assure the public of independent and professional judgment (Upton and Bass 1996). A leading program of this type was created by the Forest Stewardship Council (FSC).

Certification programs, including SFI and FSC, are described in more detail in **Chapter 5**.

How is certification approached?

Certification schemes are also classified as either performance-based or systems-based. In a performance-based scheme the organization or land base being evaluated must meet specific thresholds of performance (UN/ECE Timber Committee 1998). Performance-based standards are intended to be used to evaluate how well a forest manager performs or follows appropriate management practices. This type of evaluation typically includes performance measures such as appropriate silvicultural techniques, maintenance of biological diversity, local rights and benefits, and economic vitality of the operation (Ervin and Elliott 1996). Performance-based schemes are the form of certification that has been advocated by many certification contractors and

environmental organizations whose primary concern originates with the forest resource itself (Berg and Olszewski 1995, SAF 1995).

A systems-based approach requires an organization to have management systems in place designed to recognize the company's impact on the environment, monitor those impacts, and improve performance (UN/ECE Timber Committee 1998). The systems approach focuses on whether a company or landowner has adopted management processes that are consistent and repeatable. These approaches are based on the assumption that if a company or forest manager has an adequate system in place for dealing with the environmental impacts of its activities, this will provide a sound basis for reducing the negative environmental impacts of forest management or wood-based product manufacturing. However, certification that a company has an environmental management system in place does not guarantee that specific levels of performance are achieved. Instead, a certifier evaluates how well a forest manager incorporates environmental objectives and targets into the overall management system, and how well the system is being implemented. Performance levels may be set by the company operations, but are not part of the certification standards (Ervin and Elliott 1996, Gale and Burda 1998).

The systems-based approach is less prescriptive and more goal-oriented than the performance-based approach (SAF 1995). Forest industry firms tend to prefer the systems approach (Berg and Olszewski 1995). The systems approach provides more flexibility in the choice of technology to be used in the forest, the types of forest practices to be adopted, the volume of timber to be removed, and the degree to which biodiversity and other forest values are protected (Gale and Burda 1998).

The performance-based and systems-based approaches to certification are not mutually exclusive. In practice, certification programs combine both approaches (Ervin and Elliot 1996, Lyke 1996).

Certification and the C&I Framework

Certification and the criteria and indicators (C&I) framework are related in that they both attempt to define, measure, and promote sustainable forest management. *Standards* set them apart. By our definition and discussion in **Chapter 2**, the C&I framework identifies characteristics of forests and their management that are important ecologically, economically, and socially. Certification programs develop *standards* for various indicators for evaluating the management of forest units in the field setting. The C&I framework does not specify explicit *standards*; certification does.

The geographic scales of C&I and certification tend to be different. C&I were originally developed to assess the condition of forests and progress towards sustainable forest management at a broad national level, and were undertaken because of international initiatives. Certification programs were developed to assess systems and performance at a local scale or forest management unit level (Nordin 1996, Côté 1999). There is less distinction between geographic scales now because sets of C&I are being developed and field tested at the forest management unit level, such as in Idaho (see **Chapter 3**). A set of C&I can provide nationally and internationally recognized values against which local indicators can be selected and standards developed to certify sustainable forest management performance (Baharuddin 1995, Nordin 1996).

Many of the field tests of C&I frameworks specifically mention among their aims the examination of possibilities to link C&I with certification of forest products (IPF 1996*b*). However, it is debatable whether certification can be broadened to the national level (Upton and Bass 1996).

The specific links between the international C&I initiatives aimed at improved forest management on the one hand, and forest management certification on the other, are still unclear, and differences in opinion remain largely unresolved in international debate (IPF 1996*b*). One view sees certification as a process that can promote sustainable forest management. One way is by rewarding "good" forest management through "eco-labeling" of forest products through market-driven incentives. Another view holds that certification schemes can only be considered by countries after the successful and lasting implementation of sustainable forest management policies, and that forest certification schemes are a consequence of sustainable forest management rather than a development tool (IPF 1996*b*, FAO 1997). These arguments are being quieted as more and more land areas are certified without involving a market-based "eco-label." The goal of forest certification is concern about how forests are managed, and although an "eco-label" can reflect that goal, the label is not by itself the program goal.

The relationship of the Montreal Process C&I with certification also is unclear. In particular, the United States and European Union are at odds. Some American officials insist that the national-level C&I developed under the Montreal Process cannot be used in forest-level certification for a variety of reasons, including differences of scale and the lack of performance levels or stan-dards associated with national C&I. The European Union, on the other hand, asserts that national C&I are actually intended to lead to site-level certification (Lyke 1996). Field tests of C&I at the forest management unit level should help resolve this issue.

Chapter 5. Certification Programs

Since the movement to certify "sustainable" forest management began, numerous certification organizations and programs have developed. Listings of organizations and programs can be found elsewhere (see, for example, Upton and Bass 1996, Fletcher and Rickenbach 1999).

Rather than duplicate lists, we look at five certification programs in the United States. The International Organization for Standardization (ISO) is an example of a third-party, systems-based approach. The Sustainable Forestry Initiative (SFI) of the American Forest & Paper Association (AF&PA) is a first- or second-party, performance-based certification scheme that offers an optional third-party audit. The Forest Stewardship Council (FSC) is a third-party, performance-based certification body with several affiliated programs. The American Tree Farm System and the Green Tag Forestry programs are, respectively, the oldest and the newest certification schemes available for non-industrial private forest (NIPF) landowners. Both offer independent verification of program standards (SAF 1999).

We offer a summary table comparing the programs. After considering the reactions of stakeholders to certification in **Chapter 6**, we review stakeholder perspectives on them.

International Organization for Standardization (ISO)

The International Organization for Standardization (ISO) is a non-governmental federation of national standards bodies from approximately 130 countries worldwide, with one representative from each country (ISO 1998). The United States is represented by the American National Standards Institute. Since 1947, the ISO has promoted the development and implementation of voluntary international standards. It does not certify that a supplier of goods will produce a product with certain characteristics; rather, ISO certification demonstrates that the company has adopted systematic processes for managing quality control that are consistent and repeatable (Berg and Olszewski 1995). ISO is the most widely known example of systems-based certifiers.

In 1992, the ISO began work to expand its certification program in the area of environmental management, auditing, performance evaluation, and life cycle analysis (Berg and Olszewski 1995). These new standards are established under the ISO 14000 series. ISO is currently developing a guidelines document to assist companies in applying the ISO 14000 standards to forest management operations (UN/ECE Timber Committee 1998).

The ISO systems-based approach focuses on general environmental management tools that are designed to improve environmental performance (Jenkins and Smith 1999). The generic nature of an ISO 14000-series environmental standard allows it to be applied to the production processes of products other than wood. Thus, materials competing with wood can be held to similar compliance (Sedjo et al. 1998).

The Canadian Standards Association (CSA) has developed industry-backed sustainable forest management standards that it hopes to have certified under the ISO. Under the assumption that sustainability will become a general market condition that customers expect from suppliers, the Canadian industry did not adopt chain of custody protocols or create an "eco-label" for certified products. The CSA standards were drawn up to meet general concerns about sustainability rather than to create niche market opportunities for labeled products (Jenkins and Smith 1999). A survey of Canadian firms predicts 172 million acres will be certified by 2003 (Kiekens 1999).

ISO standards have also attracted the interest of forest products manufacturing companies in New Zealand and Europe. If this program is widely adopted it could provide a viable alternative to other programs (Jenkins and Smith 1999). This program has also attracted at least one large U.S. firm, as International Paper Co. had its eastern region earn ISO certification. The company intends to certify its three other regions (SAF 1998).

Sustainable Forestry Initiative (SFI)

The American Forest & Paper Association (AF&PA) is the national trade association of the forest, paper, and wood products industry. Its member companies own approximately 80% of forest industry timberlands in the United States. These firms account for the majority of total paper and wood product outputs (UN/ECE Timber Committee 1998). In 1994, the AF&PA announced its Sustainable Forestry Initiative (SFI).

AF&PA member companies are required to abide by the SFI policy as a condition of

membership. Member companies must follow forestry guidelines that include reforestation, water quality protection, enhancement of wildlife habitat, and minimizing the visual impacts of logging. The goal is a gradual, ongoing process toward higher forestry standards. Members report their performance progress in published annual reports (see, for example, AF&PA 1999).

Initially the SFI approach did not require third-party verification. Even so, requirements were onerous enough that between 1995 and 1997 membership decreased by 10 percent, as 15 companies were dismissed from the AF&PA membership ranks for refusing to comply and another 10 companies voluntarily resigned. More than 56 million acres of forest lands in the U.S. were enrolled in the SFI program in 1998 (AF&PA 1999).

The SFI is based on five principles for sustainable forestry (Box 5.1).

The SFI program objectives and performance measures are provided in **Appendix D**. Each year, a panel of experts—including academic, government, and non-governmental organizations—reviews the program objectives and progress made by AF&PA member companies in implementation of the SFI. The panel also makes suggestions for continued improvement of the program (AF&PA 1999).

In 1998, AF&PA adopted a licensing program that allows non-member organizations to participate in the SFI (AF&PA 1999), and adjustments are being made to accommodate non-industrial private forest owners (Fletcher and Rickenbach 1999). There has not been a discussion about a certified labeling scheme for wood-based products (UN/ECE Timber Committee 1998).

The credibility of SFI could be enhanced by farming out the certification process to an outside consulting firm, which is just what the SFI program is beginning to do (Vogt et al. 1999). Under a recently adopted voluntary verification component, AF&PA members and SFI licensees can now conduct formal self-verifications, work with a second party to verify conformity, or seek independent third-party certification (SAF 1999). Several AF&PA member companies, including Plum Creek Timber and Boise Cascade, have recognized the benefits of third-party certification and are being assessed by independent reviewers.

Box 5.1. Principles for Sustainable Forestry: Sustainable Forestry Initiative (SFI) of the American Forest & Paper Association (AF&PA)

1. **Sustainable Forestry.** To practice sustainable forestry to meet the needs of the present without compromising the ability of future generations to meet their own needs by practicing a land stewardship ethic which integrates the reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat, and aesthetics.
2. **Responsible Practices.** To use in forests, and promote among other forest landowners, sustainable forestry practices that are economically and environmentally responsible.
3. **Forest Health and Productivity.** To protect forests from wildfire, pests, diseases, and other damaging agents in order to maintain and improve long-term forest health and productivity.
4. **Protecting Special Sites.** To manage forests and lands of special significance (e.g., biologically, geologically, or historically significant) in a manner that takes into account their unique qualities.
5. **Continuous Improvement.** To continuously improve the practice of forest management and also to monitor, measure and report our performance in achieving our commitment to sustainable forestry.

Source: AF&PA 1995, 2000.

Forest Stewardship Council (FSC)

The Forest Stewardship Council (FSC) accredits or approves organizations—that is, third-party certifiers—that wish to perform forest certifications according to FSC standards. FSC is thus a "certifier of certifiers" (Scrase 1995, Cooper 1996, UN/ECE Timber Committee 1998). In the U.S., FSC has accredited two organizations to perform forest certification: Scientific Certification Systems (1999) and SmartWood (1999). FSC-accredited certifiers conduct certification audits for forest land management and for "chain of custody" between consumer wood-based products and forest land. The forest

management audit reviews management plans and on-the-ground practices, for the purpose of determining whether FSC performance-based standards are being met (Jenkins and Smith 1999).

The FSC was founded in 1993 by a diverse group of representatives from environmental and conservation groups, the forest products manufacturing industry, the forestry profession, indigenous or native peoples' organizations, community forestry groups, and forest product certification organizations from 25 countries (FSC 1998*a*). FSC's Board of Directors is from three distinct interest areas—economic, social, and ecological—with each area being equally represented (UN/ECE Timber Committee 1998). Potential parties who might pursue FSC certification are identified in Box 5.2. Although still small on a global scale, the amount of forests certified by FSC has grown rapidly, from less than 2.5 million acres worldwide in 1995 to approximately 25 million acres in 1998 (UN/ECE Timber Committee 1998) and 40 million acres in 1999 (Fletcher and Rickenbach 1999).

In the U.S., the two FSC-certifiers have awarded 65 certificates covering more than 5 million acres. Forests owned by states, counties, tribes, and private companies and individuals have been certified. In addition, more than 200 "chain of custody" product operations have been certified (see SCS 1999, SmartWood 1999). A national dialogue is ongoing about certification of federal forest lands (FSC 1998*a*; see the ***Federal Lands*** section in **Chapter 7**).

A key element of the FSC certification scheme for forest products is the certified product label. In 1998 the FSC was the only third-party, performance-based scheme with products in the marketplace (UN/ECE Timber Committee 1998). However, there are some newer "eco-labels" that are not yet market tested (Fletcher and Rickenbach 1999).

Box 5.2. Who might be interested in FSC certification programs?

Many different sectors of the wood products industry participate in SmartWood certification, a program affiliated with the Forest Stewardship Council.

- A landowner who wants to be distinguished for his/her forest management and wants to separate his/her wood from others in order to increase market share.
- A mill owner interested in new markets that want to satisfy the unmet demand for certified wood.
- A retailer dealing in recycled or salvaged timber who needs to document wood sources for customers.
- A progressive professional forester who wants to market his/her services from an environmental angle.
- A public land manager who needs an unbiased, well-rounded peer review of his/her operation.
- A manufacturer or builder who wishes to offer a product line to an environmental niche market.

Source: Northwest Natural Resources Group 1999.

FSC has developed ten principles and associated criteria for forest management designed to assure that consistent performance-based standards are used in evaluating forest practices (see **Appendix E**). These principles and criteria are similar in function to criteria and indicators (C&I) frameworks. The FSC international principles of forest management are designed not only to foster sustainable timber production but also to protect ecosystems, water quality, wildlife, and to further the goal of sustainable economic development (Jenkins and Smith 1999). Because the principles and criteria are broad and generic, they are the worldwide basis for developing national and regional standards for certifying organizations to use. The United States has been divided into 11 regions for the purposes of developing FSC standards (UN/ECE Timber Committee 1998). An effort to develop standards for the Rocky Mountain region is currently underway, which means Idaho forest land owners may soon have an option for FSC certification designed for local forest conditions (see **Chapter 9**).

The FSC also has developed a scheme for "group certification" (FSC 1998*a*). The goal is to make certification economically feasible for non-industrial private forest land (NIPF) owners. This method is based on certifying professional land managers such as consulting foresters. The individual managers (or companies) and management practices

used are evaluated and a sample of managed lands are inspected (UN/ECE Timber Committee 1998). Hrubes (1999) provides an example of how group certification works.

American Tree Farm System. We include this program because some non-industrial private forest (NIPF) owners in the Pacific Northwest view it as a certification program (see, for example, McClintock 1999, Starker 1999). The American Tree Farm System is a program of the American Forest Foundation, a non-profit group with sponsorship by forest industry companies. The system began in 1941 with a Weyerhaeuser plantation in Washington state, and now counts 70,000 certified Tree Farms in the United States comprising nearly 90 million acres. Approximately two-thirds are industrial timberlands and one-third non-industrial private forests (ATFS 1999).

Although the system was not created in response to market pressures as more modern programs have been, membership has always been limited to properties that have been inspected by a professional forester and deemed to be actively managed for wood, water, wildlife, and recreation. The program is currently being retooled to offer more rigorous certification than in the past. Standards are currently under development (Fletcher and Rickenbach 1999, ATFS 1999).

To become a certified Tree Farmer and member of the American Tree Farm System, landowners must have at least ten contiguous acres of forest land and actively follow a written forest management plan. The plan must address how the landowner will provide for wildlife habitat, recreation, water and soil conservation, while producing renewable forest products. After their land is certified by one of 8,000 professional foresters who volunteer their time to the Tree Farm program, landowners earn the right to display the green and white diamond-shaped Tree Farm sign. Every five years thereafter, their Tree Farms are reinspected to assure that landowners continue to meet the system's standards and guidelines for certification (ATFS 1999).

Green Tag Forestry. The Green Tag Forestry certification program started in 1998 and is designed specifically for non-industrial private forests (NIPFs). The program is offered by the National Forestry Association of Washington, D.C., which is affiliated with the National Woodland Owners Association (SAF 1999, Vogt et al. 1999). The Green Tag is offered as an "eco-label" for forest land owners, but the program is too new to have been tested in the marketplace (Fletcher and Rickenbach 1999). This third-party certification program uses protocols similar to the ISO systems-based approach (Vogt et al. 1999). As of late 1999, more than 16,000 acres have been certified by this program in the states of Oregon and Washington (Hanson 1999). Certification is available in 8 other states (Vogt et al. 1999). Requirements include a written and approved management plan with periodic inspections to ensure compliance with the plan. The management plan goes beyond state forest practice act rules and focuses primarily on wildlife and natural "diversity" (Hanson 1999).

Summary. A comparative tabular format (Table 5.1) has been developed by the Society of American Foresters (SAF 1999). The many features in the SAF analysis have been condensed and summarized by Fletcher and Rickenbach (1999) for use by non-industrial private forest landowners. We have followed this format in Table 5.1. The SAF (1999) provides additional details on these programs.

Table 5.1. Summary of Forest Certification Program Features.					
Program	**ISO**	**SFI**	**FSC**	**Tree Farm**	**Green Tag**
Sponsor	Worldwide Federation of National Standards Bodies	American Forest & Paper Association	Forest Stewardship Council	American Forest Foundation	National Forestry Association
Scope	international	national	international	national	national
Eligible forest landowners	any company or organization	AF&PA members and SFI licensees	any landowner	any landowner with 10 or more acres	members of National Wood-land Owners Association
Direct costs to landowner	moderate to expensive	unknown	moderate to expensive	minimal	minimal
On-ground forester inspection	no	no	yes	yes	no
Inspection team	yes	yes	yes	no	yes
Third-party audit	optional	optional	yes	yes	yes
"Chain of custody"	no	no	yes	no	yes
"Eco-label"	no	no	yes	no	yes
Performance- or system-based	system	both	both	performance	both
General Performance Measures					
Compliance with existing laws	yes	yes	yes	yes	yes
Requires written forest management plan	probably	yes	yes	yes	yes
Public availability of certification summary	no	yes	yes	no	no

Sources: Fletcher and Rickenbach 1999, SAF 1999.

Chapter 6. Stakeholders' Reactions to Certification

Most forest stakeholders recognize that forest sustainability must be addressed and, furthermore, that the increasing efforts of voluntary programs in most temperate countries could be a substantial force that will continue to encourage best management practices, significant changes in public policy, and third-party certification (Sedjo et al. 1998).

There is a diverse range of perspectives on sustainable forest management (Sedjo et al. 1998). At one extreme is the view that "current practices are sustainable," based largely upon data showing forest areas increasing in many temperate countries even though forestry has been practiced, in one way or another, for nearly a thousand years. At the other extreme is the view that many indicators show practices in these forests may not be sustainable, and that careful third-party monitoring of on-the-ground forestry practices is required to ensure forest management is sustainable. Between these extremes are a number of alternative approaches (Sedjo et al. 1998). This chapter looks first at different perspectives of various stakeholder or interest groups and government organizations toward certification, and concludes with a brief analysis of what is in the literature about preferences for different certification programs.

Forest Products Manufacturers

Political pressure and market pressure will require producers to increasingly pay attention to forest sustainability issues (Sedjo et al. 1998). Some forest products industry officials regard certification initiatives as an unnecessary intrusion into private sector affairs, while others believe that environmental certification of forest management and timber harvest is needed to achieve consumer trust (Grönroos and Bowyer 1999). Consideration of sustainability is changing the "rules of the game" for forest products manufacturers. They are currently trying to assess how a particular change is likely to affect their competitive position and position themselves so as to be a beneficiary of the changes rather than a casualty (Sedjo et al. 1998). Potential benefits from certification include the following:

- Access to actual or potential markets for certified forest products,
- Better access to information on size, species, and quality of raw material and forest product volumes and movements,
- Closer links between producers and consumers,
- Improved product quality,
- Improved ability to manage change,
- Public recognition as a company with an environmental commitment, and
- Verification of environmental credentials to shareholders and other stakeholders (Groves et al. 1996).

In addition, some producers of certified forest products have reported less tangible benefits to certification, including boosting company morale (Ozanne and Vlosky 1996).

Despite the potential for benefits, there are some problems. Forest products manufacturers in the U.S. have in the past tended to oppose third-party forest product certification because of the complexity of the issue and the potential effects on them (Baharuddin 1995, Ozanne and Vlosky 1996, Vlosky and Ozanne 1997, Hansen 1997). The forest products industry has always been skeptical about industry "outsiders" determining what "good" or "sustainable" forest practices might be. Adjustment in management practices required to obtain and maintain certification can limit a company's flexibility (Lober and Eisen 1995).

Manufacturers also tend to believe that consumers are not willing to pay a premium for certified wood products (McMahon 1996, Ozanne and Vlosky 1996, Hansen 1997, Punches and Hansen 1997, Carter and Merry 1998, Gale and Burda 1998, Jenkins and Smith 1999).

Another problem for some companies is the "chain of custody" and the feasibility of tracking wood from harvest site to the consumer (Ozanne and Vlosky 1996, Vlosky and Ozanne 1997, Hansen 1997, Gale and Burda 1998, Sedjo et al. 1998). Many companies in the forest products industry depend on multiple sources and small, private landowners for their raw material, and believe forest management decisions are the responsibility of the individual landowner, not forest products producers who purchase stumpage or logs to supply their mills (McMahon 1996).

Private Forest Landowners

For smaller private landowners, whether they are forest industry or non-industrial, the main barrier to

seeking certification is likely to be costs (Hayward and Vertinsky 1999). We explore the cost issue in some detail in **Chapter 7**.

Forest Industry Landowners. According to a study conducted by the World Forest Institute, only a few industrial timberland owners believed that certification would actually improve forest management in the Pacific Northwest. Most participants viewed certification as an opportunity for forest landowners, as well as forest product manufacturers, to improve public relations and regain lost credibility (Gale and Burda 1998). A case study of the Collins Pine Company suggested that certification has served as a credible verification of the company's land stewardship and has heightened public support for their company, and thus may be crucial in maintaining the firm's access to timber resources over the long term. The company's executives view certification as a successful investment based upon this outcome alone (Punches and Hansen 1997).

A survey of all FSC-certified forests in the U.S. found that industrial forest land managers tended to seek certification to satisfy extrinsic demands such as improving products, defending market share and market access, and seeking external validation to maintain their "public license" to operate (Hayward and Vertinsky 1999). Small forest land operations tend to seek certification to satisfy intrinsic needs such as learning, achieving self-esteem through external validation, and fulfilling such societal values as meeting forest stewardship responsibilities (Hayward and Vertinsky 1999). Once involved in certification, landowners tended to become more committed to it (Hayward and Vertinsky 1999).

Past reluctance about third-party certification appears to be shifting as several large U.S. companies have undertaken third-party forest certification of their lands. As Jenkins and Smith (1999) concluded, the commitment to continued improvement in the management and use of forests that defines sustainable forest management offers the best prospect to help the industry that manufactures forest products successfully tackle the issues that will inevitably be raised in the future about the wise management of the world's forest resources.

Non-Industrial Private Forest (NIPF) Landowners. More than half of the forest lands in the U.S. are privately owned. Most of these lands are non-industrial forests. In total, almost half (48%) of the U.S. forest area is in non-industrial private forest (NIPF) ownership. Almost 40 percent of these lands are in holdings of 1,000 acres or larger, but only 27,000 out of 9.9 million owners hold these larger tracts. Almost one-third of the NIPF lands are in parcels of 100 acres or smaller (from data in NRC 1998).

Because they are the largest single category of forest ownership in the U.S., NIPF lands provide many values to society as well as to their 9.9 million owners. Many owners have multiple objectives that generally complement each other rather than compete. Few owners (less than 3%) identify timber production as their primary reason for ownership. Recreation and personal enjoyment are much more important (NRC 1998).

Nevertheless NIPF lands are important in the national timber supply picture. In 1992 NIPFs supplied 51% of all the timber harvested in the U.S. (Powell et al. 1993). In Idaho, the NIPF ownership group is second to the national forests in area of forest ownership, and these owners have been providing as much timber for Idaho mills as forest industry timberlands do.

Most of the NIPF land is individually owned in small tracts that are not contiguous to one another and that certification protocols do not assess efficiently. Two impediments to certification for NIPF landowners are that current protocols require a management plan and large amounts of data for the assessment (Vogt et al. 1999). However, NIPF landowners can overcome these impediments and obtain certification either individually or through "group certification." For example, the FSC-affiliated SmartWood program has certified forest management on numerous small tracts (see SmartWood 1999).

We revisit the viewpoints of NIPF landowners in the Pacific Northwest toward individual certification programs at the end of this chapter.

Governments

Governments around the world vary in their support for certification. Some believe that certification, or something like it involving third-party verification of forest management activities, is inevitable; others tend to have fundamental doubts about certification (Baharuddin 1995, Upton and Bass 1996, Viana et al. 1996). On a global scale a principal doubt is whether it is possible to enforce certification by

keeping timber from uncertified operations off the market. Some governments doubt that private certification organizations alone will be adequate to institutionalize certification (Upton and Bass 1996).

Forest certification efforts are internationally driven by organized interests, including transnational environmental groups, organized groups of buyers, and consumers (Bernstein and Cashore 1999). Forest policies in various countries have been shaped by the ideas and norms of these and other interests, along with international rules and institutions. The varying degrees of influence each of these international forces exert are determined partly by the policy arenas with which they interact. Some governments appear to be well aware that the appeal of certification as an approach to sustainable forest management stems directly from its potential to bypass the sovereignty issue internationally, and opposition to regulation domestically, by operating in the marketplace independent of government regulation (Bernstein and Cashore 1999).

The role of governments in certification is the subject of many meetings and conferences at both the national and international level (IPF 1996*b*). In the U.S., a National Research Council (NRC 1998) task force has suggested that the role of the U.S. federal government in fostering certification programs could involve providing technical advice and assistance in building the technical and administrative capacity needed to ensure the success of such programs. The task force identified a federal government role for assessing impacts of certification efforts on forest landowners and forest products manufacturers (NRC 1998).

U.S. State Lands. Some managers of public forests at state and local levels are involved in certification. State and county forest land management agencies in Massachusetts, Minnesota, Pennsylvania, New York, Michigan, and Wisconsin, as well as other states, are all embarking on certification pilot projects (Mater et al. 1999). Certification of public lands began in 1997 with pilot projects on state lands, when a total of 1.8 million acres of state lands in Minnesota and Pennsylvania received FSC certification (Jenkins and Smith 1999). Pennsylvania plans to certify all 2.1 million acres of state lands and make sustainable forest management a central feature of its 15-year management plan. New York, Michigan, and Wisconsin are expected to undertake similar initiatives. Minnesota implemented a certification pilot project because, as agency managers put it, the public wants to be reassured that public forests are being properly managed (Jenkins and Smith 1999).

State public land management agencies are pursuing certification for many reasons, including assuring the public that its forests are being managed sustainably. Other reasons are political visibility, industry and environmental group support, identifying areas for agency improvement, serving as a model for private land management, and perceived market benefits (Mater et al. 1999). A survey of FSC-certified non-federal public land managers found they were seeking external validation to maintain their "public license" to operate (Hayward and Vertinsky 1999).

U.S. Federal Lands. Certification on federal lands is more problematic than on state lands. There is considerable debate about whether third-party certification is possible or appropriate for federal lands in the U.S., particularly for national forests managed by the U.S. Forest Service. The FSC has a moratorium on certifying federal forests because of "strong reservations by the U.S. Forest Service and some environmental groups" (Kiekens 1999). The FSC has offered a number of reasons why, including the lack of consensus on whether timber harvesting is appropriate on federal lands, lack of appropriate indicators related to legal, procedural, and governance concerns, and the Forest Service policy not to pursue third-party certification. These issues are explored in more depth in the ***Public Lands*** section of **Chapter 7**.

Other Stakeholders

Environmental Organizations. Environmental organizations are generally supportive of certification, but views are quite varied, reflecting the diversity of interests across the spectrum of these groups. Some groups see the regulatory approach to forest management as a failure and also believe that bans and boycotts have been ineffective. They believe certification is a better answer (Upton and Bass 1996). Other groups believe that certification may divert attention away from the need for government regulation and institutional change. Still other groups believe that the corporate approach to forestry is intrinsically "anti-forest" because it views the forest first as a producer of commodities. Such groups believe certification will be co-opted by the prevalent

economic interests. Nevertheless some environmental organizations believe certification may work if it is part of a regulatory approach, rather than purely voluntary (Upton and Bass 1996). Some environmental groups believe that some of the governments involved in international C&I initiatives would like to use C&I as a substitute for, or even as a shield against, independent third-party certification (Mankin 1996).

Local communities. Little research exists on the reactions of local communities to certification efforts. Upton and Bass (1996) suggest that local people with forest interests are often concerned that their land rights and aspirations of economic development will be ignored by the certification process. Development of a certification approach that effectively assesses small NIPF tracts should, in general, improve the economic viability of rural communities (Vogt et al. 1999).

Society of American Foresters (SAF). The Society of American Foresters (SAF) is forestry's largest professional organization, made up of and representing almost 18,000 members. The SAF operates a Certified Forester program, verifying that these individuals meet minimum education standards. The program does not address the qualifications of practicing professionals or establish performance standards for the practice of forestry. Forest land management certification should not be confused with the SAF Certified Forester program, or with other programs for logger certification or forester licensing, certification, or registration programs operated by various states (SAF 1999).

In 1994, the SAF chartered a study group to investigate and report on forest land management certification (SAF 1995). Because of continued and rapid developments in certification programs, the SAF commissioned another task force in March 1998 to take another look at certification. The latest task force report (SAF 1999) provides a positive outlook on certification. The report recommends that SAF members become informed and involved in certification programs as they deem appropriate. The task force report discourages the SAF from either developing its own independent certification program or attempting to critically evaluate existing certification programs. The task force said, "Any judgments about the effectiveness of individual programs would ultimately require SAF to judge the values of that organization, a task that goes well beyond the traditional, science-based policy development and application processes of the Society" (SAF 1999).

Certification Program Comparisons by Stakeholders

Each certification approach has its proponents and detractors (Jenkins and Smith 1999). We look at what the literature says about the preferences of stakeholders toward different certification programs.

Environmental groups, not surprisingly, favor the FSC with its performance-based standards and independent audit, whereas forest industry companies generally maintain that FSC standards are unreasonably high and certification is too expensive. Nevertheless, in Sweden the largest industry companies have agreed to FSC certification (see case study in Jenkins and Smith 1999). The association representing Sweden's small private landowners decided not to participate in certification (Sedjo et al. 1998). This creates "chain of custody" problems for certifying the large companies that purchase wood from small owners, so to address this type of problem the FSC has agreed to certify products if some threshold proportion of fiber—for example, 65%—can be identified as from certified forests (Sedjo et al. 1998).

Environmental groups fault the SFI approach for being self-policed—a classic case of the fox guarding the hen house, as they say. Executives of some AF&PA member companies also questioned a self-policing approach, and in 1997 the AF&PA began to evaluate third-party auditing for the SFI program (Jenkins and Smith 1999).

The ISO, SFI, and FSC certification programs are different approaches to setting standards and improving forest management (Jenkins and Smith 1999). These programs serve different purposes (Vogt et al. 1999). All three, however, are based on the assumption that without credible proof, people will not accept claims of sustainability at face value (Jenkins and Smith 1999).

The compatibility of the ISO and FSC approaches is the subject of debate in the literature. A World Wildlife Fund (WWF) report (cited by Gale and Burda 1998, Vogt et al. 1999) suggests that there is no inherent conflict between the two schemes, and they can be "complementary." There are two interpretations as to what this means. Gale

and Burda (1998) interpret "complementary" to mean FSC rates high with environmental organizations and low with industry while ISO rates high with industry and low with environmental organizations. The WWF report suggests that the differences bode well for a mix or combination of the two schemes (Gale and Burda 1998). Some observers take issue with the WWF, suggesting that the goals of a certification program for industry and environmental organizations are quite different, and each is attempting to control the issue politically (Gale and Burda 1998). Others suggest a closer relationship between ISO and FSC, reporting that the FSC drew heavily on ISO documents in establishing guidelines for how certifiers operate and in designing the accreditation process (Vogt et al. 1999).

Although the FSC and SFI programs make similar claims about the goal of "sustainable" forest management, the two approaches to certification differ fundamentally in their views of what sustainable forestry might be (Vogt et al. 1999).

The FSC approach raises the bar high for a few, identifying and rewarding the relatively small niche of forest land that is managed in an "environmentally preferable" manner, in relation to the larger realm of commercial timberland (Vogt et al. 1999). This strategy is tied to the preservationist and restorative goals of FSC-accredited bodies which aim to check the destruction and degradation of natural forests and their indigenous communities. FSC principles are strongly based in environmental values (Vogt et al. 1999).

The SFI approach is one of wide selectivity, raising the bar a little, for many, by setting standards for mainstream forest products industry firms to meet (Vogt et al. 1999). The fact that SFI certification is a requirement for membership in the AF&PA shows that the standards of forest management have been raised for a large portion of U.S. forest industry timberlands. However, SFI does not raise the bar as high as the FSC program in terms of meeting many societal values for forest land, such as protecting biodiversity. The SFI approach is geared more toward companies managing lands primarily for timber and/or game. The FSC, in contrast, emphasizes the protection of "high conservation value forests aiming to maintain the overall biodiversity, productivity, and ecological processes" (Vogt et al. 1999).

NIPF Landowners Revisited. Non-industrial private forest (NIPF) owners own almost half of the forest lands in the U.S., and 59% of the timberlands (see **Glossary**). These 9.9 million owners represent a large market for certification programs.

The perspectives of different NIPF owners are as diverse as their ownership objectives and viewpoints of what "good" forest management is. One point-of-view is that certification is another form of outside regulation, another person telling forest landowners what they *should* be doing with their lands. Some owners see the links to environmentalists in some certification programs and are suspicious of the motives involved (Fletcher and Rickenbach 1999). Landowners choosing to become certified do so for a variety of reasons, and markets are typically not the most important. Some do it for the recognition of doing a "good" job of forest stewardship. Others see it as a way to gain insight into their forest management operations through the eyes of a team of expert evaluators (Fletcher and Rickenbach 1999, Hansen 1999).

Kennon McClintock (1999), president of the Idaho Forest Owners Association, said, "I'm having a hard time following the issue of forest certification. ... Why are so many groups interested in forest management?" We'll tackle the question first, then compare programs available in the region that might become available in Idaho.

Why are so many people interested in forest management? Sustainable patterns of resource use have become a core value of an environmental perspective (Paehlke 2000), and certification of "good" forest management provides people with some assurance that neither long-term forest productivity nor environmental values are being irreparably harmed, including wildlife habitat and water quality. There is no dispute among environmentalists, forest industry representatives, and federal land managers that these environmental values are prominent in any effort to define "acceptable" forest management in the Pacific Northwest (Kearney et al. 1999).

Which of the certification programs in **Chapter 5** are NIPF owners likely to choose? According to the leaders of woodland owners' associations in the Pacific Northwest, opinions vary. There are some NIPF owners who are sticking with the American Tree Farm System (Idaho's McClintock 1999), others who like the new Green Tag program (Washington's Hanson 1999), and still others who for now feel adherence to state forest practices acts is ade-

quate demonstration of stewardship responsibility (Oregon's Rounds 1999, Montana's Liechty 1999).

According to an Oregon tree farmer, "There's no question that some form of sustainability certification and auditing are here to stay and that's good. ... Certification programs *should* establish standards for accomplishment ... [and] *should not* tell us why we own forest land [or] what forest benefits we should emphasize as outputs. ... [I] participated in the American Tree Farm System since the mid-1950s ... [and I now] advocate Oregon's state-of-the-art forest laws and the SFI processes of verification for certifying sustainable forestry" (Starker 1999).

Yet there are still other NIPFs in the region who prefer the certification standards and/or market potential of the "eco-label" offered by the FSC (south-central Oregon, see Hansen 1999; Washington and California, see Hayward and Vertinsky 1999; northern California, see Hrubes 1999).

In sum, given the diverse objectives and values of NIPF owners, a variety of different programs is likely a good thing for forest management in general. The different programs available in the Pacific Northwest share one thing in common: they all require a management plan. After on-the-ground analysis of eight different certification schemes on the Yale University School Forest, Vogt et al (1999) concluded that it was not possible to become certified without a management plan. This basic document is a requisite for credibility in the quest to demonstrate to others that "good" forest management is being practiced.

Conclusion

The values imbedded in all of the different approaches to certification assessment will determine how effectively an assessment will progress toward social and natural system sustainability (Vogt et al. 1999). There is no clear preference or general acceptance, or even an awareness, in the marketplace among the various approaches (Sedjo et al. 1998). Nevertheless, a tremendous amount of interest and attention has been devoted to certification schemes that can be translated into "eco-labeling." None of the various approaches has established clear credibility, and most are too new to have established a clear track record. One aspect that will be a determining factor will be the cost and ease of implementation. Another will be the competitive advantage created for some countries and companies by the various approaches (Sedjo et al. 1998). We explore these and other issues about certification in **Chapter 7**.

Chapter 7. Certification Policy Issues

Sustainable forest management can be achieved only if national and international policies identify sustainable management as a priority across all relevant sectors (Elliott 1996). Furthermore, sustainable forest management will only be possible if the roots of forest problems are addressed. These problems and issues will have to be resolved at both technical and political levels. The focus has so far been more on technical considerations. The political realm has not been addressed by either criteria and indicator (C&I) frameworks or certification programs (Jordan 1996, Bass 1997). We addressed C&I policy issues in **Chapter 2** and address certification issues herein.

Even if a forestry management policy tool such as certification cannot by itself assure sustainability, it can be argued that certification could be a catalyst for management changes (Viana 1996, Viana et al. 1996). Indeed, in most temperate forest countries, forest policies have been changing to address forest sustainability issues (Sedjo et al. 1998). Changes are not as widespread in tropical countries (Côté 1999). The analysis of issues presented herein summarizes what appears in the literature.

Sustainable forestry initiatives are creating significant changes in forest management through a combination of changes in legislation in many countries and through land management practices. There are several dimensions of sustainable forest management policy and related issues that need to be addressed in the context of certification programs. We begin with a problem analysis in order to keep in focus what certification is all about: What is "good" forest management? Related issues are many, including environmental values, market-related factors, costs of certification, governance, and several technical issues.

After considering these certification issues, our conclusions about certification and C&I frameworks as policy tools for making progress toward sustainable forest management are presented in **Chapter 8**. The situation specific to Idaho forests, forest landowners, and forest industry is addressed in **Chapter 9**.

Problem Analysis

To understand the issues associated with certification programs, it is necessary to first get a firm grasp on the fundamental problem certification is attempting to address. It is, simply stated, some assurance that "good" or "sustainable" forest management is being practiced. Certification is a fairly new enterprise, and its genesis is worth reviewing through a policy-oriented lens.

Before the 1992 "Earth Summit" several efforts to curb deforestation in tropical countries through a binding international forestry convention failed (Bernstein and Cashore 1999). Some observers have called for a global convention specifically to address the deforestation problem. Such a meeting will be held at United Nations headquarters in February 2000 to once again address this idea. However, the cost and time for negotiating an international accord, plus the slim likelihood that most governments would adopt a convention that would lead to significant improvement, have created what some view as an opportunity for the private sector and civil society to take the lead (Lash and Schmidheiny 1999). Environmental groups have realized that by directly influencing the private sector they could more quickly and perhaps more effectively achieve sustainable forestry than through a binding global agreement (Bernstein and Cashore 1999).

With the goal of leading consumers toward purchasing wood products harvested in an environmentally friendly manner, groups launched a proactive certification scheme. The most important of them was the formation of the Forest Stewardship Council (FSC) in 1993. In response to FSC's emphasis on environmental performance, forest industry companies and associations in Canada began to develop their own "system-based" approaches to sustainable forestry (Bernstein and Cashore 1999). In the U.S., the industry trade association chose a "performance-based" system. These industry-driven efforts in Canada and the U.S. continue to evolve.

Certification programs have grown out of recognition that new mechanisms are needed to address environmental concerns and that market and consumer behavior can be a powerful tool in influencing the use and management of resources (SAF 1995, Upton and Bass 1996). Certification is seen as an alternative to the perceived inefficiencies of international initiatives, government policies, and boycotts promoting sustainable forest management. In the past, policies concerning forestry or the environment were generally made by governments, and environmental organizations and manufacturers sought to influence those governments. Certification has added a new role for environmental organizations and

manufacturers, as they have begun to look for policy instruments that they can develop and implement themselves rather than rely on government programs (Elliot and Donovan 1996).

Certification is also a response to an increased recognition of the potential for market-based policy instruments rather than exclusive reliance on "command and control" governmental policy instruments. Forest products certification is being used as a "soft policy tool" by some environmental organizations and manufacturers to reach environmental goals through market-based incentives (Elliott and Donovan 1996). Some entities also see voluntary forest land management certification as a way to relieve pressure for additional and more stringent regulations on forest management (Ferguson 1998). There has been a lack of evidence to suggest that certification can effectively do this (SAF 1995), but nevertheless large companies in the U.S. and elsewhere have begun to seek third-party certification of their forest management actions without any linkage to forest products certification.

In the 1990s, the forest products certification movement encompassed all forest types, including boreal and temperate as well as tropical forests (Gale and Burda 1998). Certification was originally promoted by non-governmental conservation organizations, but more recently forest products manufacturers have become more interested (Elliott and Donovan 1996). The development and spread of certification continues for three reasons: [1] consumers' concerns about environmental issues, [2] lobbying from environmental and consumer non-governmental organizations, and [3] reaction from manufacturing industry representatives (Forstbauer and Parker 1996).

It should not be forgotten that certification has two main goals: improved forest management and market access. There was some concern that if the main benefits are found in market access, there might only be limited impact on forest management (Simula 1996). It now appears that in North America, concern about improved forest management is the main goal, with some secondary interest to market access depending on the type of forest and the landowner's management objectives.

Environmental Values

Diverse interests from environmental groups, forest industry companies, and the U.S. Forest Service agree that environmental values are prominent among the many issues involved in determining acceptable forest management (Kearney et al. 1999). Theses values include wildlife and habitat, water quality, soil, and riparian and wetland protection (Kearney et al. 1999). Although there may be agreement on the importance of these values, there is considerable debate about the means of attaining these ends on forest lands. These values are discussed herein under the general topics of biodiversity protection and ecosystem management.

Society in general may receive more benefits from sustainable forest management practices than will individual forest managers (Côté 1999). Maintenance of biological diversity, water quality, soil, and riparian and wetland protection are not necessarily tangible benefits for a landowner or forest manager. Nevertheless, these societal objectives need to be assessed, but that may be more appropriately done at scale which the benefits are recognized than at the forest management unit level (Côté 1999). This problem of scale is evident in the following subsections.

Achieving "Sustainability." At the core of the debate about different certification programs lies one issue: what is "good" forest management? Although most certification programs say sustainability is a central issue, as yet there has been no attempt to find consensus on what forest management strategies will lead to long-term sustainability along the economic, ecological and social dimensions (Fletcher and Rickenbach 1999).

The growth of interest in forest certification has spawned several competing approaches (Vogt et al. 1999). Some of them are analyzed in **Chapters 5** and **6**. These approaches make various claims of what it means to be certified, including claims of "sustainability." An unfortunate result is that consumers and those segments of the public interested in forest management become confused by the different approaches and, in some cases, labels. People can be misguided by vague and sometimes misleading claims about "sustainability." Four major problems in certifying a forest for sustainability can be summarized as follows:

- Definitions of sustainability,
- Insufficient tools, techniques, and indicators to assess sustainability,
- Issues of scale, and

- Excessive costs and data requirements associated with assessing "sustainability" (Vogt et al. 1999).

Most certification approaches do not actually evaluate sustainability, because of the great difficulty in our inability to define it, and because of the lack of measurable criteria and indicators to assess it. Instead they tend to certify that landowners comport with the goals of the certifying organization (Vogt et al. 1999).

Certification implies a particular quality of forest management to the public, so only managers who think they meet the standards are likely to pursue certification (Vogt et al. 1999). Most of the organizations that have pursued certification felt they had managed their lands well prior to pursuing certification, and used the process as a means to verify that their management practices were sustainable (Vogt et al. 1999).

Forest certification does not at the present time guarantee that a forest will be well managed, or managed in a sustainable manner (Vogt et al. 1999). Part of the problem is that certification protocols are based strongly on the goals of certifying organizations, which are based on values as well as scientific concepts. Vogt et al. (1999) asked, are we really certifying "good" forest management or are we certifying the values of the organizations supporting and promoting forest certification? Organizational goals seem to have become the driving variables for how management is assessed, and how C&I are selected and standards are set. Another approach would be to select a set of C&I appropriate to constraints that exist on the site being evaluated (Vogt et al. 1999). Some of the constraints are ecological, and some are managerial.

The goals of management will determine what is to be sustained on the land (Vogt et al. 1999). Management goals or objectives will vary depending on landowners and sites within a landownership, and will therefore have an impact on the guidelines used for certification purposes. Mostly, though, it is the goals and values imbedded in assessment protocols that become the major forces for determining how an assessment is conducted and what the requirements for certification are. For example, on the one hand a landowner may be attempting to maximize the extraction of timber for a given area in order to maximize financial returns. On the other, a certifying organization above all else may be attempting to conserve the highest number of species and ecological functions possible, while not only allowing a low level of timber extraction but also trying to provide economic benefits for local communities and the well-being of local people. The problem for the certifying organization lies in finding a balance among: ecological, economic, social, and silvicultural considerations. Certification is attempting to broker a neutral balance between what appear to be conflicting values. However, the certifying organizations themselves are "extremely value-based" (Vogt et al. 1999).

All of this suggests the need to evaluate tools and mechanisms, such as C&I frameworks, used for forest certification (Vogt et al. 1999). Such an exercise would incorporate existing scientific knowledge and have realistic goals about desired end points. For example, although the conservation of biodiversity and timber harvesting are generally compatible, for some forests with timber production as the predominant focus of management, the maintenance or enhancement of biodiversity could be an unattainable objective (Vogt et al. 1999).

Biodiversity: Wildlife and Habitat. Most certification protocols emphasize the protection of biodiversity (Vogt et al. 1999). However, managing for biodiversity can be a subjective process, because no clear procedure exists to determine what level of biodiversity is appropriate for a particular site. If a forest is being managed for a few commercial timber species that require the suppression of non-commercial species, should certification protocols override management considerations? These requirements raise the question of who should decide how many species is enough (Vogt et al. 1999).

A common element among certification protocols is the need to have surveys of wildlife habitat and use of forest lands (Vogt et al. 1999). Such surveys and wildlife plans can be an impediment for landowners seeking certification of their lands. Species of plants and animals are frequently posed as indicators of ecosystem health and sustainability, and some certification protocols use the number of species present as a central vehicle to identify indicators. However, the use of species as an indicator of the health of an ecosystem is a relatively new area of science and should be used only in those systems where consistent relationships between species and the system function have been demonstrated (Vogt et al. 1999).

Ecosystem Management: Water Quality, Soil, Riparian and Wetland Protection. Certification for sustainable forest management has some of the same problems that "ecosystem management" has faced, where the drive to define terms dominates the discussions (Vogt et al. 1997, 1999). When it is difficult to conceptualize the language and terms being used, on-the-ground implementation becomes even more difficult (Vogt et al. 1999).

Certification of forest management is related to ecosystem management in the sense that the large volume of data needed for any certification suggests that certifiers are attempting to structure their protocols based on many variables for developing a "holistic" ecosystem perspective (Vogt et al. 1999). Regarding this broadened management context, Vogt et al. (1999) have raised several questions:

- Is certification a way to force landowners to utilize the ecosystem approach in the management of their land base?
- Are there ways other than certification to assess the whole "health" of an ecosystem?
- What are the most appropriate silvicultural tools for a landowner to use?
- Does a holistic perspective mean that certification is relevant for public lands? (Vogt et al. 1999).

Certification protocols have been caught up in pushing ecosystem management philosophy, without having an understanding of how to select among the huge amounts of information associated with potential components of an ecosystem (Vogt et al. 1999). The demand for incorporating both social and natural sciences in the data reflects an understanding that human actions strongly control the functioning of ecosystems around the world. What is missing in certification protocols is the road map that shows people how to integrate data sets. There have been many suggestions to facilitate development of such implementation guidelines in order to ensure that certification programs are really assessing sustainability (Vogt et al. 1999).

Recognizing Human Values. For certification to be effective at assessing long-term maintenance of ecosystems, the human values that are an integral part of certification programs must be explicitly recognized. The consequences of reliance on value-driven standards must be made transparent so that landowners know what they are entering into (Vogt et al. 1999). For example, FSC principles are strongly environmentally based, and these values are an integral part of the assessment protocol used by FSC-approved certifying organizations. Landowners desiring to show they are capable of obtaining these environmental values from their lands may want to pursue the FSC approach to certification (Vogt et al. 1999).

Vogt et al. (1999) provide some guidance to evaluators for sorting out value-based from non-value-based indicators appropriate for site assessment. Attempting to summarize such detailed suggestions for guidance would not only be difficult, but also exceed what we set out to do in this analysis.

Market-related Factors

We examine the premise that the market will signal forest landowners and manufacturers of wood-based products that consumers are willing to pay a premium for sustainable forest management. We also look briefly at the issue of voluntary non-governmental certification as a barrier to international trade.

Markets for Certified Products. The original designers of forest certification envisioned a future of "green premiums" similar to that of organic foods, where consumers would reward forest owners by paying extra for products from forests managed in an environmentally friendly manner; but in reality, few consumers seem aware of forest certification, and even fewer seem ready to pay more for consumer products they perceive as being environmentally friendly (Hansen 1999).

The original concept has evolved. Recent experience shows there are benefits to forest managers and wood products manufacturers other than markets for certified products. Forest certification is still partly based on the idea that consumers make purchasing decisions about forest products based, in part, on the way in which the product was produced from the land and that manufacturers would respond to consumer tastes by using wood from well-managed forests. The logic was that if certification is to be effective, the desire of consumers to purchase certified forest products must be transmitted through the "chain of custody" from forest to marketplace. This provides an incentive for retailers to stock certified products, for the manufacturing sector to buy certified logs, and for the remanufacturing or secondary sector to buy certified lumber. This is supposed to provide lumber, logging companies, and

forest managers with an incentive to engage in certifiable forest practices. The original concept was that certification will influence forest practices and forest use only if there is an effective demand for certified wood products (Gale and Burda 1998). Labeling a product as "certified" has the potential to differentiate it from others and improve market share for a product (Upton and Bass 1996).

Mass markets for certified forest products have yet to emerge, but niche and regional markets in both the U.S. and Europe exist (Lyke 1996, Carter and Merry 1998, UN/ECE Timber Committee 1998). Gale and Burda (1998) summarize findings of market surveys that suggest modest demand for certified products in both the U.S. and Europe. For example, they report that one survey indicated approximately 10 percent of Americans (25 million) would be likely to seek out certified wood products (Gale and Burda 1998).

Demand for certified products, and therefore certification programs, is growing (Hansen 1999). Some companies, for example, retail chains and architects, see an advantage in buying products that have been evaluated by an outside party and declared as coming from well-managed forests. This simplifies purchase decisions and eliminates the risk of buying from a supplier that is not managing forests according to a set of acceptable standards (Hansen 1999).

There appears to be some difficulty in translating retail interest in certified products back along the "chain of custody" to forest management. The results of a 1993 World Forest Institute survey assessed stakeholder attitudes toward certification in Washington, Oregon, and British Columbia. Results indicated that stakeholders closest to consumers—that is, retailers, architects, and builders—had the most positive responses to certification and would have the least difficulties implementing it (Gale and Burda 1998). A survey by the Institute for Sustainable Forestry indicated that consumer demand for certified wood products was not making its way back through the "chain of custody" to forests as effectively as it could (Gale and Burda 1998).

The market is not yet strong enough to prompt small- to medium-sized manufacturing companies and value-added manufacturers to seek out and pay for third-party forest product certification (Gale and Burda 1998). A major obstacle to producer and value-added manufacturers is a lack of interest on the part of primary and secondary manufacturers—i.e., sawmills, remanufacturers, etc.—which makes verifying the chain of custody for certification difficult (Gale and Burda 1998). The Collins Pine Company has noted resistance on the part of its distributors to carry low-volume specialty products that require special chain-of-custody handling requirements (Punches and Hansen 1997).

One of the reasons why retailers may have been reluctant to promote certification is out of fear of harming their reputation by marketing products with bogus claims and because they did not have the expertise themselves to verify such claims. Bogus claims probably have been made in the past. For example, in 1991 the World Wildlife Fund, one of several citizen conservation groups at the forefront of promoting sustainable forest management, surveyed retail outlets in the United Kingdom and found more than 360 wood-based products claiming to come from sustainably managed forests. When merchants were asked for proof, all but four of the claims were withdrawn (Jenkins and Smith 1999).

Another explanation for retailer reluctance is a lack of consumer pressure and a lack of direct pressure from environmental organizations in the United States. Retail support for certified products may have developed in Europe as a direct result of major lobbying efforts by the environmental movement (Gale and Burda 1998).

There are signs that U.S. retailers' responses to certified forest products are changing. In August 1999, Home Depot announced it would give preference to certified wood in its purchasing decisions from its vendors. Although Home Depot sells less than 10 percent of the lumber in the world, it is the largest single retailer of lumber. The company hopes its decision will increase the world supply of certified forest products and that other home improvement retailers will follow its lead (Home Depot 1999).

The future demand for certified forest products is difficult to assess, but will depend on the pressure consumers, including governments, place on forest landowners, manufacturers, and retailers. Governments at various levels are becoming involved through legislation and preference clauses for certified products in contracts, but demand is difficult to assess because of lack of data (UN/ECE Timber Committee 1998).

Will consumers pay a premium for certified products? Quality and price have been found to be the most important attributes in customer's wood

product purchasing decisions (Forsyth et al. 1999). Consumers probably will not pay more for certified products where quality and performance is lower than that of alternative products; however, when certified products can equal or exceed the quality and performance of alternative products, their identification as a certified products may encourage increased sales (Upton and Bass 1996, SAF 1999). In actual experience, the Collins Pine Company, a producer of certified products, has noted that the perception among consumers is that wood produced in a sustainable manner is of lower quality than wood produced otherwise (Punches and Hansen 1997). The reality is that certified wood product quality may be better, worse, or no different than uncertified product quality. Certification of "good" forest management and the quality of a wood product are independent of one another.

A survey of customers of a home improvement center in British Columbia, Canada, found that 94% of respondents said they would choose a certified product if it cost the same as a non-certified product, 67% would pay 5% more for the certified product, 28% said they would pay 10% more, and 13% said the would pay in excess of 10% more for a certified product (Forsyth et al. 1999). Whether or not the actual purchases of consumers reflect these survey results was not tested. Anecdotal evidence from one company, Collins Pine, is instructive but may not be representative. Collins Pine Company's efforts to market certified products have revealed little, if any, willingness on the part of consumers to pay a price premium for certified products (Punches and Hansen 1997, Jenkins and Smith 1999).

Market tests of consumers' willingness to actually pay more for certified products have produced mixed results that depend largely on the products (SAF 1999). High value-added products or differentiated secondary products produced from certified lumber, such as furniture, doors, cabinets, flooring, and millwork, have reported a range of realized consumer premiums (SAF 1999).

Markets for commodity products, such as lumber, are less likely to be affected by wood product certification (Côté 1999). But it is not out of the question.

Environmental certification of building materials by a third party was an important consideration for almost half of the respondents to a 1997 survey of recent buyers of new single-family homes in Chicago and Minneapolis/St. Paul (Grönroos and Bowyer 1999). Although roughly the same percentage also indicated a belief that certified wood products are more environmentally sound than non-certified wood products, this did not translate into a similar percentage of those who indicated a willingness to pay more to obtain certified lumber or other wood product. In these two urban areas, 64% and 77% of the respondents indicated that they would *not* have been willing to pay a premium for certified wood products. This proportion of reluctance to pay more was much greater than that encountered in other studies (22% and 36%; Winterhalter and Cassens 1993, Ozanne and Vlosky 1997). Any number of factors could be responsible for the differences found (Grönroos and Bowyer 1999).

However, it is clear that a market exists for environmentally certified lumber and wood products in home building, as 36% and 24% of respondents in the two areas *would have been willing to pay more* for inclusion of certified lumber and wood products in their homes (Grönroos and Bowyer 1999). These respondents indicated that they would pay premiums averaging 1 to 2 percent of total home purchase price (an average of $2,500) in order to obtain certified materials. This appears to be a market opportunity deserving serious attention. Those consumers buying more expensive homes appear more likely than others to be interested in purchasing and paying premiums for these products (Grönroos and Bowyer 1999).

International Trade. Sustainability has become the centerpiece of global discussions of forests, and efforts to ensure forest sustainability have begun to influence management decisions and potentially pose new challenges in international trade. As both domestic and international environmental concerns escalated, a strong interest in implementing some type of sustainable forestry has emerged (Sedjo et al. 1998).

The willingness of forest industry companies to change land management procedures appears to be driven by concerns about the acceptability of their product today and in the future in foreign markets, especially some European markets that are expected to become increasingly "green" in the future, such as the United Kingdom and Germany. The Canadians, in particular, seem to be very sensitive to this issue (Sedjo et al. 1998), and it is also driving the industry in Sweden and Scandinavia (Fletcher and Rickenbach 1999).

The relationship between certification and foreign trade in forest products is not completely settled. So far there are no restrictions on trade between countries based on certification; however, it is not clear that this will remain the case (Chaitoo and Hart 1998). If certification becomes a tool to assess the degree of implementation of sustainable forest management by countries, then all countries, whether or not they are timber exporters, can be affected (Lowe 1995).

Certified product labels have never been directly challenged for consistency with international free trade agreements. However, the purpose of the label, which is provide environmental information about the product to the consumer and thereby allow the consumer to make an informed choice, is not in and of itself a barrier to trade (Forstbauer and Parker 1996). The U.S., or any other country, could not ban the import of non-labeled products without violating free trade agreements, however. Third-party certification labeling schemes are likely to survive challenges under free trade agreements if they are implemented by independent, non-governmental organizations (Forstbauer and Parker 1996).

Costs of Certification

Certification poses many financial costs, both direct and indirect, to those seeking certification (Box 7.1). These costs are of concern (Baharuddin 1995, Cabarle et al. 1995, Ozanne and Vlosky 1996, Hansen 1997, Carter and Merry 1998). It remains an open question whether schemes involving third-party certification of forest management practices justify their costs to managers and producers (Sedjo et al. 1998). Concerns about higher costs of adapting to these changes are valid, as marginal firms could be driven out of business. Furthermore, firms share substantial concerns about their ability to compete internationally (Sedjo et al. 1998).

Box 7.1. Financial Costs Related to Certification.

A. Indirect Costs
   1. Incremental costs of forest management to meet certification criteria
      a. Investment costs
      b. Silviculture
      c. Harvesting
      d. Other management costs
         - Conservation areas
   2. Indirect costs of certification
      a. Forest management
         - Resources inventories and surveys (timber, biodiversity, soil, waste, and so on)
         - Socioeconomic surveys
         - Forest management planning
         - Recording and reporting on activities carried out, production volumes, and so on
         - Internal inspections and other management costs
      b. Chain of custody
         - Marking logs and products
         - Recording and reporting
         - Additional costs of transportation, storing, processing, and distribution
         - Internal inspection and other management costs

B. Direct Costs
   1. Application
   2. Inspection (initial)
   3. Annual Auditing
   4. Fixed Fees (royalties and other)

Source: Simula 1996.

Most owners who consider certification however, believe they already come close to meeting certification requirements (Vogt et al. 1999). Indirect costs for compliance are therefore thought to be small. Landowners who have been certified viewed the requirements as a cost of doing business (Hayward and Vertinsky 1999). The relatively small increase in production costs for certified operations is a result of their being highly suitable for certification status; certification costs on other lands may be higher (Carter and Merry 1998). For example, a certification program requiring wide streamside areas for fish habitat, biodiversity, or other non-timber uses can have a severe economic impact on a 40-acre forest owner (Fletcher and Rickenbach 1999).

What does certification cost? Costs to the landowner for FSC certification vary depending on the certifying organization. Initial certification can run from about 2 to 8 cents per acre and another six-tenths to one cent per acre for an annual audit (Jenkins and Smith 1999). Costs of certification on state lands certified by FSC in Minnesota and Pennsylvania ranged from 9 to 12 cents per acre for initial assessment costs, plus an additional 1 to 3 cents per acre for annual licensing and auditing costs (Mater et al. 1999). Both of these state forestry certification pilot projects were underwritten by philanthropic organizations (Mater et al. 1999), and might not have been undertaken without it. Continued certification of these lands may depend on additional underwriting by outside organizations (Larson 1999).

For certification programs requiring a "chain of custody" audit, tracing timber products from origin to destination can be difficult and costly for large-scale operations where wood arrives from literally hundreds of different sources for manufacturing into composite materials such as plywood and engineered wood products (Gale and Burda 1998). Unless forest certification is going to be used as the basis of product "eco-labeling," the costly "chain of custody" protocol serves no purpose, as it contributes nothing to improving the condition of the forest (Sedjo et al. 1998).

Economies of Scale. The process of paying a certifier can be expensive, and this may be particularly problematic for the smaller operations and non-industrial private forest owners (Lober and Eisen 1995, Hayward and Vertinsky 1999). In general, other things being equal, the types of sustainability criteria that are emerging appear to make it easier and less costly (per unit of output) for large ownerships to adapt than for small ownerships (Sedjo et al. 1998).

Experience has shown that economies of scale, as measured by certification cost per acre, are realized when larger operations engage in the process. Even when the certification team is reduced in size and less time is spent in the field, the cost per acre of evaluating small non-industrial woodland parcels tends to be relatively higher. These considerations can be accommodated by "group certification" and spreading the costs among different landowners (Hrubes 1999).

It is less costly for government-owned forests to be certified than for privately owned forests (Sedjo et al. 1998). For example, it would almost certainly be easier for Canada, with the vast majority of its lands in public ownership, to implement uniform sustainability standards and "chain of custody" tracking than for the U.S., with its millions of forest owners.

The "chain of custody" issue is likely to be difficult and costly where small NIPF ownerships prevail and if many landowners in the area choose not to undertake the new practices. This situation could occur in the southeastern United States (Sedjo et al. 1998).

Economic Analysis. Experience with certification of forest products is still limited and the procedures are evolving. The situation does not yet lend itself to a rigorous economic analysis of benefits and costs (Simula 1996, Carter and Merry 1998).

This lack of analysis means certification aimed at environmentally friendly production methods and "eco-labeling" has been initiated on intuitive grounds, as a leap of faith (Sedjo and Swallow 1999). The idea that voluntary labels might allow consumers to reveal their willingness to pay for such products is an appealing argument and is supported by intuitive persuasion from firms who believe advantages exist. Microeconomic analysis of wood product markets however, identifies conditions that may exist when firms lose profits, even under a voluntary system, and where existing production constraints may lead to a single price, regardless of labeling. Such results do not imply that "eco-labeling" be abandoned, but instead focused on finding a pragmatic balance between the costs a labeling system imposes on producers and the benefits consumers feel they obtain.

Market feedback may clearly affect the degree to which product certification may successfully generate incentives for the conservation objectives of environmental organizations (Sedjo and Swallow 1999).

Governance

Two key issues in this category are government regulations and the potential certification of public forest lands, especially U.S. federal forests.

Regulation. Government regulations have a large impact on forest management (Côté 1999). Government agencies are supposed to monitor the work done by private entities according to the requirements of the regulations. A third-party certification mechanism that evaluates the government's job of monitoring could provide some interesting results, and could possibly increase the positive impact of forest certification (Côté 1999). Binkley (1999) suggested forest certification is perhaps the end point of forest practice regulation.

The essence of certification is credibility, and government institutions often suffer from credibility as well as institutional capacity problems (Viana et al. 1996). If government organizations had the necessary credibility, certification may never have gotten started as an independent movement. Excessive government involvement through mandatory regulations is a threat to certification. There is a very thin line between desirable governmental involvement and support, and inappropriate governmental control of certification (Viana et al. 1996).

In some parts of the U.S., state and local laws have very specific requirements how forest should be managed. This includes states such as Idaho with forest practices acts. These regulations may be providing the public with some confidence that natural resources are being well managed (Vogt et al. 1999). For example, survey research has shown that most landowners are complying with state forest practices act regulations and do not feel they are overburdened with them (Ellefson and Cheng 1994). Periodic audits demonstrate that when properly installed, BMPs (best management practices) are effective at protecting water quality from forestry activities (Ice et al. 1997). If landowners have satisfied these laws, how much would this contribute to satisfying the reasons certification is being pursued? (Vogt et al. 1999).

Certification requires a written management plan. Although many small ownerships do not have a management plan, many of them do meet or exceed the BMPs and are in compliance with all applicable water quality laws, regulations, and requirements of the Clean Water Act. If BMPs are installed and laws are being complied with, should this be sufficient for certification for small landowners? (Vogt et al. 1999).

The linkage between obedience to law and sustainability could be better defined in most certification protocols. Most protocols include a one-sentence statement requiring that all appropriate laws need to be followed, but give no further explanation. No details as to what the laws require landowners to do on their lands is given, nor is it stated how satisfying the laws would move a landowner toward a sustainable system. A comparison between types of sustainable systems produced by following existing laws and those resulting from certification could be quite informative (Vogt et al. 1999).

Public Lands. Whether third-party certification is possible or appropriate for federal lands in the U.S. is at issue, particularly for national forests managed by the U.S. Forest Service. The FSC has a moratorium on certifying federal forests because of "strong reservations by the U.S. Forest Service and some environmental groups" (Kiekens 1999). A Forest Stewardship Council (FSC 1998*a*) document available on the World Wide Web discusses some of the issues involved, and is summarized here. The U.S. Working Group of the FSC believes that the conditions needed for certification on federal lands in the U.S. do not exist at this time. To change that, three critical obstacles need to be overcome (FSC 1998*a*).

First and foremost, there is a lack of public consensus concerning whether, where, and how much timber harvesting should occur on federal lands in the United States. The national forests and other federal lands provide a wide range of services and benefits including wilderness, watershed protection, old growth forests, protection of endangered species, recreational opportunities, and timber production. There is a lack of consensus about the degree to which federal land management, particularly on the national forests, should prioritize and emphasize these services and benefits.

Federal forest lands are a *Forest of Discord*, as a Society of American Foresters task force recently titled its report on Forest Service and BLM lands

(Floyd et al. 1999). Resolution of land-use questions is a forest policy concern reflected in statutory law, agency regulations, and other processes (FSC 1998*a*). As this report is being written, the Forest Service has proposed new National Forest Management Act regulations for planning the uses of national forest lands, based on a report by a Committee of Scientists (see Johnson et al. 1999). If adopted, the proposed regulations would change the priority of national forest management to favor ecological considerations over social and economic viability. In October 1999, President Clinton directed the Forest Service to write regulations that would "protect" 40-50 million acres (20-25% of the National Forest System) of inventoried roadless areas. This action has invigorated the debate over these lands. Idaho has 8 or 9 million acres of such lands. If the president's directive becomes policy, these lands would be in a "permanent roadless" status precluding future development for timber harvesting, mechanized recreation, or other purposes requiring roads (O'Laughlin and Freemuth 2000). Public policies affecting the national forests are a focal point in Part II of this report.

The second obstacle is that certification of federal forest land will require national level indicators that can address the special legal, technical, procedural and governance issues for federal lands. These will be developed by the FSC/U.S. Working Group in a process with regional and national stakeholders. The supplemental federal indicators would apply uniformly to all federally-owned forest land in all eleven FSC regions within the United States. These supplemental indicators would address such issues as:

- The technical and procedural requirements that pertain to U.S. federal land management. These include the National Environmental Policy Act, the Administrative Procedures Act, and the National Forest Management Act or the Federal Lands Policy and Management Act, depending on the agency responsible for the land being assessed.
- Variability in federal land management owing to changes in legislative and administrative priorities and direction.
- The existence of ongoing disputes, including administrative and judicial appeals of Forest Service actions, that may preclude certification.
- The interest all U.S. citizens have in the management of national lands, and avoidance of any inappropriate preference for local citizens.
- The crucial role of U.S. federal lands in protecting significant portions, rather than representative samples, of existing ecosystems (FSC 1998*a*).

The third obstacle is that the U.S. Forest Service needs to demonstrate a willingness to participate. The agency's current policy directs its 9 regional foresters to "refrain from making any commitments to, or pursuing any agreements with, third party certifying organizations on national forest lands" (McDougle 1997). In June 1998, the Deputy Chief for the National Forest System reiterated this policy and added that it will remain Forest Service policy for the foreseeable future (FSC 1998*a*).

The U.S. Forest Service has initiated an internal review to study the feasibility of certification, and a conclusion about this reached by Jenkins and Smith (1999) has important ramifications in the western public lands states:

> "If certification were widely implemented on public lands, and if industry and environmental interests reached a credible compromise over forest use, some analysts predict that the industry could regain access to public forests that have been off-limits to logging in recent years" (Jenkins and Smith 1999).

Those are two rather large "if's" but the overall idea should have some appeal to forest industry interests and segments of the conservation community that are interested in sustainable forest management and not opposed to timber harvesting on the public lands.

Technical Considerations

Several technical issues about certification programs need some consideration by landowners and organizations considering certification. Among these are potentially confusing terminology between different programs, the standards used in certification, accommodating non-industrial private forest (NIPF) owners, and the credibility of certifiers.

Consistent Terminology. As certification programs continue to evolve, it may become necessary to develop a consistent set of terminologies to reduce confusion on the part of landowners and the

manufacturers and consumers of wood-based products. We recognize that it is likely a good thing that there are different programs because forest landowners have different needs tied to their individual management objectives. However, it would make choosing among different programs easier if terminology were consistent.

Standards are the key item that more than anything else reflect the goals and values of the certifying organizations. Standards and guidelines seem to be consistent terms across the different programs, although the standards and guidelines between programs may be quite different.

Principles, criteria and indicators are the basic frameworks from which standards are developed (see **Chapter 2**). It is confusing why the FSC program would identify categories of criteria as principles, and call indicators criteria, and then use the ten Principles and Criteria (P&C) instead of criteria and indicators (C&I) (see **Appendix E**). It is equally confusing that the SFI program has a set of five principles for sustainable forestry (see Box 5.1), then identifies categories of implementation guidelines as principles, and also identifies criteria as objectives and indicators as performance measures (see **Appendix D**). To reduce confusion and facilitate comparisons, we would hope these and other programs would take notice of the terminology used by international forestry research organizations (C&I) and redesign their lists of principles, criteria and indicators accordingly (see van Bueren and Blom 1997).

From Frameworks for C&I to Certification Standards. This issue was mentioned in **Chapter 4**, but as it is the technical centerpiece of certification programs, further consideration of standards is warranted. The present emphasis of existing certification protocols is on very detailed descriptions and discussions of C&I (Vogt et al. 1999). This fails to address the question whether appropriate site-specific *standards* have been selected. The key variables in certification are what indicators have been selected, and what *standards* the measured indicator values will be compared to (Vogt et al. 1999). Certification attempts to assure that wood-based products come from forests that meet *standards* as verified by the certifying organization. The *standards* are based on criteria and indicators (C&I). Some C&I have a basis in science, and some represent the values and goals of the certifying organization.

The key step in certification is determining what standards will be used to assess whether forest management is sustainable (Sedjo et al. 1998). Distinguishing "good" forestry practices from those that are unsustainable depends on the place and time (Vogt et al. 1999). Certification programs currently either endorse or condemn some forest management activities based on broad descriptions that disregard the many combinations of activities that could be used in a management regime. For example, silvicultural practices such as clearcutting may or may not be indicators of "bad" forestry. Indicators and associated standards should be chosen to identify specific activities that must be avoided under particular circumstances (Vogt et al. 1999).

Certifying Non-industrial Private Forests (NIPFs). As certification programs mature, some of them are modifying their system protocols to better accommodate NIPF owners. For example, FSC-certifiers (SmartWood and SCS) offer landowners the option of sharing participation costs with others through a certified consulting forester (Fletcher and Rickenbach 1999). The FSC calls this approach "group certification" (Hrubes 1999). Consulting foresters who have been certified under "group certification" programs such as the FSC-certifiers offer, have performed a networking function and developed previously unexplored markets for their clients (Hansen 1999).

Which certification program is appropriate for an NIPF owner is a difficult question to address. First the landowner must determine if certification is a good idea, weighing the costs and benefits (see discussion in **Chapter 6**).

If certification has some appeal, then the goals and values imbedded in different programs should be evaluated for their compatibility with the landowner's objectives and values (see Table 6.1 and related discussion).

Fletcher and Rickenbach (1999) advise landowners to watch what local forest industry companies are doing about certification, because their actions could affect future log sales. Similarly, Hansen (1999) advises landowners to watch what the big companies do because their decisions will affect how certification programs develop.

Credibility of Certifiers. One of the issues facing certification, particularly third-party certification, is the proliferation of organizations that claim to be certifiers and schemes that claim to be certification

(Baharuddin 1995, Lyke 1996, Gale and Burda 1998). One of the risks of having so many different certifiers is that their range of standards may be incompatible (Forstbauer and Parker 1996). Another is that proliferation of certification labels in the marketplace could generate consumer confusion and undermine the credibility of the entire approach. One of the reasons the Forest Stewardship Council was established as a "certifier of certifiers" was to avoid this potential problem (Forstbauer and Parker 1996, Gale and Burda 1998).

For certification to be credible, according to Vogt et al. (1999) the following points need attention:

- Avoid the traps of the debate about what "sustainability" means,
- Develop a working framework that has justifiable standards that are not exclusively value-laden,
- Show clearly for each standard what condition is being aimed for as part of certification,
- Use feedback loops between the ecological and socio-economic components of the system framework,
- Identify how both the overarching and local-level mechanisms for promoting certification are precluding different types of forestland owners from pursuing the certification initiative, and
- Seriously evaluate the procedures and standards used to evaluate forest management operations (Vogt et al. 1999).

A related issue is whether any certification that is not third-party based can be credible. Third-party certification is probably the most credible assurance to the general public that the forests from which products are derived are being managed according to the principles of sustainability (Vianna et al. 1996, Spinazze and Kant 1999). Some argue that self-certification (first-party certification) cannot be credible in the marketplace, and, more fundamentally, that it will fail to bring about improvement in forest management practices. Others suggest that producers themselves are the best judge of sustainable management because they know the intricacies of their operations far better than any outsider (Lyke 1996). The recent acceptance by large forest industry companies of third-party certification under the SFI umbrella is also in recognition that third-party is a more credible approach.

Chapter 8. General Conclusions

Sustainable forest management is a global concern and a core value of a modern environmental perspective. Certification of "good" forest management and stewardship seems to offers substantial benefits for not only producers of wood-based products, but also consumers, which includes everyone. Certification offers the promise that the public may have some confidence that harvesting and growing timber for wood-based products neither diminishes the long-term productive capability of forest lands, nor irreparably harms environmental values. The pitfalls lie in the design of certification protocols and programs, which to some extent are dependent on criteria and indicators (C&I).

Criteria and Indicators (C&I)

The quest for sustainable forest management is one of determining what "good" forest management or stewardship is (Vogt et al. 1999). This requires turning information into a tool to make judgments that may improve forest management practices.

The criteria and indicators (C&I) framework is a tool that serves two purposes. First, it can provide information relevant to assessing trends. There is no doubt about its applicability at the national level. Second, C&I can underpin certification programs and standards for defining and evaluating sustainable forest management at the local scale or forest management unit level. The C&I framework has an as yet unfulfilled potential in Idaho, the U.S., and the world to provide the public some confidence that harvesting and growing timber for wood-based products can be done sustainably.

The C&I framework approach toward "sustainability" relies on a large number of indicators. Such comprehensive data-based frameworks leave open the possibility of questionable predictions and assessments of large-scale ecological and social processes (Vogt et al. 1999). The fewer data needed, the more likely it is necessary information will be available. Landowners and forest managers will benefit by not having to pay excessive costs for unreasonable data requirements (Vogt et al. 1999). However, by collecting fewer data, it is possible that a key piece of information for determining "sustainability" will be left unmeasured. That is why the selection of appropriate C&I is a crucially important step on the path toward sustainable forest management.

Certification Programs

Certification, particularly third-party certification of forest management, represents a new way of promoting responsible stewardship of forests. Rather than relying on government regulation, certification relies on private organizations and, if forest products are certified, market operations. At this time we cannot say whether a market-oriented approach will prove more or less effective than the regulatory approach at promoting responsible stewardship (Gale and Burda 1998). Like criteria and indicator (C&I) frameworks, certification is developing rapidly (see, for example, World Wide Web sites maintained by Sampson 1999, Shook 1999).

Certification can function either as a guarantee to the final consumer that forest products were produced sustainably by linking a forest-based product with the specific site and management system it came from (Vogt et al. 1999), or as assurance to the public that certified forests are well managed, or as both. The issue is not whether demand for sustainably-produced forest products will develop but rather how fast and in which markets sustainable forestry will be an important variable (Jenkins and Smith 1999).

Some companies report that they can obtain price premiums with certified wood, but not on a consistent basis. Some companies embrace certification less for a price premium and more as a marketing technique to differentiate themselves from other companies, which may result in the increased use of certification (Bernstein and Cashore 1999).

Demand in the U.S. must grow before the market begins to require meaningful volumes of certified logs. It is therefore unlikely that non-industrial private forest (NIPF) owners will face undesirable consequences if they choose not to become certified at this time (Hansen 1999). Forest industry companies however, cannot belong to the industry trade association unless their lands are certified. There is no pressure at the moment for public land managers to become certified. All of this could change, and we do not know what the future holds. But as long as sustainability is a topic of discussion, there will be pressure for all forest landowners to demonstrate that forest management does not cause irreparable harm to the environment.

Certification faces an uncertain future (Bernstein and Cashore 1999). Like any policy instrument, certification has its limitations. A number

of conditions must be recognized for effective programs. The following operational characteristics are important for effective forest certification systems:

- Credible to consumers and non-governmental organizations,
- Objective and measurable criteria,
- Reliable and independent assessment,
- Independent from parties with vested interests,
- Cost-effective,
- Transparent to allow external judgement,
- Institutionally and politically adapted to local conditions,
- Goals oriented and effective in reaching objectives,
- Accepted by all involved partied, and
- Use of national level forestry criteria compatible with generally accepted international principles (Elliott 1996).

Certification may have a promising future, especially if mechanisms are harmonized and mutual recognition of different programs is undertaken to reduce confusion (Elliott 1996).

Overall, the proliferation of different C&I frameworks and certification schemes and the involvement of industry associations, environmental groups, and companies with a timberland base provide ample evidence that many people with different interests recognize the need to improve forest management, with or without market-based certification (Jenkins and Smith 1999). The more companies participate in sustainability initiatives, the more nonparticipants will feel the pressure to improve their forest management practices, and the more supplies of sustainably produced products will increase (Jenkins and Smith 1999).

As the concept of sustainable forest management continues to evolve, so, too, will the tools developed to implement it. C&I and certification are relatively new, and much remains to be learned about their usefulness. To be sustainable, forest management must be ecologically sound, economically viable, and socially desirable (Aplet et al. 1993). Certifying that such goals have been attained is a complex technical and political problem. Some observers question whether it is possible for certifiers to determine whether sustainable forest management is being practiced. But, as Vogt et al. (1999) concluded in their book *Forest Certification*, getting rid of certification because it has problems is not the goal, rather it is to make certification more effective and representative of the values people want from forest lands.

Certifying organizations have the flexibility to design assessment techniques. Existing approaches that are voluntary and use independent third-party assessments of forest management that promote forest productivity, forest ecosystems, and socioeconomic stability offer the appropriate models for forest certification (Heissenbuttel et al. 1995). Furthermore, the methods and techniques for making assessments must be interdisciplinary, reasonable, cost-effective, and justifiable (Vogt et al. 1999).

Although judgments of "good" forest management are somewhat subjective, there is more agreement about good forestry practice than there is about "sustainability" (Vogt et al. 1999). Tools for assessing economic viability exist, and should be calibrated according to the owners' objectives and expectations as well as market trends and timber and non-timber product yields. Proven techniques also exist for assessing non-timber forest values, including water quality and wildlife habitat. By using existing techniques, it is possible to certify a forest now, rather than waiting indefinitely to develop the theories and tools necessary for evaluating "sustainability."

Forest Products Industry

The world's forests seem to be balanced precariously between the possibility of a sustainable future and the realities of degradation and destruction. Better forest management is needed now, and it is too important to leave it up to international negotiations, environmental regulations, or resolution of arguments about what constitutes sustainable forest management (Jenkins and Smith 1999).

The forest products industry will be a determining factor in the fate of forests (Jenkins and Smith 1999). Worldwide the industry accounts for some 2 percent of global gross national product and 3 percent of world trade. As more companies become certified, there could be a snowball effect, with more companies submitting to third-party scrutiny of forest management. Supplies of certified wood products could swell. Once large volumes of certified products are flowing into the market, sustainability may well become a characteristic of products that customers simply expect (Jenkins and Smith 1999).

North American manufacturers seem to be driven by public expectation, but perhaps for a

different reason. The public simply insists that forests be managed sustainably. Certification of forest land management and wood products thus continues to grow and spread more widely and can be expected to continue.

Sustainable forest management discussions are a clear signal of a global transformation of the relationships between the world's forests, the people and industries who grow trees and use them to make products, the markets for these products, and the means the public uses to affect these relationships (Jenkins and Smith 1999). This transformation is in an early stage, and each of the organizations involved faces a different set of circumstances. By aggregating observations gleaned from 21 case studies, Jenkins and Smith (1999) offer some useful generalizations about the trajectory of the evolution of sustainable forest management that could benefit wood products manufacturers and consumers:

1. The industry is rapidly evolving toward more sustainable production.
2. The market for sustainable products, though currently tiny, is shifting at an accelerating rate from narrow niches to significant market opportunities.
3. Certification is rapidly becoming synonymous with sustainable forest management and will increasingly set a higher standard for forest management practices.
4. Certification can open up business opportunities.
5. Sustainable forestry in tandem with good business practices can contribute to competitiveness through lower costs and the ability to help companies ensure long-term, reliable, high-quality sources of wood.
6. The transition of the forest industry toward sustainability will require a cultural transformation (Jenkins and Smith 1999).

Toward a Sustainable Future

Costs of certification and compliance with certification standards will always be an issue, and there will be landowners reluctant to undertake certification regardless of the benefits to them and to society. If sustainable forest management becomes a public policy goal, then a regulatory backup program to complement voluntary certification may have some merit. Together the voluntary and regulatory approaches could be useful policy instruments for assuring that the public interest in sustainable forest management is being met.

The environmental values associated with sustainable patterns of resource use seem to be more compelling than market incentives in driving certification. Without public acceptance that forest management activities are not environmentally destructive, timberland owners and forest products manufacturers can expect not only public relations problems, but also increased emphasis on government regulation of forestry practice.

The examples of certification programs described in **Chapter 5** are being implemented by U.S. forest products manufacturers. Companies or landowners who want their stewardship standards reflected in labeled forest products may choose certification by organizations that offer such "eco-labels." The primary option in the U.S. are third-party programs affiliated with the Forest Stewardship Council (FSC). At least one large U.S. manufacturer, International Paper Co., is seeking third-party forest management systems-based certification under the International Organization of Standards (ISO) program, as are many Canadian firms. Several large U.S. manufacturers are seeking third-party forest management certification under the Sustainable Forestry Initiative (SFI) of their trade association, the American Forest & Paper Association (AF&PA). Several of the large companies in the industry have begun the process of third-party certification of forest management. Among them are Plum Creek Timber, Mead Corporation, Consolidated Papers, Champion International (Kiekens 1999), and Boise Cascade. Large, multi-national accounting firms are being used to do the certification. As these firms move from auditing business records to auditing environmental standards and performance, certification benefits from their credibility and professionalism, but it will add costs to manufacturers and landowners (Fletcher and Rickenbach 1999). The competitive dynamics of the industry might change if other companies undertake forest certification (see Jenkins and Smith 1999).

Although some observers feel that there may be too many certification programs and over time one will dominate, for now it seems a diversity of certification programs is desirable, as each has something different to offer landowners and forest products manufacturers.

An overarching question in Idaho is whether forest management on federal lands can be certified as sustainable, as three-fourths of the timberlands in the state are in the national forests. If these lands are to continue to provide timber, the public will expect management for timber production to be done sustainably. What that means, simply, is "good" forest management or stewardship. The array of policies that govern forest management on federal lands are currently in a state of change. C&I frameworks can define how "good" forest management can be measured, and certification programs can build on that by developing standards for making those judgments. If a third-party certification program is a good thing for private forests, whether industrial or non-industrial, and if it is a good thing for state and county public forests, then third-party certification could be a good thing for federal lands where timber production is allowed. Policy barriers for certification of federal lands are public policy and public trust. Restoring public trust through third-party certification may be a good reason for changing federal land management policy. We will analyze this situation in the sustainability context in Part II of this report, at a later date. For now, it seems clear to us that certification of federal land management is not possible until policy changes have been made.

Both the C&I framework and certification have roles to play in defining and implementing sustainable forest management. These relatively new ideas have the potential in Idaho, the U.S., and the world to provide the public some confidence that products derived from timber are not irreparably damaging the long-term productive capability of forest lands and other forest values. The problem is that there is little agreement among different interests as to what values various forest management units should provide. Forest values that interest groups agree on are wildlife habitat, water quality, soil, and riparian and wetland protection (Kearney et al. 1999). There are, however, major disagreements on the means to attain these ends. Perhaps the benefits of certification are a good reason to undertake changes in public policy.

Because there are some significant problems to overcome we do not want to paint too rosy a picture of the future of certification. U.S. landownership sectors currently not being served by existing certification programs in a meaningful way are the non-industrial private forest sector and the federal public lands sector. Several certification programs are adapting to the needs of the non-industrial private forest owners. Although state forest lands have been certified, in some cases the costs have been absorbed by philanthropic organizations, not by taxpayers.

More data in a C&I framework is only a partial reply to sustainability questions. Before assessments of sustainable forest management can be made effectively and efficiently, the objectives for managing forest lands for timber and non-timber products and ecological values need careful consideration. Then, perhaps, some attention to redesign of existing certification protocols is warranted. To determine what values forests should sustain, interest groups and landowner groups need to work together on what is in everyone's best interests today and tomorrow.

Chapter 9. Sustainable Forest Management in Idaho

Are we making progress toward the goal of sustainable forest management in Idaho? A definitive reply depends on some agreement as to what this means, an information base, and protocols for making assessments. None of these are well developed at this time. There is a role for a criteria and indicators (C&I) framework to assemble information at the state level, and possibly a role for voluntary non-governmental assessments through certification programs. Standards for relevant indicators are a necessary component of certification programs.

Idaho's forest landowners and forest managers, whether public or private, and Idaho's forest product manufacturers are not at the forefront of sustainable forest management efforts in the United States. However, the Idaho Department of Lands is cooperating with the National Association of State Foresters in assessing the availability of data for various criteria and indicators (C&I). Information about these C&I can be used to assess trends in resource use and resource conditions. In this way the C&I framework contributes information as a basis for making judgments about forest management at the local level.

Although in some respects Idaho's forestry community is not a leader in certification activity, in at least one respect Idaho is at the forefront of efforts by the international scientific community to field test criteria and indicators (C&I) for sustainable forest management (see **Chapter 4**). Results of this experiment, conducted by an international forestry research organization (CIFOR) in southwestern Idaho in 1998 identified several problems with adapting an international C&I framework at the forest management unit level. These shortcomings may be may be inherent problems with the C&I framework or artifacts of CIFOR's test techniques, or both. Other tests, using different methods, may show different results. For example, the Oregon Department of Forestry recently completed a statewide forest assessment using the Montreal Process C&I. Although gaps in available data were reported, the framework appears to be useful for organizing information about the state's forest resources (ODF 1999). Perhaps a statewide assessment of Idaho's forests using the Montreal Process C&I would be similarly useful, but as only 18 of 67 indicators have adequate data available (see **Appendix A**), results would be inconclusive for non-timber resources.

The potential impact that the movement toward sustainable forest management could have on Idaho's forest resources and the markets for Idaho's forest products are unknown. The preponderance of National Forest System lands in Idaho makes the issue of federal land management crucial to answering questions about sustainability of Idaho's forests. For example, if certification were implemented on federal lands, some analysts have predicted that manufacturers could regain access to national forests that have been off-limits to timber harvesting (Jenkins and Smith 1999). The relationship of existing federal land management policies to timber availability and water quality, wildlife habitat, scenic values, and other things people care about is very complex. We will address these values in Part II of this analysis to be published separately.

Certification of Idaho Forest Lands

The effect of certification on Idaho landowners so far has been small. First we summarize information about the land ownership pattern in the state, then discuss what we know about certification efforts.

Forest Land Ownership. Although we do not have direct evidence of the effects of certification on Idaho's forest owners and industries, based on what we know about forest land ownership and the structure of the forest products industry in Idaho, to a limited extent we can speculate as to how they might be affected.

Of the 53.5 million acres in Idaho, 22.3 million acres or 41.8%, are forest land (Brown and Chojnacky 1996). Almost all of the forest land is classified as timberland (21.4 million acres, or 96%), which means that timber species make up at least 10% of its stocking (Brown and Chojnacky 1996, but see the **Glossary**). Timberlands are where commercial timber products are most likely to originate from. Assuming that the owners of timberlands pursue certification, timberlands will be important in contributing to the timber-related objectives of the certification program, such as economic viability. However, these lands also likely will be important for achieving the non-timber objectives of certification, such as protecting imperiled species and maintaining ecological processes and functions. Forest lands that are

not timberlands also are likely to contribute towards the non-timber objectives of certification.

Almost 50,000 non-industrial private (NIPF) forest landowners own more than two million acres of forest land in Idaho (Table 9.1). This is the second largest ownership category. About three-fourths of these landowners own less than 10 acres (Birch 1997). Many Idaho NIPF landowners identify reasons other than timber production as objectives (Force and Lee 1991). Some NIPF owners may have no interest in certification. Depending on the program, certification of individual forest tracts may prove to be too costly for many small non-industrial private forest owners. However, programs are changing to meet NIPF needs. For example, in the future Idaho NIPFs may be able to choose a "group certification" program in which a professional land manager is the entity that is certified (see, for example, Hrubes 1999).

Table 9.1. Idaho Forest Land Ownership, 1991.

Ownership Class	Acres	%
Federal	17,807, 875	79.7
State	1,084,324	4.9
County and Municipal	6,623	<0.1
Indian Trust	110,683	0.5
Forest Industry	1,239,478	5.5
Non-Industrial Private	2,085,922	9.3
TOTAL	22,334,905	100.0

Source: Brown and Chojnacky 1996.

The ownership of forest land in Idaho makes the question of certification of federal lands vital to predicting the effects of certification on Idaho's forests as a whole. Almost 80% of the forest land in Idaho is owned by the federal government (Table 9.1). Almost all of the federal forest land is in the National Forest System managed by the U.S. Forest Service (Brown and Chojnacky 1996).

Of the 21.4 million acres of timberland in Idaho, 3.8 million acres (21.7% of the total) are "reserved," which means they have been withdrawn from tree utilization through statute or administrative designation (Brown and Chojnacky 1996). Almost all of the reserved timberlands are part of the National Forest System and have been congressionally designated as part of the National Wilderness Preservation System (Brown and Chojnacky 1996). Again, these "reserved" timberlands are likely to contribute to the non-timber objectives of any certification program that might be undertaken on federal lands. There is no "reserved" designation for forest industry or non-industrial private timberlands. Company and individual management objectives determine the management activities that occur on any particular tract of private forest land.

Certification Programs in Idaho. At this time we are unaware of any agencies, tribes, companies, public or private timberland owners in the state of Idaho that have completed a third-party certification process. However, there is certification activity taking place in Idaho.

Sustainable Forestry Initiative. Some Idaho forest products manufacturers are members of the American Forest & Paper Association (AF&PA), which as a condition of membership requires companies to have second-party certification of forest management according to AF&PA's Sustainable Forestry Initiative (SFI) standards (see **Appendix D**). To our knowledge, third-party certification of forest lands, managers, and products has not been implemented in Idaho. According to their sites on the World Wide Web, Boise Cascade and Plum Creek Timber are currently in the process of third-party certification of all their lands under the SFI program. PricewaterhouseCoopers LLP will conduct the on-site audits of forest management practices for both of these companies. We do not know when the companies' Idaho lands are scheduled for auditing. The SFI program is also being modified to better meet the needs of non-industrial private forest owners (Fletcher and Rickenbach 1999).

Forest Stewardship Council. Idaho is in the Forest Stewardship Council's Rocky Mountain region. In 1998, a working group of 24 individuals was established to draft regional standards for certification by FSC-certifiers. The group met on four occasions in the Missoula, Montana area for a total of 9 days. The standards have been drafted and circulated for public comment. In July 1999, the draft standards were field tested on the 450,000 acres of forest of the Confederated Salish and Kootenai Tribes on their Flathead Reservation in Montana (FSC 1999). A report of the test will not be distributed publicly. Regional standards should be finalized

by mid-2000 (Steve Thompson, personal communication).

There is some speculation that Idaho forest landowners and forest product manufacturers have not actively pursued third-party certification from FSC-approved certifiers because standards for the Rocky Mountain region have yet to be endorsed by the FSC (Adams, review comments). However, FSC-approved certification is taking place in other regions without FSC-endorsed regional standards.

Forest Products Markets

Idaho's forest managers and product producers will need to be responsive to consumers' changing values about forests, not only in Idaho, but in markets around the world where Idaho products are sold. If current trends continue, certification may become necessary to retain or expand markets for Idaho's forest products. Current evidence suggests that there is limited consumer demand for certified forest products, but that may change as consumers become more exposed to them in the marketplace.

How might an increase in the demand for certified products affect Idaho's forest industry? A look at the structure of Idaho's forest products industry provides some insights.

In 1995, Idaho had 149 primary wood products plants including 62 lumber mills, 32 house log mills, 16 post and pole mills, 15 cedar products mills, and 6 plywood, veneer, and OSB mills. In total, they had sales of $1.55 billion (Keegan et al. 1997). Softwood lumber is the major product manufactured by Idaho's forest products industry. In 1995, the output was 1.67 billion board feet, accounting for 5.2% of U.S. softwood lumber production and 3.5% of U.S. softwood lumber consumption (Keegan et al. 1997). Strong demand for certified structural lumber has yet to emerge in the U.S., but when it does, Idaho's lumber producers have the potential to contribute significantly to the market.

In 1995, 277 secondary wood products manufacturers in Idaho—makers of products such as cabinets, moulding, doors, and furniture—had combined sales of over $861 million (Keegan et al. 1997). Demand for certified secondary wood products currently is stronger than that for primary products, and certified secondary products are more likely to demand a price premium (SAF 1999). Again, Idaho's manufacturers are in a position to contribute to the market for certified secondary wood products.

We do not have data on where Idaho's secondary forest products are sold, but Idaho's primary forest products are sold worldwide. Only 19%, by value, of the primary forest products produced in Idaho are sold in Idaho (Keegan et al. 1997). The other 81% are exported to other Rocky Mountain states (22%), the north central states (22%), the far western states (18%), the northeastern states (10%), the southern states (8%), and other countries (1%). The markets for certified products that exist and develop in other parts of the U.S. and the world will affect Idaho's wood-based manufacturers. If, for example, the certified products market grows in the population centers of the northeastern and west coast states of the U.S., Idaho is in a position to respond to those markets.

Conclusion

The development of an information base employing a criteria and indicators (C&I) framework is a necessary step in determining at the state level whether Idaho is making progress toward sustainable forest management. This is a question people are beginning to demand an answer to.

If certification were pursued on federal lands, the effect on Idaho's forest resources potentially would be significant, as Jenkins and Smith (1999) have suggested. National forests have almost three-fourths of the timberlands in the state. The volume of timber harvested from national forests has declined more than 60% from 1990 to now. The national forest proportionate share of timber harvested in Idaho from the national forests has declined from a peak of 60% in the late 1960s, to 40% throughout the 1980s, and to less than 20% now. Sustainability questions associated with non-timber resources such as endangered species are prominent among the reasons why federal timber harvests have declined, but there are other reasons (Haminishi et al. 1995). There is little hope that other owners can make up the difference. As a result, mills close when national forest timber harvests decline.

At this point we hope the reader will be interested not only in the possibility that certification might increase timber available from federal lands, but also in how extraction of wood would affect wildlife and habitat, water quality, soil, riparian areas, scenic values, and other things people in Idaho care about in forests across the state's landscapes. An integrated approach to these issues in the context of

sustainable forest management raises a number of policy issues. These are the subject of Part II of this analysis. (You may obtain a copy of Part II by contacting the PAG; see **About the PAG** for our address.)

Appendix A. Montreal Process Criteria and Indicators (C&I)

Criteria and Indicators (C&I) for the Conservation and Sustainable Management of Temperate and Boreal Forests (**T** = Adequate data available in Idaho)

Criterion 1: Conservation of Biological Diversity.
Indicators:

Ecosystem Diversity

T 1. Extent of area by forest type relative to total forest area.
T 2. Extent of area by forest type and by age class or successional stage.
T 3. Extent of area by forest type in protected area categories as defined by IUCN or other classification systems.
T 4. Extent of areas by forest type in protected areas defined by age class or successional stage.
5. Fragmentation of forest types.

Species Diversity

6. The number of forest dependent species.
7. The status (rare, threatened, endangered, or extinct) of forest dependent species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment.

Genetic Diversity

8. Number of forest dependent species that occupy a small portion of their former range.
9. Population levels of representative species from diverse habitats monitored across their range.

Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems.
Indicators:

10. Area of forest land and net area of forest land available for timber production.
T 11. Total growing stock of both merchantable and nonmerchantable tree species on forest land available for timber production.
T 12. The area and growing stock of plantations of native and exotic species.
T 13. Annual removal of wood products compared to the volume determined to be sustainable.
14. Annual removal of non-timber forest products (e.g., fur bearers, berries, mushrooms, game), compared to the level determined to be sustainable.

Criterion 3: Maintenance of Forest Ecosystem Health and Vitality.
Indicators:

T 15. Area and percent of forest affected by processes or agents beyond the range of historic variation, e.g. by insects, disease, competition from exotic species, fire, storm, land clearance, permanent flooding, salinisation, and domestic animals.
16. Area and percent of forest land subjected to levels of specific air pollutants (e.g. sulfates, nitrate, ozone) or ultraviolet B that may cause negative impacts on the forest ecosystem.
17. Area and percent of forest land with diminished biological components indicative of changes in fundamental ecological processes (e.g. soil, nutrient cycling, seed dispersion, pollination) and/or ecological continuity (monitoring of functionally important species such as nematodes, arboreal epiphytes, beetles, fungi, wasps, etc.).

Criterion 4: Conservation of Soil and Water Resources.
Indicators:

18. Area and percent of forest land with significant soil erosion.
19. Areas and percent of forest land managed primarily for protective functions (e.g. watersheds, flood protection, avalanche protection, riparian zones).
20. Percent of stream kilometers in forested catchments in which stream flow and timing has significantly

deviated from the historic range of variation.

21. Area and percent of forest land with significantly diminished soil organic matter and/or changes in other soil chemical properties.
22. Area and percent of forest land with significant compaction or change in soil physical properties resulting from human activities.
23. Percent of water bodies in forest areas (e.g. stream kilometers, lake hectares) with significant variance of biological diversity from the historic range of variability.
24. Percent of water bodies in forested areas (e.g. stream kilometers, lake hectares) with significant variation from the historic range of variability in pH, dissolved oxygen, levels of chemicals (electrical conductivity), sedimentation or temperature change.
25. Area and percent of forest land experiencing an accumulation of persistent toxic substances.

Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles.

Indicators:

26. Total forest ecosystem biomass and carbon pool, and if appropriate, by forest type, age class, and successional stages.
27. Contribution of forest ecosystems to the total global carbon budget, including adsorption and release of carbon (standing biomass, coarse woody debris, peat and soil carbon).
28. Contribution of forest products to the global carbon budget.

Criterion 6: Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the needs of societies.

Indicators:

Production and Consumption

T 29. Value and volume of wood and wood products production, including value added through downstream processing.

30. Value and quantities of production of non-wood forest products.
31. Supply and consumption of wood and wood products, including consumption per capita.
32. Value of wood and non-wood products production as percentage of GDP.
33. Degree of recycling of forest products.
34. Supply and consumption/use of non-wood products.

Recreation and tourism

35. Area and percent of forest land managed for general recreation and tourism, in relation to the total area of forestland.
36. Number and type of facilities available for general recreation and tourism, in relation to population and forest area.
37. Number of visitor days attributed to recreation and tourism, in relation to population and forest area.

Investment in the Forest Sector

T 38. Value of investment, including investment in forest growing, forest health and management, planted forests, wood processing, recreation and tourism.

39. Level of expenditure on research and development, and education.
40. Extension and use of new and improved technology.
41. Rates of return on investment.

Cultural, Social and Spiritual Needs and Values

42. Area and percent of forest land managed in relation to the total area of forest land to protect the range of cultural, social and spiritual needs and values.
43. Non-consumptive-use forest values.

Employment and Community Needs

44. Direct and indirect employment in the forest sector and the forest sector employment as a proportion of total employment.

45. Average wage rates and injury rates in major employment categories within the forest sector.
46. Viability and adaptability to changing economic conditions of forest dependent communities including indigenous communities.
47. Area and percent of forest land used for subsistence purposes.

Criterion 7: Legal, Institutional and Economic Framework for Forest Conservation and Sustainable Management.

Indicators:

Extent to which the Legal Framework (Laws, Regulations, Guidelines) Supports the Conservation and Sustainable management of Forests, including the extent to which it:

48. Clarifies property rights, provides for appropriate land tenure arrangements, recognizes customary and traditional rights of indigenous people, and provides means for resolving property disputes by due process.
T 49. Provides for periodic forest-related planning, assessment, and policy review that recognizes the range of forest values, including coordination with relevant sectors.
T 50. Provides opportunities for public participation in public policy and decision making related to forests and public assess to information.
51. Encourages best practice codes for forest management.
52. Provides for the management of forests to conserve special environmental, cultural, social, and/or scientific values.

Extent to which the Institutional Framework Supports the Conservation and Sustainable Management of Forests, including the capacity to:

53. Provide for public involvement activities and public education, awareness and extension programs, and make available forest related information.
54. Undertake and implement periodic forest-related planning, assessment, and policy review including cross-sectoral planning and coordination.
T 55. Develop and maintain human resource skills across relevant disciplines.
T 56. Develop and maintain efficient physical infrastructure to facilitate the supply of forest products and services and support forest management.
T 57. Enforce laws, regulations and guidelines.

Extent to which the Economic Framework (Economic Policies and Measures) Supports the Conservation and Sustainable Management of Forests through:

T 58. Investment and taxation policies and a regulatory environment which recognize the long-term nature of investments and permit flow of capital in and out of the forest sector in response to market signals, non-market economic valuations, and public policy decisions in order to meet long-term demands for forest products and services.
59. Non-discriminatory trade policies for forest products.

Capacity to Measure and Monitor Changes in the Conservation and Sustainable Management of Forests, including:

T 60. Availability and extent of up-to-date data, statistics and other information important to measuring or describing indicators associated with criteria 1-7.
T 61. Scope, frequency and statistical reliability of forest inventories, assessments, monitoring and other relevant information.
62. Compatibility with other countries in measuring, monitoring and reporting on indicators.

Capacity to Conduct and Apply Research and Development Aimed at Improving Forest Management and Delivery of Forest Goods and Services, including:

63. Development of scientific understanding of forest ecosystem characteristics and functions.
64. Development of methodologies to measure and integrate environmental and social costs and benefits into markets and public policies, and to reflect forest related resource depletion or replenishment in national accounting systems.

65. New technologies and capacity to assess the socioeconomic consequences associated with the introduction of new technologies.
66. Enhancement of ability to predict impacts of human intervention on forests.
67. Ability to predict impacts on forests of possible climate change.

Sources: *["First Approximation"] Report of the United States on the Criteria and Indicators for the Sustainable Management of Temperate and Boreal Forests* (USDA Forest Service 1997); *First Approximation Assessment Project: What data do state forestry agencies have?* (National Association of State Foresters 1999).

Appendix B. Center for International Forestry Research (CIFOR) North American C&I Assessment Team

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Appendix C. Center for International Forestry Research (CIFOR) North American Principles, Criteria and Indicators

Principle #1. ECOLOGICAL INTEGRITY IS MAINTAINED

Criterion 1.1. Ecosystem function is maintained.

Indicators:

1.1.1. Ecologically sensitive areas, especially buffer zones along water courses, are protected.
1.1.2. Coarse woody debris and snags retained at functional levels.
1.1.3. Area and severity of area burned.
1.1.4. Area and severity of insect attack and disease infestation.

Criterion 1.2. Landscape patterns support native populations.

Indicators:

1.2.1. Level of fragmentation and connectedness of forest ecosystem components.
1.2.2. Road network density, type, use, and location.

Criterion 1.3. Native species diversity is maintained.

Indicators:

1.3.1. Protected areas are maintained to protect rare, unique and representative species and features.
1.3.2. Populations of indigenous species are likely to persist.
1.3.3. Number of known forest-dependent species classified as extinct, extirpated, endangered, threatened, or vulnerable relative to the total number of known forest dependent species.
1.3.4. Assessment of changes in the distribution and abundance of native aquatic fauna.

Criterion 1.4. Ecosystem diversity is maintained.

Indicators:

1.4.1. Percentage and extent, in area, of vegetation types and structural classes relative to the historical condition and total forest area.
1.4.2. Rate and total area of forest land converted to non-forest land cover, classed by major forest type.
1.4.3. Representation of selected key and sensitive guilds occur in the community guild structure.

Criterion 1.5. Incidence of disturbance and stress.

Indicators:

1.5.1. Pollutant levels in the ecosystem (Implement screening procedure).
1.5.2. Area and severity of occurrence of exotic species detrimental to forest condition.

Criterion 1.6. Genetic diversity is maintained.

Indicators:

1.6.1. Population sizes and reproductive success are adequate to maintain levels of genetic diversity.
1.6.2. Use of scientifically-based seed transfer rules and seed orchard zones in planting native species.
1.6.3. Management does not significantly change gene frequencies.

Criterion 1.7. Physical environmental factors.

Indicators:

1.7.1. Percentage of harvested area having greater than 25% of the area with degraded soil quality, including soil compaction, displacement, erosion, puddling, and loss of organic matter.
1.7.2. Trends and timing of events in stream flows from forest catchments.

Principal #2. YIELD AND QUALITY OF FOREST GOODS AND SERVICES ARE SUSTAINABLE

Criterion 2.1. Policy, planning and institutional framework are conducive to sustainable forest management.

Indicators:

2.1.1. Effective instruments for inter-institutional co-ordination on land use and forest management exist.
2.1.2. There is sustained and adequate funding and staff for the management of forests.
2.1.3. Institutions responsible for forest research are adequately funded and staffed.

Criterion 2.2. Forest management provides for sustainability of goods and services.

Indicators:

2.2.1. Policy and planning are based on recent and accurate information.
2.2.2. Objectives are clearly stated in terms of the major functional areas of the forest, with respect to their spatial distribution.
2.2.3. Silvicultural systems are prescribed are appropriate to forest type, production of desired products and condition, and assure forest establishment, composition, and growth.
2.2.4. Harvesting systems and equipment are prescribed to match forest conditions in order to reduce impact on wildlife, soil productivity, residual stand conditions and water quality and quantity.
2.2.5. Annual and periodic removals calculated by area and/or volume prescribed.
2.2.6. Mean annual increment for forest type and age class.
2.2.7. Distribution of, and changes in, the land base available for timber production are identified.

Criterion 2.3. The management plan is implemented and effective in moving toward stated goals.

Indicators:

2.3.1. Actual vs. planned performance is measured and recorded.
2.3.2. An effective monitoring and control system audits management's conformity with planning.
2.3.3. Continuous inventories established and measured regularly.
2.3.4. Documentation and records of all forest management activities are kept in a form that makes monitoring possible.

Criterion 2.4. Forest management is socially efficient.

Indicators:

2.4.1. Availability and use of recreational opportunities are maintained.
2.4.2. Total expenditures by individuals on activities related to non-timber use.
2.4.3. Existence of economic rents: Total harvesting revenues exceed harvesting costs.

Principle #3. SOCIETY ACCEPTS RESPONSIBILITY FOR SUSTAINABILITY

Criterion 3.1. Forest management provides ongoing access to the resources.

Indicators:

3.1.1. Access to forest resources is perceived to be fair and secure.
3.1.2. Ownership and use rights and responsibilities to resources (inter- and intra-generational) are clear and respect pre-existing claims.

Criterion 3.2. Concerned stakeholders have a right to participate in open and meaningful public participation processes in order to influence management.

Indicators:

3.2.1. The process should be inclusive with all interests represented.
3.2.2. Stakeholders should have detailed and meaningful reciprocal background information necessary to provide quality input into the public participation process.

3.2.3. Management staff and stakeholders should recognize and respect the interests and rights of each other.

3.2.4. The decision-making processes must be transparent such that participants are confident that their opinions and values will be considered during the process and be reflected in the final product.

Criterion 3.3. Forest-based human health issues.

Indicators:

3.3.1. Forest managers co-operate with public health authorities regarding illnesses related to forest management and potable water related concerns.

3.3.2. Forestry employers follow ILO working and safety conditions and take responsibility for the forest-related health risks of workers.

Criterion 3.4. Recognition and respect for aboriginal roles in sustainable forest management (aboriginal rights, treaty rights and aboriginal values).

Indicators:

3.4.1. Extent to which forest planning and management processes consider and meet legal obligations with respect to duly established Aboriginal and treaty rights.

3.4.2. Assess the extent of Aboriginal participation in forest-based opportunities.

3.4.3. Extent to which forest management planning takes into account the protection of unique or significant Aboriginal social, cultural or spiritual sites.

3.4.4. Area of forest land available for subsistence purposes.

Criterion 3.5. There is equitable access to and distribution of economic rents.

Indicators:

3.5.1. Mechanisms exist for sharing the economic benefits derived from forest management.

3.5.2. Wages and other benefits conform to national and/or ILO standards.

3.5.3. Employment of local population in forest management.

3.5.4. Estimated distribution of rent capture.

3.5.5. Number of communities with a significant forestry component in the economic base.

Principle #4. ENABLING CONDITIONS

The Following Criteria and Indicators Are Enabling Conditions That Support the Overall Framework of Sustainable Forest Management

Criterion 4.1. Policy, planning and institutional frameworks are conducive to sustainable forest management.

Indicators:

4.1.1. Effective instruments for inter-institutional co-ordination on landuse and forest management exits.

4.1.2. There is sustained and adequate funding and staff for the management of forests.

4.1.3. Institutions responsible for forest research are adequately funded and staffed.

Source: *North American Test of Criteria and Indicators of Sustainable Forestry, Final Report* (Woodley et al. 1998, Vol. 1, Table 5).

Appendix D. Sustainable Forestry Initiative (SFI) Objectives and Performance Measures for Sustainable Forestry

The Sustainable Forestry Initiative (SFI) of the American Forest & Paper Association (AF&PA) has five Principles (see Box 5.1). These principles represent the vision and direction for sustainable forest management. The SFI program has ten **Objectives**. Each objective is a fundamental goal of sustainable forest management. **Objectives** are comparable in function to criteria. Objectives 1-8 are guidelines for sustainable forestry on SFI program participants' forests. Objective 9 is a guideline for program participants procurement of wood and fiber from wood producers (i.e., loggers) and landowners. Objectives 10 and 11 are for public reporting and involvement in the practice of sustainable forestry. Each **objective** is accompanied by a set of specific **Performance Measures**, which are a means of judging whether an **objective** has been fulfilled, and are comparable to indicators (AF&PA 2000, Vogt et al. 1999).

Objective 1. Broaden the practice of sustainable forestry by employing an array of scientifically, environmentally, and economically sound practices in the growth, harvest, and use of forests.
Performance Measures:

- Program Participants will define their own policies, programs, and plans to implement and achieve the AF&PA Sustainable Forestry Standard Principles and Objectives.
- Program Participants will (individually, through cooperative efforts, or through AF&PA) provide funding for forest research to improve the health, productivity, and management of all forests, as well as to better understand the role of managed forests in sequestering carbon.
- Program Participants will provide recreation and education opportunities for the public where consistent with their forest management objectives.

Objective 2. Ensure long-term forest productivity and conservation of forest resources through prompt reforestation, soil conservation, afforestation, and other measures.
Performance Measures:

- Program Participants will reforest after final harvest by planting or direct seeding within two years, or by planned natural regeneration methods within five years.
- Program Participants will promote state-level reporting of the overall rates of reforestation success and afforestation.
- Program Participants will use forest chemicals prudently (follow all applicable label requirements, Best Management Practices (BMPs), and meet or exceed laws and regulations concerning the use of fertilizers, herbicides, and other forest chemicals) to improve forest health and productivity, while protecting employees, neighbors, the public, and the forest environment.
- Program Participants will implement management practices to protect and enhance forest and soil productivity.
- Program Participants will manage so as to protect forests from damaging agents such as wildfire, pests, and diseases to maintain and improve long-term forest health and productivity.
- Program Participant that is utilizing genetically improved seedlings, including those derived through biotechnology, will use sound scientific methods and follow all appropriate federal and state regulations and other internationally applicable protocols.

Objective 3. Protect the water quality in streams, lakes, and other waterbodies by implementing riparian protection measures based on soil type, terrain, vegetation, and other applicable factors.
Performance Measures:

- Program Participants will use Best Management Practices developed under Environmental Protection Agency (EPA) approved state water quality programs and meet or exceed all applicable state water quality laws and regulations, and the requirements of the federal Clean Water Act.
- Program Participants will develop (where they do not currently exist), implement, and document riparian

protection measures for all perennial streams and lakes and involve experts at the state level to help identify goals and objectives for riparian protection.

- ! Program Participants will, individually, through cooperative efforts, or through AF&PA, provide funding for water quality research.
- ! Program Participants will require BMP training for employees in woodland management and wood procurement operations, and will encourage training for forest management and harvesting contractors.

Objective 4. Enhance the quality of wildlife habitat by developing and implementing measures that promote habitat diversity and the conservation of forest plants and animals.

Performance Measures:

- ! Program Participants will define their own policies, programs, and plans to promote habitat diversity.
- ! Program Participants will, individually, through cooperative efforts, or through AF&PA, provide funding for wildlife research.

Objective 5. Manage the visual impact of clearcutting and all other forest operations.

Performance Measures:

- ! Program Participants will define their own policies, programs, and plans to manage the impact of harvesting on visual quality.
- ! Program Participants will develop and adopt, in each state where they operate, appropriate policies for managing the size, shape, and placement of clearcut harvests. The average size of clearcut harvest areas will not exceed 120 acres, except when necessary to respond to forest health emergencies or other natural catastrophes.
- ! Program Participants will adopt a "green up" requirement, under which past clearcut harvest areas must have trees at least 3 years old or 5 feet high at the desired level of stocking before adjacent areas may be clearcut; or companies may adopt other, more comprehensive methods that provide age, habitat and aesthetic diversity.
- ! Program Participants will use harvest methods, age classes, and judicious placement of harvest units to promote diversity across the forest landscape.

Objective 6. Manage Program Participant lands of ecologic, geologic, or historic significance in a manner that recognize their special qualities.

Performance Measures:

- ! Program Participants will identify special sites and manage them in a manner appropriate to their unique features. Program Participants are encouraged to cooperate with organizations having expertise in protecting special places to suggest how these lands can best be managed to maintain their unique character.

Objective 7. Contribute to biodiversity by enhancing landscape diversity and providing a variety of habitats and plant communities.

Performance Measures:

- ! Program Participants will (individually, through cooperative efforts, or through AF&PA), provide funding for research to improve the science and understanding of landscape management, ecosystem functions, and the conservation of biological diversity.
- ! Program Participants will continually apply the knowledge gained through research, science, technology, and field experience to conserving biological diversity.

Objective 8. Help ensure the most efficient use of forest resources.

Performance Measures:

- ! Program Participants will employ appropriate forest harvesting technology and manufacturing processes and practices to minimize waste and ensure efficient utilization of trees harvested.

Objective 9. Broaden the practice of sustainable forestry by cooperating with nonindustrial landowners, wood producers, consulting foresters and Program Participants' employees who have responsibility in wood procurement and landowner assistance programs.

Performance Measures:

- Program Participants will encourage landowners to reforest following harvest and to use Best Management Practices by providing information on the environmental and economic advantages of these practices.
- Program Participants will work closely with state logging and state forestry associations, appropriate agencies and others in the forestry community to further promote the professionalism of wood producers by establishing state groups (where none exist) and by cooperating with existing state groups to promote the training and education of wood producers in:
    - Awareness of AF&PA Sustainable Forestry Principles;
    - Best Management Practices, including road construction and retirement, site preparation, streamside management, etc.;
    - Regeneration, forest resource conservation, and aesthetics;
    - Awareness of responsibilities under the Endangered Species Act and other measures to protect and enhance wildlife habitat;
    - Logging safety;
    - OSHA and wage and hour rules;
    - Transportation; and
    - Business management; and
    - Public policy and outreach
- Program Participants will support and promote efforts of state groups to sponsor training and education programs for wood producers, employees involved in procurement and landowner assistance, and contractors.
- AF&PA will collect information from its members, state groups, and other sources in order to annually report:
    - The number of landowners who receive information about the SFI program, forest regeneration, BMPs, and wildlife habitat from contractors, company employees, and others;
    - The number of wood producers and member company employees who completed each year's training and education programs; and
    - The percentage of wood delivered by qualified logging professionals.
- Program Participants will encourage landowners to utilize the services of qualified resource professionals and qualified logging professionals in applying principles of sustainable forest management on their lands.
- Program Participants will ensure their commitment to the Sustainable Forestry Standard Principles is communicated throughout all levels of their companies—particularly to mill and woodland managers, wood procurement operations, and field foresters.
- Program Participants will support and promote efforts by consulting foresters, state and federal agencies, state groups, and programs like the American Tree Farm System®, to encourage, educate and assist nonindustrial landowners and to encourage them to apply principles of sustainable forest management.
- Program Participants will clearly define and implement their own policies, programs, and plans to ensure that mill inventories and procurement practices do not compromise adherence to the Principles of Sustainable Forestry.

Objective 10. Publicly report Program Participants' progress in fulfilling their commitment to sustainable forestry.

Performance Measures:

- Program Participants will report annually to AF&PA on their compliance with AF&PA Sustainable Forestry Standard Principles and Objectives.
- AF&PA will issue an annual report to the public on its membership's and licensees' performance regarding compliance with and progress on sustainable forestry, including a listing of all companies

complying with the AF&PA Sustainable Forestry Standard Principles and Objectives.

- An advisory group of independent experts will assist in the preparation of the annual report, including validation of conclusions and the assessment of reported progress..

Objective 11. Provide opportunities for the public and the forestry community to participate in the AF&PA membership's commitment to sustainable forestry.

Performance Measures:

- Program Participants will support and promote appropriate mechanisms for public outreach, education, and involvement related to forest management, such as: 800 numbers; environmental education; and/or private and public sector technical assistance programs.
- Program Participants will establish, at the state, or other appropriate levels, procedures to address concerns raised by loggers, consulting foresters, employees, the public or Program Participants regarding practices that appear to be inconsistent with the AF&PA Sustainable Forestry Standard Principles and Objectives.
- Program Participants will continue to support a national forum of wood producers, landowners, and senior industry representatives, including CEO representation, that will meet at least twice annually to review progress toward the AF&PA Sustainable Forestry Standard Principles and Objectives. The results of each meeting will be reported to the AF&PA Board of Directors.

Source: *The Sustainable Forestry Initiative (SFI) Standard* (American Forest & Paper Association 2000).

Appendix E. Forest Stewardship Council (FSC) Principles and Criteria for Forest Management

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 this destruction but rather help to secure forest resources for the future. In response to these demands, certification and self-certification 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 authenticity of their claims. In all cases the process of certification will be initiated voluntarily by forest owners and managers who request the services of a certification organization. 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 recognized and respected Principles of Forest Management.

The FSC's Principles and Criteria (P&C) apply to all tropical, temperate and boreal forests, as addressed in Principle #9. Many of these P&C apply also to plantations and partially replanted forests. More detailed standards for these and other vegetation types may be prepared at national and local levels. The P&C are to be incorporated into the evaluation systems and standards of all certification organizations seeking accreditation by the FSC. While the P&C are mainly designed for forests managed for the production of wood products, they are also relevant, to varying degrees, to forests managed for non-timber products and other services. The P&C are a complete package to be considered as a whole, and their sequence does not represent an ordering of priority. This document shall be used in conjunction with the FSC's Statutes, Procedures for Accreditation and Guidelines for Certifiers.

FSC and FSC-accredited certification organizations will not insist on perfection in satisfying the P&C. However, major failures in any individual Principles will normally disqualify a candidate from certification, or will lead to decertification. These decisions will be taken by individual certifiers, and guided by the extent to which each Criterion is satisfied, and by the importance and consequences of failures. Some flexibility will be allowed to cope with local circumstances.

The FSC recognizes that there is a continuum of forest management intensity and resulting forest condition. This continuum includes primary, undisturbed natural forest, (with all or most of the characteristics and functions of the natural forest ecosystem), well-developed secondary and semi-natural forests (with many or some of the characteristics and functions of the natural forest ecosystem), and plantations (with few or no characteristics of the natural forest ecosystem). The decision to categorize and evaluate a managed forest (a management regime applied to a specific forest type) as a "natural forest" or as a "plantation" must be made at a local level, and should be guided by clearly articulated FSC-endorsed regional standards, when such standards exist. These standards may include further conditions and restrictions on plantation management. The FSC also recognizes differences between plantations of exotic species and those of native species. Plantations composed of exotic species inherently pose more risks than those of native species, and will require additional ecological and social safeguards. These safeguards are to be articulated in FSC regional standards. In order to be considered for certification, all forests, including plantations, must meet Principles #1 through #9 and their Criteria. Plantations, however, must also satisfy Principle 10 and its Criteria.

The scale and intensity of forest management operations, the uniqueness of the affected resources, and the relative ecological fragility of the forest will be considered in all certification assessments. Differences and difficulties of interpretation of the P&C will be addressed in national and local forest management standards. These standards are to be developed in each country or region involved, and will be evaluated for purposes of certification, by certifiers and other involved and affected parties on a case by case basis. If necessary, FSC dispute resolution mechanisms may also be called upon during the course of assessment. More information and guidance about the certification and accreditation process is included in the FSC Statutes, Accreditation Procedures, and Guidelines for Certifiers.

The FSC P&C should be used in conjunction with national and international laws and regulations. FSC intends to complement, not supplant, other initiatives that support responsible forest management worldwide.

The FSC will conduct educational activities to increase public awareness of the importance of the following: 1) improving forest management; 2) incorporating the full costs of management and production into the price of forest products; 3) promoting the highest and best use of forest resources; 4) reducing damage and waste; and 5) avoiding over-consumption and over-harvesting. The FSC will also provide guidance to policy makers on these issues, including improving forest management legislation and policies.

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.

Criteria:

1.1 Forest management shall respect all national and local laws and administrative requirements.

1.2 All applicable and legally prescribed fees, royalties, taxes and other charges shall be paid.

1.3 In signatory countries, the provisions of all binding international agreements such as CITES, ILO Conventions, ITTA, and Convention on Biological Diversity, shall be respected.

1.4 Conflicts between laws, regulations and the FSC Principles and Criteria shall be evaluated for the purposes of certification, on a case by case basis, by the certifiers and the involved or affected parties.

1.5 Forest management areas should be protected from illegal harvesting, settlement and other unauthorized activities.

1.6 Forest managers shall demonstrate a long-term commitment to adhere to the FSC Principles and Criteria.

Principle #2: TENURE AND USE RIGHTS AND RESPONSIBILITIES

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

Criteria:

2.1 Clear evidence of long-term forest use rights to the land (e.g. land title, customary rights, or lease agreements) shall be demonstrated.

2.2 Local communities with legal or customary tenure or use rights shall maintain control, to the extent necessary to protect their rights or resources, over forest operations unless they delegate control with free and informed consent to other agencies.

2.3 Appropriate mechanisms shall be employed to resolve disputes over tenure claims and use rights. The circumstances and status of any outstanding disputes will be explicitly considered in the certification evaluation. Disputes of substantial magnitude involving a significant number of interests will normally disqualify an operation from being certified.

Principle #3: INDIGENOUS PEOPLES' RIGHTS

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

Criteria:

3.1 Indigenous peoples shall control forest management on their lands and territories unless they delegate control with free and informed consent to other agencies.

3.2 Forest management shall not threaten or diminish, either directly or indirectly, the resources or tenure rights of indigenous peoples.

3.3 Sites of special cultural, ecological, economic or religious significance to indigenous peoples shall be clearly identified in cooperation with such peoples, and recognized and protected by forest managers.

3.4 Indigenous peoples shall be compensated for the application of their traditional knowledge regarding the use of forest species or management systems in forest operations. This compensation shall be formally agreed upon with their free and informed consent before forest operations commence.

Principle #4: COMMUNITY RELATIONS AND WORKERS' RIGHTS

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

Criteria:

4.1 The communities within, or adjacent to, the forest management area should be given opportunities for employment, training, and other services.

4.2 Forest management should meet or exceed all applicable laws and/or regulations covering health and safety of employees and their families.

4.3 The rights of workers to organize and voluntarily negotiate with their employers shall be guaranteed as outlined in Conventions 87 and 98 of the International Labour Organisation (ILO).

4.4 Management planning and operations shall incorporate the results of evaluations of social impact. Consultations shall be maintained with people and groups directly affected by management operations.

4.5 Appropriate mechanisms shall be employed for resolving grievances and for providing fair compensation in the case of loss or damage affecting the legal or customary rights, property, resources, or livelihoods of local peoples. 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.

Criteria:

5.1 Forest management should strive toward economic viability, while taking into account the full environmental, social, and operational costs of production, and ensuring the investments necessary to maintain the ecological productivity of the forest.

5.2 Forest management and marketing operations should encourage the optimal use and local processing of the forest's diversity of products.

5.3 Forest management should minimize waste associated with harvesting and on-site processing operations and avoid damage to other forest resources.

5.4 Forest management should strive to strengthen and diversify the local economy, avoiding dependence on a single forest product.

5.5 Forest management operations shall recognize, maintain, and, where appropriate, enhance the value of forest services and resources such as watersheds and fisheries.

5.6 The rate of harvest of forest products shall not exceed levels which can be permanently sustained.

Principle #6: ENVIRONMENTAL IMPACT

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

Criteria:

6.1 Assessment of environmental impacts shall be completed—appropriate to the scale, intensity of forest management and the uniqueness of the affected resources—and adequately integrated into management systems. Assessments shall include landscape level considerations as well as the impacts of on-site processing facilities. Environmental impacts shall be assessed prior to commencement of site-disturbing operations.

6.2 Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g., nesting and feeding areas). Conservation zones and protection areas shall be established, appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Inappropriate hunting, fishing, trapping and collecting shall be controlled.

6.3 Ecological functions and values shall be maintained intact, enhanced, or restored, including:

a) Forest regeneration and succession.

b) Genetic, species, and ecosystem diversity.

c) Natural cycles that affect the productivity of the forest ecosystem.

6.4 Representative samples of existing ecosystems within the landscape shall be protected in their natural state and recorded on maps, appropriate to the scale and intensity of operations and the uniqueness of the affected resources.

6.5 Written guidelines shall be prepared and implemented to: control erosion; minimize forest damage during harvesting, road construction, and all other mechanical disturbances; and protect water resources.

6.6 Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides. World Health Organization Type 1A and 1B and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited. If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.

6.7 Chemicals, containers, liquid and solid non-organic wastes including fuel and oil shall be disposed of in an environmentally appropriate manner at off-site locations.

6.8 Use of biological control agents shall be documented, minimized, monitored and strictly controlled in accordance with national laws and internationally accepted scientific protocols. Use of genetically modified organisms shall be prohibited.

6.9 The use of exotic species shall be carefully controlled and actively monitored to avoid adverse ecological impacts.

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.

Criteria:

7.1 The management plan and supporting documents shall provide:

a) Management objectives.

b) Description of the forest resources to be managed, environmental limitations, land use and ownership status, socio-economic 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) Rationale for rate of annual harvest and species selection.

e) Provisions for monitoring of forest growth and dynamics.

f) Environmental safeguards based on environmental assessments.

g) Plans for the identification and protection of rare, threatened and endangered species.

h) Maps describing the forest resource base including protected areas, planned management activities and land ownership.

i) Description and justification 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 workers shall receive adequate training and supervision to ensure proper implementation of the management plan.

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

Criteria:

8.1 The frequency and intensity of monitoring should be determined by the scale and intensity of forest management operations as well as the relative complexity and fragility of the affected environment. Monitoring procedures should be consistent and replicable over time to allow comparison of results and assessment of change.

8.2 Forest management should include the research and data collection needed to monitor, at a minimum, the following indicators:
- a) Yield of all forest products harvested.
- b) Growth rates, regeneration and condition of the forest.
- c) Composition and observed changes in the flora and fauna.
- d) Environmental and social impacts of harvesting and other operations.
- e) Costs, productivity, and efficiency of forest management.

8.3 Documentation shall be provided by the forest manager to enable monitoring and certifying organizations to trace each forest product from its origin, a process known as the "chain of custody."

8.4 The results of monitoring shall be incorporated into the implementation and revision of the management plan.

8.5 While respecting the confidentiality of information, forest managers shall make publicly available a summary of the results of monitoring indicators, including those listed in Criterion 8.2.

Principle #9: MAINTENANCE OF NATURAL FORESTS

Primary forests, well-developed secondary forests and sites of major environmental, social or cultural significance shall be conserved. Such areas shall not be replaced by tree plantations or other land uses.

Criteria:

9.1 Trees planted in natural forests may supplement natural regeneration, fill gaps or contribute to the conservation of genetic resources. Such plantings shall not replace or significantly alter the natural ecosystem.

9.2 The use of replanting as a technique for regenerating stands of certain natural forest types may be appropriate under certain circumstances. Guidelines on the acceptable intensity and spatial extent of tree planting will be addressed in national and regional forest management standards to be approved by the FSC. In the absence of such national or regional standards, guidelines developed by the certifier and approved by the FSC will prevail.

Principle #10: PLANTATIONS

Plantations shall be planned and managed in accordance with Principles and Criteria 1-9, and Principle 10 and its Criteria. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

Criteria:

10.1 The management objectives of the plantation, including natural forest conservation and restoration objectives, shall be explicitly stated in the management plan, and clearly demonstrated in the implementation of the plan.

10.2 The design and layout of plantations should promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests. Wildlife corridors, streamside zones and a mosaic of stands of different ages and rotation periods, shall be used in the layout of the plantation, consistent with the scale of the operation. The scale and layout of plantation blocks shall be consistent with the patterns of forest stands found within the natural landscape.

10.3 Diversity in the composition of plantations is preferred, so as to enhance economic, ecological and social stability. Such diversity may include the size and spatial distribution of management units within the landscape, number and genetic composition of species, age classes and structures.

10.4 The selection of species for planting shall be based on their overall suitability for the site and their appropriateness to the management objectives. In order to enhance the conservation of biological diversity, native species are preferred over exotic species in the establishment of plantations and the restoration of degraded ecosystems. Exotic species, which shall be used only when their performance is greater than that of native species, shall be carefully monitored to detect unusual mortality, disease, or insect outbreaks and adverse ecological impacts.

10.5 A proportion of the overall forest management area, appropriate to the scale of the plantation and to be determined in regional standards, shall be managed so as to restore the site to a natural forest cover.

10.6 Measures shall be taken to maintain or improve soil structure, fertility, and biological activity. The techniques and rate of harvesting, road and trail construction and maintenance, and the choice of species shall not result in long term soil degradation or adverse impacts on water quality, quantity or substantial deviation from stream course drainage patterns.

10.7 Measures shall be taken to prevent and minimize outbreaks of pests, diseases, fire and invasive plant introductions. Integrated pest management shall form an essential part of the management plan, with primary reliance on prevention and biological control methods rather than chemical pesticides and fertilizers. Plantation management should make every effort to move away from chemical pesticides and fertilizers, including their use in nurseries. The use of chemicals is also covered in Criteria 6.6 and 6.7.

10.8 Appropriate to the scale and diversity of the operation, monitoring of plantations shall include regular assessment of potential on-site and off-site ecological and social impacts, (e.g. natural regeneration, effects on water resources and soil fertility, and impacts on local welfare and social well-being), in addition to those elements addressed in principles 8, 6 and 4. No species should be planted on a large scale until local trials and/or experience have shown that they are ecologically well-adapted to the site, are not invasive, and do not have significant negative ecological impacts on other ecosystems. Special attention will be paid to social issues of land acquisition for plantations, especially the protection of local rights of ownership, use or access.

Source: "Regional Standards Highlights." *Forest Stewardship Council United States Initiative Update* 2 (Forest Stewardship Council 1998*b*).

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GLOSSARY

Certification: Independent verification of conformity to a standard (SAF 1999). There are two applications in forestry: [1] A voluntary market-driven initiative to provide independent assessment of performance against agreed-upon standards (Nordin 1996); [2] A program that attests that the management of forest land or wood products from such land meet approved standards of a designated authority (Helms 1998).

Chain of custody: [1] Assurance provided by a seller that a certified forest product has remained identifiable from its origin in the forest to the buyer throughout its production, processing, and marketing (Helms 1998); [2] The monitoring process of the production and distribution channel from forest to end-product (Upton and Bass 1996).

Conservation: The management of a renewable resource with the objective of sustaining its productivity in perpetuity while providing for human use compatible with sustainability of the resource (Helms 1998).

Criterion: [1] A category of conditions or processes by which sustainable forest management may be assessed (USFS 1994); [2] Characteristics that are considered important and by which success or failure may be judged (SAF 1999).

Ecosystem management: Management guided by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on the best understanding of ecological interactions and processes necessary to sustain ecosystem composition, structure, and function over the long (Helms 1998). (See also **forest management, sustained yield**.)

Forest industry: An ownership class of private lands owned by companies or individuals operating wood-using plants (Powell et al. 1993).

Forest land: Land at least 10% stocked by forest trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. Also included are pinyon-juniper and chaparral areas in the West and afforested areas. The minimum area for classification is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have at least 120 feet to qualify as forest land (Powell et al. 1993, Brown and Chojnacky 1996).

Forest management: The practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and **conservation** of forests to meet specified goals and objectives while maintaining the productivity of the forest—*note* forest management includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, and other forest resource (Helms 1998).

Forestry: The profession embracing the science, art, and practice of creating, managing, using, and conserving forests and associated resources for human benefit and in a sustainable manner to meet desired goals, needs, and values (Helms 1998).

Indicator: [1] A measure of an aspect of a criterion (USFS 1994); [2] Quantitative, qualitative, or descriptive measures that when periodically evaluated and monitored show the direction of change (SAF 1999).

Non-industrial private forest (NIPF): An ownership class of private lands where the owner does not operate wood-using plants (Powell et al. 1993).

Norm: A reference value of an indicator established for use as a rule or basis of comparison. By comparing the norm with the actual measured value, the result demonstrates the degree of fulfillment of a criterion (van Bueren and Blom 1997). (See also **Standard**.)

Principle: A fundamental rule that serves as a basis for reasoning and action (SAF 1999).

Reserved timberland: Timberland withdrawn from timber utilization by statute or administrative regulation (Powell et al. 1993).

Standard: [1] An acknowledged measure of comparison for quantitative or qualitative value (Ervin and Elliott 1996); [2] Documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes, and services are fit for their purpose (Upton and Bass 1996).

Sustainability: [1] The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time (Dunster and Dunster 1996); [2] The capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity, and overall integrity, in the long run, in the context of human activity and use (Helms 1998).

Sustainable development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED 1987).

Sustainable forest management (sustainable forestry): This evolving concept has several definitions. [1] Sustainable forestry is forest management that is ecologically sound, economically viable, and socially desirable (Aplet et al. 1993). [2] The practice of meeting the forest resource needs and values of the present without compromising the similar capability of future generations—*note* sustainable **forest management** involves practicing a land stewardship ethic that integrates the reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the **conservation** of soil, air and water quality, wildlife and fish habitat, and aesthetics (UN Conference on Environment and Development, Rio De Janeiro, 1992); [3] 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 potential to fulfill, now and the future, relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems (the Ministerial Conference on the Protection of Forests in Europe, Helsinki, 1993)—*note* according to the Montreal Process, criteria for sustainable forestry include (a) conservation of biological diversity, (b) maintenance of productive capacity of forest ecosystems, (c) maintenance of forest ecosystem health and vitality, (d) conservation and maintenance of soil and water resources, (e) maintenance of forest contributions to global carbon cycles, (f) maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies, and (g) a legal, institutional, and economic framework for forest conservation and sustainable management (Helms 1998).

Sustained yield: [1] The yield that a forest can produce continuously at a given intensity of management—*note* sustained-yield management implies continuous production so planned as to achieve, at the earliest practical time, a balance between increment and cutting; [2] The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources without impairment of the productivity of the land (Helms 1998).

Timberland: [1] U.S. Forest Service definition used nationwide: Forest land that is producing or is capable of producing crops of industrial wood, and that is not withdrawn from timber utilization by statute or administrative regulation—*note* areas qualifying as timberland are capable of producing more than 20 cubic feet per acre per year of industrial wood in natural stands (Powell et al. 1993); [2] U.S. Forest Service definition used in Idaho: Forest land where timber species make up at least 10 percent stocking—*note* this is equivalent to the definition for commercial forest land in Forest Service Handbook 4809 (Brown and Chojnacky 1996).

Wood-based industry: An aggregate combination of primary "forest-based" manufacturers such as logging, sawmilling, veneer mills, and pulpmills, and secondary manufacturers that depend on substantial inputs from primary forest-based industries, including manufacturers of such products as doors and windows, furniture, mobile homes, and paper and paper products (Phelps 1980, Ellefson and Stone 1984).

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