



# Eco-Link

Linking Social, Economic, and Ecological Issues

Volume 11, Number 3

## Sustainable Forestry II

Sustaining healthy, productive, diverse, and resilient forest ecosystems is the vision for sustainable forestry. Sustainable forestry is an extremely important subset of a broader concept known as **Sustainable Development**. By practicing sustainable forestry, we help to make sustainable development a reality. Sustainable development is "meeting the needs of the present without compromising the ability of future generations to meet their own needs." This commitment to future generations facilitates excellent stewardship of resources, which are temporarily in our care. Sustainable forestry means that forests will continue to meet our ecological, social and economic needs on into the future. Foresters, biologists, entomologists, engineers and others will accomplish it, by working as a team in forest ecosystems.



Investment



Principal



Interest

The earth and its resources represent the **principal we have in the bank**. We need to learn how to conserve the principal while living off of the interest. This will be increasingly important and difficult as the earth's population is estimated to double from 6.1 billion to 12.2 billion people, within the next 70 years. We need to meet as many needs as possible with renewable resources while minimizing our unsustainable consumption of non-renewable resources.

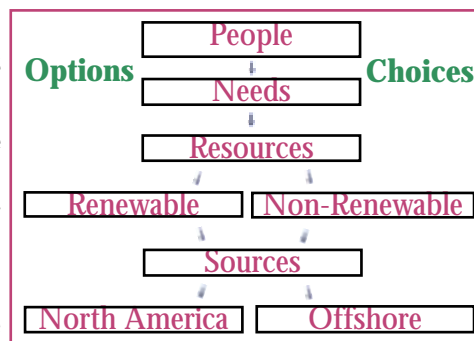
*The paradox of life is that we must take from life to live. However we must also put something back, be it seed in a field or a seedling in a forest. Nature is the garden and we are the gardeners living together in a symbiotic (mutually-beneficial) relationship.*

Living sustainably doesn't start in the forest, it starts with consumers.

We as consumers create the demand for resources, which is then met by the producing industries. These industries nurture us with products and services to meet our needs. As consumers, we must evaluate our options and make informed choices as to which resource we use.

Our needs for food, clothing, shelter, transportation, and energy are met by transforming raw materials into useful products. We are constantly choosing between renewable and non-renewable resources. By definition, non-renewable resources are finite and can't be replaced. Whenever possible we should choose renewable resources. We should also do everything possible to slow down the depletion of non-renewable resources, while we make the transition to a sustainable society.

### Responsible Consumption



**As a society, our next choice is where we obtain raw materials such as wood.** Living sustainably suggests that we should obtain as many resources as possible in our own back yard, wherever that may be. Closing our own forests to wood production would not be a good idea if that meant obtaining wood from other places where the economic costs and environmental impacts would be much higher. We would fail to “think globally and act locally.”

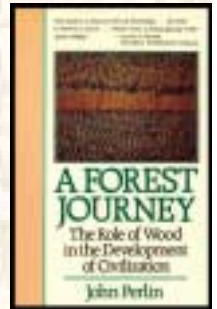
*“Consumption forms a mass culture, and each act of consumption draws together the realms of meaning, nature and social relations, and in turn transforms them.” - Robert D. Sack*

**There is no point in talking about sustainable forestry, or forest stewardship, unless we understand our options as consumers, and the interdependent relationship we have with the producers who meet our needs.** Population and per capita consumption are the two factors, which create demand. There is no indication that either will slow down in the foreseeable future. Therefore, which resources we choose, where we get them, how we use them, and how we dispose of them are all critical issues for sustainable development.

### Lessons from the Past

**Many great civilizations have fallen by failing to live sustainably, within their economic and ecological means. In his book, *A Forest Journey*, John Perlin offers us some excellent insights:**

**Mesopotamia: Mesopotamia is considered the cradle of civilization.** The “Fertile Crescent,” of present day Iraq, is where Western Civilization first emerged. At times of rapid growth in Mesopotamia, the value of wood was equal to precious gems, stones, and metals. Neighboring states were conquered for wood, gold and silver. By 2000 B.C. the last Mesopotamian empire had collapsed. The connection between their decline and deforestation is well supported. Excessive amounts of timber were felled around the Tigris and Euphrates rivers, and their tributaries. This caused increased siltation and salinity, which compromised the water quality and soil productivity. Irrigation canals filled with sediment and the waterways required constant dredging. Barley was the staple food of the Mesopotamians, and as crops diminished the great cities fell. They realized too late what had happened.



**Greece: The late Bronze Age saw a great surge in the population and economic strength of Mycenaean Greece.** In the thirteenth century B.C. large tracts of forests were cleared to accommodate the needs of the rapidly growing population. The wood was used for construction and to feed the great bronze furnaces. The harvested land was heavily grazed, hampering natural regeneration of the forest. The decline of ancient Greek civilization was directly linked to deforestation and soil depletion.

**Rome: In the 1st century A.D. Rome already devoured its own forests for fuel, shelter and transportation.** The fuel wood was used to heat, cook, smelt metals and fire the public baths.



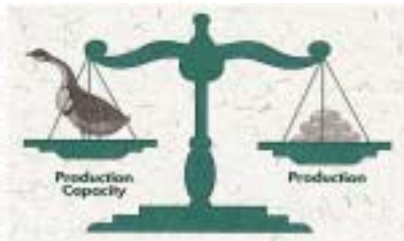
**Rome's monetary system was based on silver which required huge quantities of wood, a renewable resource, to convert ore into metal, a non-renewable resource.** As wood became scarce the silver content of the metal was drastically reduced. This created a monetary crisis and a shift back to the bartering system. The public baths were used to appease the masses and also used huge quantities of wood.

**Deforestation caused decreased soil stability, which resulted in decreased agricultural production.** The gap between wood and agricultural needs and domestic supply was an impetus for Rome's conquests throughout the Mediterranean region. These conquests employed Rome's fleet of 60 wooden ships. The decline of the Romans was directly linked to their failure to manage their resources sustainably.

**The same pattern repeated itself throughout history all over the world.** Growing populations, excessive consumption, the use of wood for energy to process non-renewable resources, deforestation, soil depletion, watershed destruction, and the resulting problems of famine, led to economic and social collapse. When societies fail to live sustainably they come crashing down, even the greatest ones.

## Balancing Production with Production Capacity

It is an undeniable law of nature that we must keep our production in balance with our production capacity. Just like the goose that laid the golden eggs in Aesop's fable, the land represents our production capacity, and the bounty we get from the land represents the production...the golden eggs. In Aesop's fable a farmer got greedy and killed the goose looking for more golden eggs, and in the process destroyed his production capacity. Great civilizations have risen based on their wealth of natural resources and then have fallen by failing to maintain the productivity, health and resiliency of the ecosystems which produce those resources. At some point, they destroy their production capacity and run out of options.



*During European settlement of the United States 310,000,000 acres of forest land were converted for agricultural use.*

Forests play the leading role in sustaining human populations and providing a good quality of life. We can take a lesson from ancient Mesopotamia, Greece, and Rome. We must live in a symbiotic relationship with the earth. Stewardship is treating earth as the **garden** with humans as the **gardeners**. Forestry and agriculture are the foundations on which a sustainable society is built.

*"Those who cannot remember the past are condemned to repeat it." - George Santayana*

Following the death of living trees in a forest, regardless of whether this is caused by fire, wind, insects, disease, or harvesting, the natural processes of ecosystem recovery and forest renewal begin to operate. However, these natural processes were continually thwarted by ancient civilizations who knew little about stewardship of forest ecosystems. Over-consumption, poor stewardship, and failure to live sustainably led to their demise.

## Moving to a Higher Level

A mature society lives within its social, economic and ecological means. Such a society keeps its population and consumption at a sustainable level. It uses renewable resources to meet its needs. It uses durable goods, and extends the life of those goods already in use. It produces more from less: less raw material input, less waste, and less pollution. It reduces, reuses, and recycles. And, a mature society delays gratification, leaving all options open for future generations.

*EcoPoint*

Dr. Robert G. Lee, a professor specializing in forest sociology at the University of Washington, teaches that for any forest policy to be truly sustainable it must be:

Socially acceptable



Economically feasible



Biologically possible



Beyond this, Dr. Lee says that without some predictability in the future there can be no conservation. This is because conserving forest resources means waiting for a future reward, perhaps a reward to be reaped by ones descendants. If there is no predictability in the future, then it is rational to reap all the gains possible in the present moment. Forests grow on long rotations (25-200 years) and the forest owner needs to believe that his or her property rights are secure so that a long-term management plan can be executed. Reaching stage four in forest stewardship demands the incentive to manage for both current and future generations.

*"The reciprocal interplay between human kind and the earth can result in true symbiosis." - Rene Dubos*

"Life Cycle Analysis" studies a product from "cradle to grave," and determines what environmental impact that product will have over its useful life. Now, a new concept is emerging called "cradle to cradle" analysis. Before a product is born, we start thinking about its subsequent uses. This comes with a new understanding of what it means to live in a closed system with finite resources. Everything we have was present on earth before we arrived, albeit in a different state. Matter just keeps getting rearranged for better or worse. Once we understand this, we understand much more about living sustainably.

Adjustments in our present society are needed to achieve sustainability. A total commitment to the vision of sustainable development and sustainable forestry are essential. Most options are still open to us, however we must learn from history and apply our scientific, financial and human resources to achieve a sustainable society. If we fail in this task, then like so many ancient civilizations, our options will begin to vanish. Our children and their children will judge us by what we pass on to them.



*"We have not inherited the earth from our ancestors; we are borrowing it from our children."*

*Native American Proverb*

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## Foundations of Modern Forestry

In the thirteenth and fourteenth centuries A.D., central European monks laid the foundation for modern forestry with experiments in silviculture and agriculture. What they learned about soils, plants and forest regeneration became the building blocks for today's practices. Their newfound knowledge didn't prevent exploitation of European forests until the 19th century. During the 19th century a new science-based forest ethic emerged. Gifford Pinchot, the first chief of the U.S. Forest Service, studied forestry in Europe and was credited with bringing science-based forestry to the United States in the late 1800's.

*"We abuse land because we regard it as a commodity belonging to us. When we see the land as a community to which we belong, we may begin to use it with love and respect." Aldo Leopold*

We are making the transition to sustainable forestry as we begin our journey through the 21st Century. We have science, information and technology, which were beyond comprehension just a generation ago. We have satellite and computer technology, which allow us to construct powerful monitoring and modeling programs. These programs facilitate collection of data across broad landscapes and project changes over long time horizons. Now we need an educated public and the political will to move to the next level.

*"It's not enough to manage for wood anymore; besides environmental concerns, there are also social, spiritual and aesthetic values and many other values to take into account before an area is logged." Bill Cafferata.*



## Core Concepts of Modern Forestry

By understanding forest dynamics we can manage forest ecosystems for the continuous reoccurrence of desired conditions. Two landmark books, ***Discordant Harmonies*** by Daniel Botkin and ***Forest Stand Dynamics*** by Chadwick Oliver and Bruce Larson help us understand how forest ecosystems work in space and time.

- 1. Everything in an ecosystem is connected in an intricate web of interdependency.*
- 2. Everything in a forest is constantly changing due to ecological succession and disturbances.*
- 3. Forest ecosystems benefit from disturbance. Continuous smaller disturbances can help to ward off catastrophic events such as wildfire.*
- 4. Diversity across a forest landscape can make ecosystems more resilient and able to recover from disturbances faster.*



## Stages in Forest Stewardship

In his book '***Balancing Act***,' Dr. Hamish Kimmins, a forest ecologist at the University of British Columbia, outlines four stages of forest stewardship culminating with sustainable forestry:

- 1. Unregulated Forest Exploitation:** Unregulated exploitation of local forests leads to ecosystem degradation, and results in loss of forest productivity and resiliency. The next step is often exploitation of other nations resources through colonization, forced acquisition, or commerce.
- 2. Regulated Forest Exploitation:** In this stage the rate and pattern of exploitation are regulated in an attempt to maintain various values. However, these regulations generally fail to respect the ecological principles. This stage of forestry has generally been unsuccessful. The Greeks and Romans made it into this stage, but no real conservation was achieved because politics, law or religion rather than science drove forest management.
- 3. Ecology Based Forestry:** Ecology begins to drive forest management policies. This stage takes the ecological processes of the forest into consideration to ensure these processes are maintained. However, because this stage has frequently focused on timber production it has not always sustained all of the values desired by society. The ancient Greek and Roman empires collapsed before they were able to apply the ecological knowledge they had acquired.
- 4. Sustainable Forestry:** Under sustainable forestry social wants and needs are fully considered, and forests are managed to produce a variety of values and benefits. Values that go beyond the direct sustainability of the forest ecosystem include: aesthetics, wilderness, recreation, biodiversity, and non-traditional forest products. For this reason this stage is sometimes referred to as 'social forestry.' A strong economy and strong local communities are essential for this stage to exist.

## From Sustained-Yield to Sustainable Forestry

Sustainable forestry builds on what we have learned from Sustained-yield forestry. Sustained-yield means that we only harvest what we can grow. Both sustained-yield and multiple-use are good concepts. However, they are being superseded by sustainable forestry and ecosystem management. These new strategies consider longer time frames, larger landscapes, more values, complex interre-

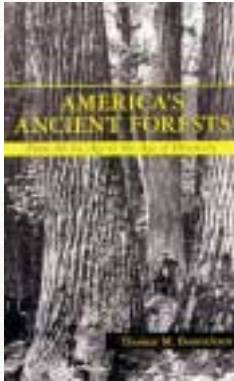
relationships, and constant-change. Sustainable forestry is determining a harvest level, which can be maintained for the long run, without jeopardizing the natural diversity, resiliency, health, and productivity of forest ecosystems.

*Worldwide over half of the 3.5 billion cubic meters of wood harvested annually is fuel wood for cooking, heating, and energy production. This is also the fastest growing category of wood consumption.*

### Restoration Forestry

Today, the population of North America is almost 80% urban.

The urban public has a poor understanding of forest dynamics (change, chaos and disturbance) and prefers "preservation" to "conservation." Yet forests cannot be maintained in a steady state. Dr. Tom Bonnicksen of Texas A&M University, in his book Americas Ancient Forests, proposes "Restoration Forestry," which is synonymous with sustainable forestry. He further explains that urban dwellers are familiar with restoration projects, which involve people and can be very messy. However, the results can be spectacular. Similarly, we need to restore many of our forests to the dynamic landscapes they were but without the large-scale catastrophic events.



### Certification

Many people see certification of "well managed forests" as a critical tool for achieving sustainability and perhaps eliminating some of the conflict and chaos surrounding forest policy. Certification emerged from the rainforests of South America where boycotts of tropical hardwoods only exacerbated deforestation as the commercial value declined. Certification was introduced as a means of rewarding companies who were managing forests with a goal towards sustainability. It was intended to address social (Aboriginal) as well as economic and ecological issues. The Forest Stewardship Council (FSC), a non-profit group was formed to set regional standards and to accredit the certifiers which in the case of FSC are Smartwood and Scientific Certification systems. FSC has carried a strong social component into North America while other Certification systems focus more on integrating Economic and Ecological. The primary certification systems in North America today are:

Forest Stewardship Council (FSC)

[www.fscus.org](http://www.fscus.org)

Sustainable Forestry Initiative (SFI)

[www.aboutsfi.org](http://www.aboutsfi.org)

Canadian Standards Association (CSA)

[www.csa.ca](http://www.csa.ca)

American Tree Farm System (ATFS)

[www.treefarmssystem.org](http://www.treefarmssystem.org)

International Standardization Organization (ISO)

[www.iso.ch](http://www.iso.ch)

### Sustainable Forestry Trends

Sustainable Development cannot be achieved without the contributions of sustainable forestry. Sustainable forestry cannot be achieved without system standards and performance standards. Then there must be an audit to see if the standards are being met. If the standards are good an audit will certify that forests are well managed with a goal towards sustainability. This will enhance credibility with public.

#### Sustainable Development:

As defined by the World Commission on Environment and Development in 1987 "**Meeting the needs of the present without compromising the ability of future generations to meet their own needs.**" ↓



**Sustainable Forestry:** Defined in the 1990's as forestry which is socially beneficial, economically feasible and ecologically sound. Takes an ecosystem approach over broad landscapes. ↓

**Systems Standards:** As defined by ISO 14,001. Good environmental management system standards are essential. ↓

**Performance Standards:** As defined by SFI, ATFS, CSA, FSC and other certification systems. These standards are what we measure performance against. ↓

**Voluntary 3rd party Certification:** Accredited organizations can do audits and certify against a standard. As an example, PriceWaterhouseCoopers has certified many companies in the forest products industry against the Sustainable Forestry Initiative (SFI) Standard. The American National Standards Institute (ANSI) did the accreditation of PriceWaterhouseCoopers and the Registration Accreditation Board (RAB) must accredit the lead certifier. Under SFI independent third party certification is voluntary. ↓

**Credibility:** As defined by the people who purchase and use wood products and the people who vote on forest policy.





## Sustainable Forestry Initiative (SFI) since 1994

(a closer look)



**“The Sustainable Forestry Initiative (SFI) standard is a comprehensive system of principles, objectives and performance measures.**

SFI integrates the perpetual growing and harvesting of trees with the protection of wildlife, plants, soil and water quality. The system provides a means for foresters, landowners, loggers and wood and paper producers to operate an economically viable industry while satisfying the growing demand of the American people for environmental responsibility. The SFI program is supported by most of North America’s largest industrial timberland owners. Together, they represent 90% of the industrial timberland in the US. The American Forest & Paper Association whose board approved the SFI principles and implementation guidelines in 1994 has administered the SFI program. However, an independent governance structure called the Sustainable Forestry Board was formed in July of 2000.”

**“The SFI program encompasses more than 100 million acres in the US and Canada.**

**More than 85 million acres will be third party Certified by December 2001;** an additional 25 million acres are certified under the American Tree Farm System. The American Tree Farm System and the Sustainable Forestry Initiative have mutual recognition. In Canada, approximately 10 million acres are certified under SFI and 12 million acres are certified under CSA. Negotiations have started on mutual recognition between SFI and CSA.”

Source: AF&PA, June 1, 2001

### SFI Auditing

**“Auditing is a means to evaluate forest management methods by independent agents to ensure that practices are sustainable and in line with the Sustainable Forestry Initiative Standard (SFI).** Third-party involvement is the most persuasive to the public, as it sends a message of openness and accessibility, and cuts through the skepticism and cynicism.”

#### SFI Principles

- 1.To practice sustainable forestry to meet the needs of the present without compromising the ability of future generations to meet their own needs. 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.To use in its own forests, and promote among other forest landowners, sustainable forestry practices that are economically and environmentally responsible.
- 3.To protect forests from wildfire, pests, disease, and other damaging agents in order to maintain long-term forest health and productivity.
- 4.To manage its forests and lands of special significance (e.g. biologically, geographically or historically significant) in a manner that takes into account their unique qualities.
- 5.To continuously improve the practice of forest management and also to monitor, measure and report the performance of our members in achieving our commitment to sustainable forestry.

#### SFI Objectives

- 1.Broaden the practice of sustainable forestry by employing an array of scientifically, environmentally, and economically sound principles in the growth, harvest and use of forests.
- 2.Ensure long-term forest productivity and conservation of forest resources through prompt reforestation, soil conservation, afforestation, and other measures.
- 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.
- 4.Manage the quality and distribution of wildlife habitats and contribute to the conservation of biological diversity, by developing and implementing stand and landscape level measures that promote habitat diversity and the conservation of forest plants and animals.
- 5.Manage the visual impact of harvesting and other forest operations.
- 6.Manage Program Participant lands of ecologic, geologic, or historic significance in a manner that recognizes their special qualities.
- 7.Promote the efficient use of forest resources.
- 8.Broaden the practice of sustainable forestry by cooperating with forest landowners, wood producers, consulting foresters, and Program Participants’ employees who have responsibility in wood procurement and landowner assistance programs.
- 9.Publicly report Program Participants’ progress in fulfilling their commitment to sustainable forestry.
- 10.Provide opportunities for the public and the forestry community to participate in the commitment to sustainable forestry.
- 11.Promote continual improvement in the practice of sustainable forestry and monitor, measure and report performance in achieving the commitment to sustainable forestry.

*There are 35 Performance Standards under these Objectives and 75 Core Indicators under the Performance Standards. The 75 core indicators are evaluated and audited by the firms doing the Certification against the SFI Standard.*

### SFI Licensing

**“In 1998, the SFI program was opened to landowners outside of AF&PA membership.** The Conservation Fund, a nationally respected conservation organization, became the first nonprofit conservation organization in the U.S. to become an SFI licensee. The Conservation Fund enrolled three demonstration forests comprising 20,000 acres of working woodlands. St. Louis County, with 900,000 acres in Northern Minnesota, was the first public land agency to enroll in this program.”



## Forest Stewardship Council (FSC) since 1993

(a closer look)

Forest Stewardship Council is an independent, not-for-profit organization that sets standards and accredits its certifiers. The certifiers (e.g. Smartwood and SGS) in turn issue; Forest Management Certificates, Resource Manager Certificates, Chain-of-Custody Certificates.

“The Forest Stewardship Council defines forest stewardship in a set of global Principles and Criteria. These Principles and Criteria, which apply to all forests worldwide, ensure that FSC-endorsed forests are managed in an ecologically sound, socially responsible and economically viable manner. Regionally specific standards translate these global principles into meaningful standards at a local level. FSC-endorsed regional standards reflect a balance between the latest science, the best known forest management practices, and current public values.”

“The FSC’s Principles and Criteria (P&C) apply to all tropical, temperate and boreal forests. 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 a complete package to be considered as a whole, and their sequence does not represent an ordering of priority.”

**FSC certified land in the US: 8.2 million acres**

**FSC Forest Management Certificates in the US: 88**

**FSC certified land in Canada: 88,000 acres**

**FSC Forest Management Certificates in Canada: 9**

**Worldwide FSC certified lands: 55 million acres**

Source: Forest Stewardship Council, U.S. news & views, June 2001



### FSC Principles

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 9. Maintenance Of High Conservation Value Forests:** Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.
- 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.

“FSC and FSC-accredited certification organizations don’t 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 made 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 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 in interpretation of the P&C will be addressed in national and local forest stewardship 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. 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.”



## Conclusions

Although we're still defining them, "sustainable forestry," and "ecosystem management" are excellent goals. They focus on achieving desired future forest conditions. As the Society of American Foresters Task Force points out, they "do not advocate preservation, or the return to some ideal 'natural state,' but rather maintenance of the integrity of the forest ecosystem and the production of goods and services within those constraints."

Intensive forest management can be included within this framework if it contributes to the goals for ecosystem management at the landscape and higher levels.

**The final key to sustainability is education.** People can only make informed choices when they understand the issues and options. All of our consumption and production options have strengths, weaknesses, risks and trade-offs. It is imperative that the public is informed and educated on the issues and options of natural resource management. An unformed public may be the greatest threat of all to implementing sustainable forest policies. There are no simple solutions, only intelligent choices.



## Glossary

**Adaptive Management:** Driving forest management with scientific research. This requires excellent monitoring, and feedback loops to quickly put new knowledge into practice on the ground. **Afforestation:** The establishment of a forest or stand in an area where the preceding vegetation or land use was not forest. **Biomass:** The weight of living organisms. Forests are biomass factories, producing plant, animal, and microbial biomass. **Certification:** being audited against a standard. **Conservation:** The sustainable use of forest resources in a manner that does not degrade the collective resource values of a region over the long term. **Eco:** This prefix comes from the Greek "Oikos" which means house. In the original context, ecology refers to the house we live in and economy refers to how we manage that house. **Ecology:** The study of ecosystems. As a science ecology makes no value judgments. **Ecosystem:** A natural system, which functions as a unit. It can be anything from a rotting log to the entire planet. It is assemblage of living organisms together with their non-living environment in a particular area. **Forest:** An ecosystem dominated by trees, with a unique combination of plants, animals, microbes, soil, and climate. **Foresters:** Foresters manage forests for the maintenance and reoccurrence of desirable conditions. What is desirable is determined by social, biological, and economic considerations. **Forestry:** The art, science, and practice of managing forest landscapes to provide a sustained production of a variety of goods and services for society. **Silviculture:** The art and science of managing stands of trees to achieve desired outcomes relative to species composition and stand structure.

## Links & Resources

**Sustainable Forestry Initiative (SFI) Program:** [www.aboutsfi.com](http://www.aboutsfi.com). **Forest Stewardship Council:** [www.fscus.org](http://www.fscus.org), [www.fscscanada.org](http://www.fscscanada.org) & [www.fscoax.org](http://www.fscoax.org). **Sustainable Forestry & Certification Watch:** [www.sfcw.org](http://www.sfcw.org). **Society of American Foresters:** [www.safnet.org](http://www.safnet.org). **Forest World:** [www.forestworld.com](http://www.forestworld.com). **A Forest Journey (the role of wood in the development of civilization):** John Perlin, Harvard University Press, 1991, ISBN 0-674-30892-1, [www.forestinfo.org/Products/books.htm](http://www.forestinfo.org/Products/books.htm). **America's Ancient Forests (From the Ice Age to the Age of Discovery):** Thomas M. Bonnicksen, John Wiley & Sons, Inc., [www.forestinfo.org/Products/books.htm](http://www.forestinfo.org/Products/books.htm). **Balancing Act (environmental issues in forestry):** Hamish Kimmins, UBC Press, Copyright 1992, ISBN 0-7748-0426-2. **Discordant Harmonies (a new ecology for the twenty-first century):** Daniel B. Botkin, Oxford University Press, 1990, ISBN 0-19-505491-1. **Forest Stand Dynamics:** Chadwick Oliver & Bruce Larson, McGraw Hill, 1990, ISBN 0-07-047829-5. **Living in the Environment:** G. Tyler Miller, Jr., Wadsworth, 1994, ISBN 0-534-19950-X. **Our Common Future:** World Commission on Environment and Development, Oxford University Press, 1987. **Principles of Sustainable Forestry:** Forest Alliance of British Columbia. **Sustaining Long-Term Forest Health and Productivity:** Society of American Foresters 1993, ISBN 0-939970-55-4. **Symbiosis between the Earth and Human Kind:** Rene Dubos, Science, Volume 193, 1976. **The Earth as Transformed by Human Action:** Robert D. Sack, Cambridge University Press with Clark University.



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