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Environmental Issues Affecting the Forestry and Forest Products Industries in the Eastern United States

August 24-26, 1994
Baltimore, Maryland

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Proceedings

**Environmental Issues
Affecting the Forestry and
Forest Products Industries in
the Eastern United States**

**August 24-26, 1994
Baltimore, Maryland**



**Edited by
J. Daniel Dolan
and
Angela Riegel**



PREFACE

These proceedings are the result of a two and one-half day conference that was sponsored by the **Forest Products Society, the Department of Wood Science and Forest Products and College of Forestry and Wildlife Resources at Virginia Polytechnic Institute and State University, USDA Forest Service's Northeast Forest Experimental Station and Region 8 Cooperative Forestry**. In addition, American Plywood Association, American Pulpwood Association, Inc., American Wood Preservers' Association, Association of Consulting Foresters of America, Inc., Audubon Society of New York State, Champion International Corporation, Chesapeake Forest Products Company, Environmental Law Institute, Forest Farmers Association, Forest History Society, Inc., Lake States Forestry Alliance, Maryland Forests Association, Massachusetts Forestry Association, National Association of Conservation Districts, National Association of State Foresters, National Association of University Fisheries and Wildlife Programs, National Council of the Paper Industry for Air and Stream Improvement, Inc. (NCASI), National Hardwood Lumber Association, National Oak Flooring Manufacturers' Association, National Particleboard Association, National Recreation and Park Association, National Wildlife Federation, Northeastern Loggers' Association, Inc., Piedmont Environmental Council, Rawles-Aden Lumber Corporation, Smart Wood Program-Rainforest Alliance, Society of American Foresters, Society for the Protection of New Hampshire Forests, Southeastern Dry Kiln Club, Southeastern Lumber Manufacturers Association, Inc., Southern Forest Products Association, Southern Pine Inspection Bureau, Tall Timbers, Tennessee Valley Dry Kiln Association, Timber Framers Guild of North America, Truss Plate Institute, Virginia Department of Conservation and Recreation, Virginia Department of Forestry, Virginia Forestry Association, Virginia Native Plant Society, West Virginia Forestry Association, Wildlife Management Institute, Woodworkers Alliance for Rainforest Protection, and World Forestry Center lent their assistance by providing mailing lists and other non-monetary assistance.

The steering committee consisted of **Derb Carter**, Attorney at Law, Southern Environmental Law Center; **J. Daniel Dolan**, Department of Wood Science and Forest Products, Virginia Polytechnic Institute and State University; **J. Michael Foreman**, Chief, Forest Resources Utilization, Virginia Department of Forestry; **John Godbee**, Manager, Environmental Compliance, Union Camp Corporation; **Russ Lea**, Interim Associate Vice Chancellor for Research, Outreach, and Extension, North Carolina State University; **Jeff Olsson**, Director, Bolle Center, Wilderness Society; **Edith Petrick**, Deputy Director, Cooperative Forestry, Southern Region U.S. Forest Service; **W.D. Ticknor**, President Forest Consultant, Inc.; **Cynthia D. West**, Research Project Leader, USDA Northeast Forest Experimental Station, **Anne Heissenbuttel**, Director of Forest Planning and Policy, American Forest and Paper Association.

The conference addressed the broad issues concerning environmental policies affecting the forestry and forest products industries, the driving forces behind them, and the effects they have on the national and global environment. A paradigm of three general factors or forces that drive environmental policy was proposed based on: 1) Society's Wants and Needs, 2) The Need to Maintain the Integrity of the Eastern Forest Ecosystems, and 3) The Role of Forest Management,

Forest Products Research and Development, and the Associated Improved Utilization of the Harvested Resource in satisfying forces (1) and (2). Within this system, it was recognized that the two drivers, Regulation and Incentive Systems, are used to provide direction for the paradigm to function.

This paradigm was investigated, and the strengths and weaknesses of the current policy for management of the forest resource and industry of the Eastern United States were highlighted. Representatives for consumers, industry, government, environmental organizations, academia, and private land owners met together to assess current policy and worked toward recommendations for how future policy might better serve all parties affected.

The objectives for the conference that were met and addressed during the conference were:

- A forum for discussion of environmental issues affecting forestry and forest products industries of the Eastern United States, based on more scientific observations and rational thinking, rather than emotions was provided.
- A fairly balanced review of the methods and policies used to direct the use of the eastern forest resource over the past 50 years was provided.
- Direction for future policy makers in government, industry, and environmental organizations was provided. These included topics that affect local, regional, national, and international environmental quality.
- Environmentally sound forestry operation was clarified.
- Examples of how groups can cooperate for mutual gain of all groups involved were presented.
- Steps for improvement of forestry operations of all scales were identified.
- Multi-disciplinary research and problem solving were identified as the “best” approach to environmental understanding and problem solving.
- Several incentive for good practice were identified as preferable to continued disincentive approaches to problem resolution.

The conference could be deemed a success based on the response of those attending. Most of the participants stated that they gained a tremendous amount of respect and understanding for the opposing parties on the issues of concern. A better understanding of the rationale behind the rhetoric and actions was gained. Finally, most participants agreed that a more optimistic view of environmental negotiation was in order, and the extreme views held by parties on both sides of the issues were usually not the view held by the majority of interested parties.

The surprising result of the conference was definitely the willingness of all participants to listen intently to what individual speakers were saying, give credit to all view points without discounting out of hand, and openly discussing the topics without a loss of tempers. While no earth-shattering agreements were arrived at, with few exceptions, cooperation and compromise was seen as achievable.

These proceedings provide some of the discussion that took place during the conference. The first section contains the manuscripts for the formal plenary presentations and the second section contains the extended abstracts for the poster session presentations given during the meeting. It was impossible to document all of the discussions, however, the moderators for each of the work sessions have provided their interpretation of the work session discussion. It is hoped that these proceedings will continue to provide a basis for further discussion and foster further cooperation and compromise when negotiating solutions to future problems related to those discussed at the meeting.

J. Daniel Dolan
Conference Chair

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Opening Speech

For

Environmental Issues Affecting the Forestry and Forest Products Industries of the Eastern United States

J. Daniel Dolan

Conference Chairman

Welcome to the National Conference on Environmental Issues Affecting the Forestry and Forest Products Industries of the Eastern United States. My name is Dan Dolan and I am Chairman of this conference. If there are any questions you may have, or any problems that I, or my assistants, can help with during the next 2-1/2 days, please feel free to contact either myself, Angela Riegel, our conference secretary, or any of those assisting with the registration and audio visual aids. We all will do our best to make your stay as enjoyable, educational, and productive as possible.

I would like to introduce the Steering Committee that helped plan this conference. Since my specialty is structural engineering, I hardly qualify as an expert in environmental issues. This topic is a personal interest of mine. I might add that the Steering Committee members were the ones that conceived most of the ideas. The Steering Committee consists of:

- ◆ **Mr. Derb Carter**, an attorney with the Southern Environmental Law Center;
- ◆ **Mr. Michael Foreman**, Chief of Forest Resources Utilization, with the Virginia Department of Forestry;
- ◆ **Mr. John Godbee**, Manager for

Environmental Compliance, with Union Camp Corporation;

- ◆ **Ms. Anne Heissenbittel**, Director of Forest Planning and Policy, with the American Forest and Paper Association;
- ◆ **Dr. Russ Lea**, Associate Dean of Research at North Carolina State University;
- ◆ **Mr. Jeff Olsson**, Director of the Bollie Center, with the Wilderness Society;
- ◆ **Ms. Edith Petrick**, Deputy Director of Cooperative Forestry, Southern Region U.S. Forest Service;
- ◆ **Mr. William Ticknor**, President of Forest Consultant, Inc.; and
- ◆ **Ms. Cynthia West**, Project Leader, USDA Northeast Forest Experimental Station.

Would you please join me in giving these fine individuals the recognition they so deserve. All members of this Steering Committee will be moderating and facilitating the various sessions during this conference. I would also like to thank our conference secretary, **Angela Riegel**, for her tremendous efforts in making this conference a success, as well as our assistants who are helping out with the audio visual aids and registration.

The conference is being sponsored by the following contributors:

- ◆ the Carolina-Chesapeake Section of the Forest Products Society;
- ◆ the College of Forestry and Wildlife Resources, the Department of Wood Science and Forest Products, and the Division of Continuing Education at Virginia Tech;
- ◆ the Division of Cooperative and Private Forestry for the Southeast Region of the Forest Service, and
- ◆ the Northeast Experimental Station of the Forest Service.

I would like to extend our thanks to all our sponsors for the financial support that kept registration fees to a minimum, and made this conference possible. Finally, a thank you should be given to the myriad of cosponsors that have lent their assistance in announcing the event to their members and lending their general support to the effort.

Now, you may wonder why we conceived this forum for discussion. I would like to take this time to provide some background, and to outline some of our expectations.

As you know, the environmental issues in forestry, for the western part of the United States, have been in the spotlight for some time. I believe this is because the federal and state governments control the vast majority of the land directly affected by changes in forest policy in the western United States. Therefore, most of the effort to change practices in forestry and forest products have been concentrated on issues such as preventing cutting of old growth forests in the west. This is partially because the different interest groups had to deal with a single landowner, the U.S. government, and could avoid other issues associated with private landownership. However, some of the environmental issues

affecting the eastern United States are just as important and, possibly, have far more reaching ramifications. In some ways, the decisions reached, in an effort to address the environmental issues in the eastern United States, may have severe impact on the industry and society, as a whole. For instance, in the State of Virginia, most of the forest land affected by the forestry and forest products industry is privately owned. Therefore, if government policy changes such as to protect endangered species, water quality, to create recreation opportunities, or to address other societal requirements, the policies will directly affect the individual freedoms associated with private land ownership. The potential precedents this could set for all aspects of American society are immense, and due consideration must be given to ensure the changes will be effective in improving the environment, and any costs or restrictions placed on land owners are justifiable. On the other hand, doing nothing has adverse effects on the environment and the economy. If uncontrolled development is allowed to continue, the forestry resource will be fragmented into small plots. This would have immediate adverse effects on the wildlife, water quality, and economy, in addition to problems manifesting themselves years into the future. Since the forest products industry is one of the largest employers in the Eastern United States, and the fact that the fragmentation of the forest will also reduce the availability of the raw material required to maintain the employment level currently experienced, the impact of policy decisions is important.

In addition to these national problems, U.S. environmental policy indirectly affects global forestry practices. Since the demand for forest

products will not decrease, due to policy changes, and restricting our resources will only transfer the impact of demand to another location in the world. This may not be the "best" management technique, from a global environmental policy standpoint. It is, therefore, important to provide a forum for these issues to be discussed, where areas of agreement for potential cooperation between the parties involved can be highlighted. It is just as important to highlight the areas of disagreement so that the differences can be discussed in a rational manner, and an effort towards compromise can be made.

Some of the issues facing the government, corporations, and other interested parties include chlorine by-products such as dioxines, mono-cultures, bio-diversity, ecosystem management, point source and non-point source pollutants, endangered species, clear-cutting vs. selective cutting, general punitive vs. incentive regulation, recreational vs. wilderness, vs. commercial uses of the land, and the list goes on and on.

I agree with many of the ideas and statements made by representatives of Federal and State agencies, environmental groups, and industrial concerns. At times, I have felt like I was being drawn and quartered by my desires to defend the various positions. My hope is that more co-operative efforts, such as the model exemplified by the Greater Yellowstone Coalition, might be formed to work on long-term use and development plans, on a regional basis. The Greater Yellowstone Coalition is a combination of ranchers, ski resort developers, miners, the National Park Service, environmental groups, logging companies, and state and federal forest service. The group is working on a long-term plan for land use in the Yellowstone River drainage basin. More

cooperative groups like this need to be formed to work on regional problems.

I have as many concerns about how each of the parties act and react as I have feelings of support. **Should forest companies be able to function in a laissez faire political environment?** I doubt it, a few bad apples will spoil the barrel. **Should all the forest lands be off limits to logging?** Again, I do not think this is wise either because of the importance of forest products to society. **Should battles over these political issues be continuously fought with no intent of compromise?** The only ones that benefit from this standpoint are fund raisers, politicians, and lawyers. **We need to begin to co-operate and compromise on a much larger scale.** The environmental concerns of society are here to stay. But, are the assumptions made by society correct? Hopefully, this conference will help clarify some of these points.

I heard a story a short while ago that concerned me. A colleague of mine related an incident where children at their church were performing a skit or prayer that included the idea of protecting the environment. Included in the idea was protection of the trees -- meaning not cutting trees. While this might sound like success to many, it concerns me. If we take this idea to the extreme, we would shut down forests to logging, which in turn shuts down the entire forest products industry. **No more lumber to build homes, no paper to learn to write on, or books and newspapers to read, a loss of pharmaceuticals, and chemicals that are used in our everyday lives.** Will society remain committed to this type of protection? Not likely, at this current time. We must realize that living in the United States provides us the luxury of being concerned about the

environment. Anyone who has travelled to the developing world can attest to the lack of concern for the environment in communities where the major concern is how to feed one's family in order to survive on a day-to-day basis. **If environmental concerns cause one of the United States largest industries to become non-competitive and large numbers of jobs are lost, the pendulum of concern would swing away from environmental concerns, and all the improvements and gains made over the past 50 years would be lost.** At the same time, if industry does not change to co-operate and embrace environmentalism, society will push it into extinction. We must work together to re-shape our thinking and actions.

This conference was conceived around a paradigm. The paradigm consists of 3 general factors, or forces, that drive environmental policy. It is based on 1) Society's wants and needs; 2) The need to maintain the integrity of the eastern forest ecosystems, and 3) The role of forest management, forest resources research and development, and the associated improvement in utilization of the harvested resource in satisfying forces 1) and 2). Within this system, there are 2 drivers: Regulation and Incentives. These drivers provide direction for the paradigm to function. The question is: **is this paradigm valid? Should there be a major paradigm shift to improve how we interact with the biosphere we live in called earth?** Your task for the next 2-1/2 days is to answer these questions. Please provide input on how our current system can be improved.

In holding this conference, we strive to take a pro-active stance towards environmental concerns, and potential resolutions and

solutions, in order to get leaders from all sides of the issues to sit down together and begin addressing how long solutions may be obtained. The Forest Products Society, a group of forest products professionals in government, academia, and industry, will use this forum to gather information and provide direction for future research towards technical solutions to some of the problems. We also strive to provide direction for policy makers at the Federal and State government levels, as well as for corporations and other interested parties.

I believe that this conference is an opportunity for all of the general issues concerning environmental policy and forest use to be addressed by parties on all sides, in a more or less rational manner. This is one of the few attempts made to examine past successes and failures, as well as where the opportunities for future cooperation exist. The areas of severe contention, where avenues for compromise need to be found, will be discussed. We no longer have the opportunity to ignore the issues. **Global environmental pressures on forests have grown, and the focus on the forests of eastern North America has been affected.** These issues are no longer simply regional in nature, and decisions made to address these problems have become global, in importance. We hope that you are willing to assist us in this endeavor and will provide your views for inclusion in the discussions. We welcome your active participation and I, personally, look forward to hearing from you during the various plenary sessions, the technical forum this evening, and especially during the break-out sessions tomorrow afternoon. We have an opportunity to set aside our political baggage, roll up our sleeves, and work toward providing an even-handed,

broad directive for future policy makers to follow. Let us see how effective we can be.

To help you keep track of your ideas during the conference, the program has been printed with a blank column alongside each speaker's abstract. Please use this to take notes that might assist you during the break-out sessions, where each of you is expected to participate in formulating a critique of current policy and practices, a directive for how to improve upon the current policies and practices, and a statement on how to foster more co-operation between interested parties, rather than continuing in the current confrontational mode.

Again, thank you for your time and effort in participating in this conference. Let's get started. At this time I would like to introduce the moderator for the first session on Society's Wants and Needs, Ms. Edith Petrick, Deputy Director for Cooperative Forestry, Southwestern region U. S. Forest Service.

Society May Not Always Want What it Needs

James W. Giltmier, Executive Vice-President, Pinchot Institute for Conservation

In a lifetime of study of American politics I have determined that sometimes things do happen for no apparent reason whatever.

Ordinarily, through the democratic processes of consensus building, progress is obtained by taking three steps forward, and then two steps backward. It is a maddeningly tedious way of getting things done. It makes ordinary people claim that they despise politics and politicians. But the process keeps anarchy from occurring, and the society remains intact.

But sometimes -- not often thank heaven -- things just evolve, so that things that were shades of gray yesterday are today clearly black and white.

The Cold War was a thing like that. For more than 50 years the Soviet Union and the West engaged in the most expensive conflict in the history of our species. Then it was over and there was no longer a place called the Soviet Union.

The background for everything we did as a nation for half a century was the Cold War. Tens of thousands of Americans lost their lives in Korea, Viet Nam and elsewhere. A significant percentage of our national treasure for the foreseeable future was mortgaged to fight that war.

And then, as if by magic, it was over.

But it wasn't magic was it? In the simplest terms, our side out spent their side in dollars and scientific ingenuity. And as their side struggled to keep up, their economy collapsed.

As I said, that magic trick took 50 years for the payoff to occur.

Today I am going to talk about another magic trick that is now playing itself out in terms of the

management of the world's forests, and when the trick is over, people will say, "How is it that it took so long for us to come to agreement almost over night?"

Ever since the creation of the national forest reserves in 1891, forests and forestry have been items of considerable controversy in American political thought.

As early as 1864 George Perkins Marsh was writing about the "profligate waste" of the forests causing drought floods and erosion.

But America was not listening.

A little over five years ago I worked for a law firm as a non-lawyer consultant on foreign trade. I read some-where then that there is nothing in America that is not for sale.

I believed that then, and I suppose I still believe it to a considerable extent today.

Another spin on that theme is that America is a nation of shoppers. Look for the best deal you can find and then snap it up before someone else grabs it.

The Japanese feel like traitors when they purchase foreign goods. In this country there is no stigma in buying less expensive foreign goods instead of U.S.-made products.

Our country has a cheap food policy. We are the best-fed country on earth, and our food is less expensive than anywhere else in the world. The public has felt badly that family farms have given way to industrial agriculture.

But those are the breaks. WalMart is cheaper than mom and pop stores, and cheap, abundant food is better than family farms.

Am I being critical of the American fondness for the marketplace?

I am not!

The market may be a ruthless place that cares nothing about human values and nuances. But we know that it usually works for the benefit of the majority.

But when it comes to forests, some new values come into play that interfere with market-oriented, utilitarian ideas.

It's this!

God or some spiritual value like a god is in the forest.

Before you write me off as a nut, let me explain.

Some people look at a forest and they see commodities.

Others look and they see in their minds' eyes works of art carved from walnut and other precious wood materials.

Other see cities created from the wilderness.

But all of us -- whether we admit it or not -- have personal spiritual values that we get from forests. These are values that transcend the uses that we may make of the products of the land.

My friend Herb Schroeder, a sociologist in Chicago who studies such things, says that throughout history, human cultures have used trees, forests, animals and other elements of the natural environment to symbolize their most basic spiritual values and beliefs.

Those of you who have no use for "touchy-feely" kinds of ideas won't like what Herb says next, but here goes: "If we really want to understand and appreciate the spiritual values of forests, we have to be willing to explore the intuitive/feeling side of the mind on its own terms. In doing this, we cannot rely exclusively on rational, scientific methods. On the intuitive side of the mind, experiences of beauty, love, and imagination carry more weight than scientific data and statistics."

Be careful now before you write Herb and me off as a couple of liberal humanists.

I could argue that it is the intuitive side of our intellect that has kept us going as a species. In its narrowest terms after all what is human love? We use it to procreate, and we use it to work together so that we won't be picked off one by one.

As for beauty I won't mention Michelangelo or Frank Lloyd Wright.

As for imagination, I won't ask how it was that some of us were smart enough to figure out how to cultivate wheat and rice so that we could stay put and build cities.

What is important to society's wants and needs today is that human beings think a lot more about what forests are than products for the wood yard.

In a nationwide public opinion poll taken this year, Americans said they want healthy forests, above all else. With regard to the federal lands, people say they want the government to balance recreational forest uses off with commodity uses.

The public says it wants to be involved in forest management decisions, and that long-term health of the public forest should not be compromised for short-term gains.

What happened here? What happened to the market-loving Americans who want things on the cheap?

When it comes to forests you can forget all of that utilitarian stuff.

Think about the word, "majesty."

Think about "grandeur," "magnificence," "splendor" and "stateliness."

These terms once were used in connection with royalty. But there aren't many kings and queens around anymore. And now those words are used most often in connection with mature trees and forests.

My colleague William Shands said last November: "In the field of natural resources, polarization among interest groups is accompanied by a deterioration of civil debate as groups attack government agencies and each other in the media and other public forums. The acrimony over management of old-growth forests and protection of the northern spotted owl in the Pacific Northwest moved a *Seattle Times* reporter to write:

'Even the Civil War produced a kind of community between rival armies. Here, any sense of cooperation and compromise has lagged far behind self-righteousness, myopic interest and legal stalemate.'

"That description applies to many areas of the country and many issues where, to quote John Gordon (of Yale University), 'We would rather fight than win.' 'Win' means mutually beneficial outcomes."

There is so much more to this than I can say here. Look me up and we can talk. But human beings do not think of forests the way they think of other land forms. Those who persist in believing otherwise will continue to get their scientific forest formulas shoved down their throats.

Forests were the original home of our species. Don't try to give people economic efficiency. They don't care. They will buy good forest science to a point. But in their guts -- in a secret chamber of their

subconscious -- they know what's good for forests, and they want to have a say.

The trouble with this is that most of the people in the Northeastern states are two or three generations removed from any personal identification with the land and water resources. Despite that secret chamber of remembrance, they are detached from an understanding of the vital importance of soil and water to human survival as a result of succeeding generations of city living.

Therefore, if you want rational decisions from the public about the uses of forested land, they need a better understanding from someone about what conservation management means, and what an important part of nature human beings are.

If terms like biodiversity and ecosystem management are to be of any value to the judgement of people who buy forest products and pay taxes to manage forest reserves, the forestry community had better find a much more effective way to carry these concepts across the city limits into urban America, because that's where the voters are.

Now it is time for me to end the story about the magic trick.

Grey Towers, the family home of Gifford Pinchot, is the home as well of the Pinchot Institute for Conservation. In late 1990 the first event of the celebration of the 100th anniversary of the creation of the national forest reserves was held there. Several thoughtful people met for a workshop on "Land Stewardship in the Next Era of Conservation."

The result was the "Grey Towers Protocol," which said:

(Forest) management activities must be within the physical and biological capabilities of the land, based on comprehensive, up-to-date resource information and a thorough scientific understanding of the ecosystem's functioning and response.

The intent of management, as well as monitoring and reporting, should be making progress toward desired future resource conditions, not on achieving specific near-term resource output targets.

Stewardship means passing the land and resources -- including intact, functioning forest ecosystems -- to the next generation in better conditions than they were found.

Land stewardship must be more than good "scientific management;" it must be a moral imperative.

In 1992, the Pinchot Institute cosponsored with the Northeastern Area Office of the Forest Service a Duluth, Minnesota conference on stewardship.

Following that conference, Bill Shands, Bill Ticknor and Perry Hagenstein developed the idea for what has come to be called the Duluth Manifesto, a nine point set of principles that addresses the posture of the United States in world forestry. The first principle is most important:

"Humans are part of nature and the forest environment. All forests will continue to be affected by human actions."

More than 50 influential foresters have become signers of the manifesto.

This is a part of the magic, don't you see?

I'm tooting the horn of the Pinchot Institute, but there have been many others involved in the creation of the magic, including the Society of American Foresters.

Here's how the magic plays out:

Last January the Tropical Timber Agreement was renewed by a United Nations conference, but no one walked away from the table happy.

The Southern Hemisphere countries wanted the

Northern Hemisphere nations to accept the same the same standards of sustainability that the Northerners wanted to impose on the tropical forests.

Instead the northern nations would only agree on a vague, sustainable management agreement for their forests, while offering their poor relations to the South what were termed "appropriate resources" for future forest conservation programs.

Under the old politics that is what might be expected. Three steps forward and two steps backward.

But on June 22 this year a group of foresters and other scientists met in Geneva, Switzerland to determine what "sustainability" means in terms of the temperate and boreal forests. Represented were Australia, Canada, Chile, Finland, Germany, Japan, Korea, Mexico, New Zealand, Russia and the United States.

The United States announced at the meeting that it would cosponsor with the Rockefeller Brothers Fund a technical conference September 7-10 on criteria and indicators for sustainable forests.

But there is more to the magic.

On the following day in Geneva there was a European Union ministerial conference to work on the development of "quantitative indicators for sustainable forest management" in the European Community. The agenda included management of forest resources for their contribution to global carbon cycles as well as non-timber forest values.

Insofar as I understand global politics, big countries never acknowledge to little countries what concessions they might make to be less incommodious.

That's magic folks!

Here's some more.

On August 25, my pal John Heisenbuttal of the American Forest and Paper Association will reveal a set of "Sustainable Forestry Principles and Implementation Guidelines." The guidelines will address biodiversity, ecosystem management, forest acreage, logger training and performance monitoring.

The initiative has the support of the major executives of the largest forestry corporations.

If these events do not constitute magic for you...

Then you don't know what magic is.

But I do.

Thanks for your attention and time.

The Miracle Resource

Robert F. Legg, President & CEO, Temperate Forest Foundation, 14780 S.W. Osprey Drive, Suite 355, Beaverton, Oregon 97007

Of the world's natural resources - petroleum, coal, natural gas, wood - only one is renewable. That same material is biodegradable, recyclable, non-toxic and requires the least amount of energy to convert to useful products. Plus, it is beautiful.

From the trees in the forest, to the lumber in your home, to the paper you read after a long day's work, wood and wood products dominate our lives. But there's more to wood than meets the eye.

Not only is wood an abundant resource which has thousands of uses, it is a unique product of nature in many ways. Perhaps most important is that wood is a resource which holds tremendous opportunity as we work to meet the growing needs of populations around the world in a sustainable manner. But first, what is wood? As much as we depend on wood, very few people know what it is or how it is produced.

The cycle begins in the forest factory

We know that wood products are made from trees which come from the forest, but how is wood, the hard, fibrous substance beneath the bark, produced? When it comes to wood, the forest is really the 'factory' where trees produce this miracle resource. Not only is the product of trees renewable, so is the process by which trees themselves are made - it's called photosynthesis. And just like fossil fuels power a factory, the sun is the energy which powers the forest's production.

In the forest's factory, healthy, growing trees capture free energy from the sun and carbon dioxide from the atmosphere, then combine them with water to produce carbohydrates, or sugars. The carbon which is captured becomes the main ingredient of wood: the miracle resource. Even after harvesting

and manufacturing, wood still retains its carbon level, again contributing to our healthy atmosphere.

Beautiful, versatile wood

You'd be surprised at the number of products we use each day which come from wood. Mills today process every part of the tree into a variety of products. In fact, there are an estimated 10,000 uses for wood! Many are obvious like dimension lumber, panels, roofing, telephone poles, railroad ties, fencing, chairs, desks, cardboard, newspapers, magazine, milk cartons, landscape bark, toilet paper, park benches, pianos and popsicle sticks.

Others are not so obvious, because they are made with wood residues, fibers and chemicals. These everyday, but not so obvious, products include frames for prescription glasses, cosmetics, photographic film, rayon, acetate, cellophane, chewing gum, medicines, sausage casings, artificial vanilla flavoring, vinegar, poultry feed, paint, hair spray and even the thickener in milkshakes!

Advancements in wood technology have resulted in engineered wood products which are made by combining several types of wood to make new products that have more uniform properties than the wood from which they are made. For example, several sheets of wood veneer are glued together to make one piece of plywood, a strong, dimensionally stable product. Wood shavings, scraps and sawdust can be glued together to form oriented strand board, fiber board, and particle board, products that have many structural and non-structural applications.

Wood waste can also be used to generate electricity or steam to power manufacturing processes. This is called co-generation and the paper industry generates 60 percent of its power this way.

As we look around our natural and constructed environments, it is possible to see wood in use virtually everywhere - from the home we live in, to our food, clothing and medicine. Look around your home, office or school. What items do you use which are made with wood, the miracle resource?

Wood: The environmental choice

Everything we use comes from a natural resource. And it takes energy from coal, natural gas, petroleum, water, or uranium to produce the things we use. Because our burgeoning world population demands more and more material goods, demand for energy continues to rise.

We do not have an endless supply of energy. Hydropower is threatened by increasing regulations designed to recover fish species, and nuclear power has not met its promise due to problems with cost, plant safety and hazardous toxic waste. Alternative sources, such as wind and solar power, are not yet technologically advanced to supply enough energy to major industries. Consequently, we are currently dependent on dwindling supplies of fossil fuels. If we hope to stretch current reserves of non-renewable resources as far as we can, we need to choose products which are energy conservative instead of energy intensive.

In other words, we can choose products which take little energy to produce and ones which conserve energy once they are in use. It's a choice we make many times a day. When you stop to consider the alternatives, one product stands above the rest - wood.

First, wood requires less energy to produce than alternative building materials.

A study commissioned by the National Research Council involved a comprehensive analysis of wood, plastic, steel, aluminum and concrete and its findings are chronicled in what is known as the CORRIM report. The results reveal that it takes 21 times more energy to produce a 4" thick concrete

slab floor than a raised wood floor. It takes 9 times more energy to produce a steel stud than a wood stud; 5 times more energy to produce aluminum siding than wood siding; and 3 times more energy to produce a concrete block than to produce its equivalent weight in wood.

Wood also excels when comparing energy efficiency as measure by R-value, or resistance to heat transfer. Again, wood retains heat more efficiently than alternative materials. The CORRIM tests revealed that wood has 413 times the R-value of steel, 2000 times that of aluminum, and eight times that of concrete.

Then, of course, wood is recyclable. So is steel. But steel, both new and recycled, is energy-intensive in refining, manufacturing and fabricating. In fact, even a 60 percent recycled steel stud uses three times more energy to produce than a wood 2 X 4. Aluminum recycling also is energy intensive; and not all plastic can be recycled.

Though paper has long been recycled, as have wooden pallets and barn siding, recent research and development efforts have led to many exciting, new, versatile products which combine renewable and non-renewable resources.

Without a doubt, wood's greatest asset is that it is renewable. Furthermore, wood is the only natural resource which is increasing in reserve volume each year. As an example, the total volume of wood growing on forestlands in the United States is 25 percent greater today than it was in 1952! Knowing that makes you feel good about choosing wood.

As consumers, we are always choosing between products made from renewable and non-renewable raw materials. The best choices are those made based on a solid understanding of our role on this planet, especially in the face of exponential growth in world population and consumption alike.

The world's population currently totals 5.7 billion people and is projected to double within the next 50 to 70 years. The task to sustain ourselves

environmentally and economically is challenging, but not insurmountable.

Wood for the world

The solution is called sustainability and we must all be involved if sustainability is to be achieved.

Living sustainably means using our own resources and living within our means.

If we are to save this planet for coming generations, we need to decrease our reliance on the resources that are irreplaceable, and increase our use of renewable resources. We also need to avoid the use of energy-intensive products, choosing instead materials such as wood that can be converted to useful products with little use of energy. Choosing a product made of wood is a choice for an ecologically and economically sustainable future. It is also a choice for well-managed forests.

Intensified management of our private forestlands is our only alternative as larger and larger tracts of public forests are set aside in reserves for uses other than wood production. Managed forests, whether they be small woodlands or industrial forestlands, are diverse and complex ecosystems. They contain abundant wildlife habitat, as well as recreational opportunities and structural diversity. Managed forests contain healthy trees which are less susceptible to insects and disease. As such, the trees found in a managed forest create strong wood products which, in turn, contribute to a sustainable economy and society.

Today, we need to produce more from less - less raw materials, less waste and less pollution of the air, water and soil. One tool to help us produce more from less is the computer. This is witnessed today in the forest products industry where computers have dramatically improved efficiency and quality of wood production at every level.

Nearly all wood product manufacturers in North America use computerized technology in their mills

to maximize product yields. Efficiently produced wood products are the most cost-effective both to the producer and the consumer.

The advantages of choosing wood are clear - wood is biodegradable, recyclable, energy efficient and renewable. Our challenge is to both conserve and develop this natural resource. Such a task takes responsible producers and consumers working together to make a difference. It's a difference in which producers are able to manufacture the wood products because consumers choose to use the thousands of products made from wood: the miracle resource.

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Fix The Dented Fenders: Society's Wants and Needs in Relation to Forests of The Eastern U.S.

W.D. Ticknor, President, W.D. Ticknor Forestry Consultants, Inc., Orient, OH, 43146.

Abstract

To provide an effective managerial bridge between forests and the human communities of interest on whose behalf resource professionals manage forest resources, societal values must be understood and considered in decision processes. Both quantitative and qualitative values, logical and subjective views must be incorporated in the manager's perspective if society's interests are to be adequately served. A strategy to integrate a social view into traditional resource management programs is presented.

When I first agreed to participate in this discussion of society's wants and needs in relation to forestry and the forest products industry in the eastern U.S., I really thought it was going to be a pretty easy job; I have given a lot of thought to the subject over the last several years, and felt I had a pretty good grasp of the fundamentals.

But after sitting down at my computer to begin putting words on paper, as it were, I realized that what I was preparing to describe for you under the rubric of "society's wants and needs" were things which *you* have told *me*; in other words, the scientific community's estimate of society's wants and needs.

I wanted to try to do better. Over the years I have looked at a lot of surveys of the public's opinions about forests and forestry. Many of these queries have taken the form of lists of forest attributes, amenities and products which respondents were asked to rank or score. Somehow, while they usually seemed reasonable enough, they did not seem to add significantly to our fundamental understanding of underlying public values, nor have they been particularly useful predictive tools. It

seemed to me that we were missing an important key to the public attitude.

I think its true that as individuals who are involved in resource management, research, and the academic dimension of forestry, we tend to visualize the forest in terms of components and products; wildlife, wood products, recreation, water, air, soil, non-commercial plants and animals, etc. We constantly deal in these individual elements, and in combinations thereof.

The public has a different view altogether. My thesis is that the public views a forest as an integrated whole, which is not the same as an aggregation of parts, or even the sum of parts. The concept I'm describing is clear if we think of people; we conceive people as integrated organisms, not composites of their anatomical parts or personality traits. Unless you are a mechanic, your view of your car is an integrated view; when you look at the car your are looking at a single object. Now, if I were to ask you, what do you like most about your car, and give you a list of components, you might say almost anything on any given day. How do you like the overhead valves? The tires? The paint job? The dashboard? The point is, your answers to these questions about components don't really tell me very much about your affection for the *car*.

Now let's suppose your son comes home one day and says, "Dad, I hate to tell you this, but I put a wrinkle in the back fender of your car!" How do you feel? "Don't worry about it; it's buffered by the rest of the car, I wont' see it that often...and after all, the car has four fenders, and only one is bent. Besides, its just cosmetic, not functional. Don't worry about it!"

No, no. That's not the way it works for most of us. If the fender's bent, the car is broke, and we're not comfortable 'til it's fixed. Likewise for the public; if part of the forest they know is dysfunctional or visually impaired, the whole is somehow affected.

Ralph Waldo Emerson helped me to understand the holistic view I'm trying to describe for you. In his essay, "Nature," penned in 1836, he wrote,

"When we speak of nature in this manner, we have a distinct but most poetical sense in the mind. We mean the integrity of impressions made by manifold natural objects. It is this which distinguishes the stick of timber of the wood cutter from the tree of the poet. The charming landscape which I saw this morning is indubitably made up of some twenty or thirty farms. Miller owns this field, Locke that, and Manning the woodland beyond. But none of them owns the landscape. There is a property in the horizon which no man has but he whose eye can integrate all the parts...This is the best part of these men's farms, yet to this their warranty deeds give no title."

Against this background, trying to see clearly through the mist of preconceived notions, I have decided that society's wish list for eastern forests is fundamentally very simple: maintain a stable, healthy forest. In this context, "stable" means subject to very little change: in equilibrium. "Keep it the way it is right now."

Translating "stability" to terms which may be useful to us as managers and planners, its essence is captured in maintaining three things:

-- First, abundance...the area in forest cover, the question of *how much*.

-- Second, distribution...the question of *where*, the issue of local abundance by comparison to historic norms.

-- And third, character...the question of *what kind*, also compared to some historic norm.

When abundance, distribution or character change, society becomes distressed.

The second major category of social concern is health. As I use the term here, it means sufficiently vigorous so that, with a little help, the forest can maintain its abundance, distribution and character.

Stability and health, then, comprise priority number one on the public agenda for eastern forests. It represents their primary "want."

The second priority is for professional resource managers capable of translating the first priority into action specifics.

The resource professional society visualizes embodies the same characteristics we want in our doctors: understanding, judgment, skill, and a commitment to excellence. Honesty goes without saying. Collectively, these attributes engender trust, and a high comfort level with the decisions the doctor helps us make, and the numerous decisions he or she makes on our behalf. Essentially, once we have reached a level of trust in the relationship, we decide what it is we *want*, and depend on the doctor to decide what we *need*.

Right now, in this country, public trust of both the public and private institutions which make forest stewardship decisions for us is at a low ebb, to say the least. The public has difficulty trusting its own employees--foresters on the public payroll--to do "right." And of course, we don't believe a thing industry says. Even corporations which have earned some degree of credibility are tainted by association with the corporate culture which can say, "We see no evidence that tobacco causes cancer."

I don't want to turn this discussion into a meaningless barrage of sociological concepts, but

there are three things we are going to have to do if we want to obtain the public trust as resource manager and stewards. They are right at the center of what the public wants and needs, and, I might add, deserves:

1. First, we must learn the value systems and language of people on whose behalf resource management decisions are made, and to whom communications are addressed. Foresters are the handshake, the bridge between society and its forest resources. Tom Bonnicksen (1991) has observed, "Resource management takes place in an environment of continuous social and ecological change. Managers must adjust to these changes and guide them, where possible, to meet the needs of society. So a resource manager acts as a mediator between society and the physical environment from which resources are derived."

As mediators, we must recognize that society parses its resource wants and needs in terms of *values*, not the forest practices needed to obtain or preserve values. To make matters even more difficult for the practicing resource manager, many of the values are subjective. The manager's job, really, is to interpret societal values in terms of practical forest stewardship alternatives, a very perplexing task.

Mitchell and others (1993) have made a significant contribution toward better understanding and managing objective and subjective forest values; they make the distinction between "use orientation" and "attachment orientation." Use orientation stresses "the importance of the environment in relation to the activities [or uses] pursued." Attachment orientation derives from "a strong emotional bond to places." While Mitchell et al were addressing *places*, the same distinctions apply to *phenomena*, like old growth. Some people value old growth for its species composition and ecosystem dynamics; others, for a warm feeling they get just thinking about it.

As we consider society's wants and needs, we need to hear the authors' conclusion: "At the heart of today's forest management issues is emotion. The 'felt' perceptions of the forest are as real and as important as 'scientific facts.' Both should be incorporated into public land management planning. To do this, public land managers need to follow a process that integrates rational, objective science with the 'felt' perceptions of the forest." My only reservation about this statement is that it should not be limited to public land.

The bottom line is that we must learn to practice objective forestry in a subjective world (Ticknor, 1989). To the many voices expressing concern that warm, fuzzy feelings are replacing hard, cold logic, my response is that the logic must be supportive of and include a place for the emotional side.

There is no better model for the kind of scientific, philosophic and poetic integration I'm talking about than Aldo Leopold. His much revered *Sand County Almanac* seamlessly blends science and poetry. It has been widely quoted as a source of wisdom by partisans of both wilderness and "wise use."

Now what does all of this have to do with the eastern forest? A lot, because there are very few acres of the eastern forest which do not have a strong emotional attachment of one sort or another to many, many people. Forests manifest many qualities increasingly difficult to find in modern urban life. They radiate serenity, stability, a certain sense of security. Thoreau (said it thusly, "There is something indescribably inspiring and beautiful in the aspect of the forest skirting and occasionally jutting into the midst of new towns...The very uprightness of the pines and maples asserts the ancient rectitude and vigor of nature. Our lives need the relief of such a background, where the pine flourishes and the jay screams."

"Our lives need the relief of such a background." I can't say it any better, I can't define it any more precisely. Sure, society wants and needs fresh air and clean water and lumber and paper and recreation and hunting and fishing and hiking and birding and

morels...But more than anything, we need the emotional sustenance we derive from just knowing forests are there. Thus, the yearning for stability of which I spoke reflects a desire to preserve the contributions forests make to the quality of life. And I believe--although I cannot prove--that in an increasingly crowded, urbanized world, this contribution of forests becomes increasingly important. Weekend traffic patterns and the second home phenomenon are outspoken reminders of this truth.

Professional managers will ignore the flow of psychic goods and services at their peril.

2. The second in my trio of mandates to meet social expectations is to communicate forthrightly. I think a major part of the problem in the perceived lack of candor in communications from institutions in both the public and private sectors reflects the devotion of much energy to "spin doctoring," trying to put a good face on anything an agency or company has to say. As a result, the content and its meaning are often lost or at least, confused. Incidentally, if you're looking for a good, old-fashioned synonym for "spin doctoring," try "dissimulation," which, to Webster, means "hiding under a false appearance." In their advertising, their annual reports, their press, American institutions ultimately say anything they please. It is a license which does not serve them well. This observation, incidentally, comes from a person who used to take great pride in crafting statements for release by corporations: the point was to be truthful in what was said, but to omit qualifying phrases which would make both a statement *and its implications* true.

In case you are not certain what I'm talking about, here's an example: a company proudly reports the huge number of trees it plants annually, but nowhere mentions that stifling competition means very few of the survivors are free to grow.

I don't intend to demean or detract from the skill of "PR" professionals and "public information specialists." But my experience tells me something very special and important happens when a professional resource manager or researcher, not coached by a PR intermediary, shares his or her views and knowledge directly with the public.

What society wants and needs, I believe, is access to unabridged information, information unadulterated by the intrusion of ulterior motives.

3. The third element of this triad of initiatives to meet public wants and needs is a proven axiom for success in an organizational context. Avoid unhappy surprises! We can't avoid unhappy *experiences*, but we *can* mitigate the element of surprise.

A couple of years ago, shortly after I had acquired my woodlot in Ohio, I was out one Saturday afternoon with my tractor and my chainsaw cutting an interior trail around the property not far from the boundary. At one point, I looked up, and there, perhaps 20 feet away on the other side of the fence that defined the property line was another human being, a man, glaring at me with a look that absolutely snarled with antagonism and anger.

"Who are you?" he says. I told him.

"What are you doing?" I told him.

"You know who owns this property?"

"Yes," I told him, "I do. I bought it from Martin Stahl."

"I didn't know he had it for sale. What did you pay for it?"

It turned out he was my neighbor, and that the trail I was cutting was in an area he had hunted in (with permission) for years and years. He was very attached to my property, and took extreme umbrage at the change he thought I was making in this part of "his" landscape.

I came away from this experience with a bitter taste in my mouth. Later, once I got to know him a little better, it dawned on me if I had just told him about what I planned to do before the fact, it would have disarmed the whole nasty scene.

I am sure many of you have experienced that same sinking feeling seeing a lowboy loaded with logging equipment pull off the road opposite your house or camp. Or, discovering that your view has been "destroyed" by the unexpected intrusion of harvesting activity into your line of sight. These things are going to happen, they can't be avoided. But what we can avoid is the element of surprise. We can telegraph our intentions with signs; by talking with neighbors; by having information-sharing meetings before the fact on site, with a dialogue between interested individuals and the "forester in charge."

When I was a kid and was dropped off at the dentist, after cleaning my teeth and mumbling something unintelligible to himself the dentist would get to work undoing the damage wreaked by six months worth of Necco wafers and Baby Ruth bars. Today, after my chops are clean and have been X-rayed and examined, the dentist invites me into his office for a "fireside chat" to cushion the unhappy surprises and share treatment alternatives with me. We forestry professionals need to do the same thing for our constituencies.

We have asserted that the public wants two things; a stable healthy forest, and resource doctors they can trust.

As the doctors, then, what will we prescribe?

Take two tranquilizers and call me in the morning!

Seriously, here is my prescription:

1. First, we will want to make our intrusions into the forest as inconspicuous as possible, our treatments light-handed. The public is saying not just that aesthetics are important, but also that stability is important. We don't

like change, especially in scenery and landscapes to which we have strong emotional attachments.

Now, as professionals, as the landscape doctors, we know that change is inevitable. The forest is dynamic. But we spend fortunes on the cosmetic dimension of life in this country, on the appearance of things. And the public wants us to be as fussy about preventing the visual deterioration of forest landscapes as we are about upscale residential neighborhoods, our architecture, our bodies. When change *is* prescribed, we would like it to be incremental, out of site and intended for some longer term purpose consistent with maintaining abundance, distribution or character..

This fussiness and public preference also translates into longer rotations, larger trees, and more frequent, less radical selection harvests in parts of the forest region. The public seems to accept the concept that in order to maintain our flows of tangible forest products, it will be apropos to practice intensive forestry on part of the landbase, extensive forestry on the remainder. What they don't want is one unbroken even-age plantation stretching from Jacksonville to Fort Kent.

2. Maintaining stability also means keeping all the parts and systems. It means maintaining biological diversity. Yes, we recognize that in the normal course of events, species will become extinct. What we must avoid is an *abnormal* course of events, a course that accelerates the demise of critical ecosystem components. And it may well be, perhaps often, that moderating "normal" events to preclude the extinction of species which might otherwise have occurred is a significantly better outcome than the obverse.

Mankind will leave his indelible imprint upon the face of nature; we are suggesting that there will be times when the imprint can be an improvement upon the outcome of chaotic chance.

Preservation of systems and their components has implications at every geographic scale; we are not just talking about preserving specimens, as in a global zoo or botanical garden. We are talking about maintaining viable ecosystems within their natural range of occurrence. This is an aspect of the distribution and character concerns I have alluded to earlier.

3. The application of best management practices to preserve soil and water resources must become routine, just like maintaining aseptic conditions in an operating room. Forestry activities conducted under the supervision of professional resource managers should consistently attain very high marks for attention to these details. There is no excuse for anything less.
4. We must become very sensitive to "special places," places that have particularly high value for aesthetic reasons, because they support unusual natural curiosities, or have value as historical or archeological sites. If any of these sites is neglected or destroyed, the credibility of managers plummets, to say nothing of the damage itself.
5. I think the eastern public has great capacity to learn, in terms of both willingness and the ability to grasp complex subject matter. As we better understand the importance of coordinated management of certain features across ownerships, as we develop an economics that is supportive of ecosystem management, I believe the public will also be supportive. Preserving water quality and the special characteristics of streamside zones, maintaining connectivity, minimizing further fragmentation, safeguarding critical species habitat--all are consistent with the public's commitment to stability and health.

But we will need to involve the publics we serve in a variety of learning experiences--learning for them and for us. We can teach ecological basics; they can

teach us the priorities identified by the local community, so that where there is a wide variety of options, all consistent with good fundamentals, the choices can reflect their preferences.

Let me summarize and close.

We have asserted that society's wants and needs in relation to the eastern forests are typically experienced most urgently at the level of emotions. They don't have a shopping-list mentality that says they need one of this and one of that. Their wish list, then, is for a holistic approach that delivers the entire package of individual amenities, plus the package itself. We have summarized by suggesting that society's *wants* boil down to health and stability. Their *need* is for professionals who can manage the resource in a manner consistent with their wants.

These social aspirations for the forest are by no means antithetical to a "new forestry" that integrates a more intense focus on ecosystems, landscape-scale phenomena and sustainability. In fact, they are eminently complementary; I can imagine no forest management scenario that could come closer to meeting society's wants and needs than the evolving ecosystem management paradigm. However, those who aspire to positions of responsibility in the new era of resource stewardship will need to convey scientific realities in the language of the humanities. Not an easy task, but by no means impossible. Let me close with just one more illustrative anecdote.

Not long ago, I did some work for a client in southern Mississippi who was terribly afraid that I "just didn't get it," that I didn't understand what was important to him as I worked to help him develop a management plan for about 2,500 acres of forestland. But his anxiety disappeared when, in the preface to my plan I summarized what his place is all about in these words:

"The forest and agricultural landscape makes a number of profound statements about Piney Woods;

- It is an island of *peace* in turbulent world;
- It is a *diverse* community...young trees commingle with old trees, hardwoods with pines;
- It is a place where *beauty* is respected, cultivated;
- It is a product of the *patience* and *devotion* and *hard work* of an earlier generation;
- It is a constant, eloquent reminder of underlying *spiritual* values."

I daresay that society is hoping that it will hear us affirm these same realities so far as the eastern forests of the US is concerned. They may then begin to feel, "These resource managers have finally got it!"

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ECOSYSTEM MANAGEMENT IN THE SOUTHERN APPALACHIANS: OPPORTUNITIES FOR BIODIVERSITY CONSERVATION ON FEDERAL LANDS

Gregory H. Aplet, Forest Ecologist, The Bolle Center for Forest Ecosystem Management, The Wilderness Society, 900 17th Street NW
Washington, DC 20006

Abstract

Ecosystem management can be described as the "process of achieving sustainability." If it is to meet the requirements of the Brundtland Commission definition, ecosystem management must "meet the needs of the present without compromising the ability of future generations to meet their own needs." Because we cannot know the needs of future generations, providing for their needs means maintaining options, the *potential* of the ecosystems upon which we depend. Ecosystem potential can be partitioned into genetic potential, the living biological diversity of ecosystems, and productive potential, for example, soil fertility, clean air, and clean water. Ecosystem management is the process of maintaining the biological diversity and productive potential of ecosystems.

One place that provides a tremendous opportunity to protect the biological diversity of a regional ecosystem is on the federal lands of the Southern Appalachians. There, most of the rare elements of the forest ecosystem, including endangered species, old growth forests, and remote interior forest are found on the 16% of the regional landbase in national forests and national parks. Unique among the ecological regions of the eastern United States, the Southern Appalachians possess a central core of federal lands that could provide the basis for regional biodiversity conservation upon which to build a regional strategy of ecosystem management.

Introduction

The Wilderness Society's Bolle Center for Forest Ecosystem Management was established in 1991 to promote sustainable management of the forest lands of the United States. At The Wilderness Society, we are interested in ecosystem management as a process to achieve sustainability, where sustainability implies maintaining biological diversity and the productive capacity of ecosystems.

The Brundtland Commission (1988), in their landmark report Our Common Future, defined sustainable development as "providing for current needs without compromising the ability of future generations to meet their needs." They recognized the relationship between healthy ecosystems and the ability to meet the needs of current and future societies and concluded that saving species and their ecosystems is "an indispensable prerequisite for sustainability." However, because it is impossible to know the needs of future generations, it is difficult to know if a sustainable condition has been attained. A useful goal, in the absence of such knowledge, is to maintain options by maintaining ecosystem potential.

Ecosystem potential resides in two qualities of ecosystems: biological diversity and productive potential (Franklin 1993). Biological diversity encompasses the entire variety of life, including genetic, species, ecological community, and landscape diversity. Productive potential includes tangible things, like clean air and water and soil fertility, but it also includes intangibles, such as solitude and spiritual values that one might find only

in wilderness. As ecosystem management represents the process of achieving sustainability, its objective must be the conservation of biodiversity and productive potential of ecosystems.

Principles of ecosystem management

Virtually every paper written about ecosystem management has included some statement of basic principles. Recently, a few authors (Grumbine 1994, Moote et al. 1994) have attempted to distill

recurrent themes from the literature. Many of the so-called principles are more statements of what should be, rather than fundamentals upon which to base a new approach to management. Here, I will attempt a distillation of fundamental principles to serve as a foundation for the further development of ecosystem management (Table 1). These five principles do not describe what should be; they are statements of fact about ecosystems, people, and knowledge. They do not define ecosystem management, but they do provide a basis for its development.

Table 1. Principles of Ecosystem Management.

<p>Ecological Integrity - All parts of ecosystems are interconnected through ecological processes, including interrelationships, such as predation and competition, and dynamic forces, such as population growth. Pattern, the kinds and quantities of ecosystem elements and their arrangement, is a function of the processes occurring in ecosystems. A healthy ecosystem retains its patterns and the processes that bind the system together.</p>
<p>Change - Ecosystems continually change in response to key processes. For example, disturbance processes, including fire, insect outbreaks, and extreme climate, are known to affect dramatically ecosystem structure and function.</p>
<p>Scale - Ecosystems occur at all spatial scales from the rotten log on the forest floor to the entire globe. Ecosystems are structured in a hierarchy such that large ecosystems are composed of smaller ecosystems. Ecosystem boundaries rarely follow political or ownership boundaries. Ecological processes also occur at a variety of rates represented in a temporal hierarchy.</p>
<p>Uncertainty - The remarkable complexity of ecosystems ensures a perpetual gap between what is known about ecosystem behavior and how ecosystems actually behave. Adding to the resulting uncertainty about the future are unpredictable changes in environmental factors (for example, climate) and societal preferences (for example, management objectives). Modern management has often treated land and water as simple systems with a static goal of commodity production, which has had negative effects on native ecosystems in some places. Managing in the face of uncertainty requires a commitment to constant learning, both about the environment and about society. Acknowledging uncertainty reflects a humility toward the environment that has been missing from past management philosophy.</p>
<p>Humans As Part of Ecosystems - People, like all organisms, are members of, and are dependent on, their ecosystems. Ecosystem condition affects all aspects of human life from health to the economy. People also have a tremendous ability to influence the quality of the ecosystems in which they live.</p>

The first principle of ecosystem management is the **principle of ecological integrity**, which affirms the complexity and interconnectedness of ecosystems. This principle captures the notion so well expressed by John Muir when he said, "When we try to pick out anything by itself, we find it hitched to everything else in the Universe." Ecosystem management acknowledges and maintains the fundamental interconnectedness of all life.

The second principle is the **principle of change**. Through processes of birth, death, growth, migration, etc., ecosystems are constantly changing. The relatively recent scientific acceptance of the pervasiveness of disturbance in ecosystems (White 1979, Pickett and White 1985, Botkin 1990) is forcing managers to reconsider traditional approaches that focussed on maintaining an optimal state in favor of one that accommodates processes (Mladenoff and Pastor 1993).

The **principle of scale** simply states that ecosystems exist in all sizes. Small ecosystems combine to make larger ecosystems, and these combine into still larger ecosystems. Likewise, the processes that bind and change ecosystems proceed at various rates, with some processes, like germination or fire, taking place in a matter of minutes or hours and others, such as climate change or soil development, taking place over thousands of years. Management that focusses on only one scale will fail to account for important phenomena at other scales.

It has been said that ecosystems are not only more complex than we know, they are more complex than we can know (Noss and Cooperrider 1994). The **principle of uncertainty** acknowledges the challenges that ecosystem complexity, random chance, and changing public values create for management. It highlights the danger of believing that what we know now is all we will ever need to know, and it makes explicit the need to approach management as a learning process to try to reduce future uncertainty.

The final principle, the **principle of humans as part of ecosystems**, recognizes the vital connections between people and their environment. People function within ecosystems and are both affected by, and have an effect on, those ecosystems. Everything we do, from breathing and eating to our livelihoods and leisure activities, is influenced by the quality of our ecosystems. Ultimately, ecosystem management reflects human values; the choice to live sustainably derives from an ethically-based vision of the ecosystem we want to live in and pass on. Ecosystem management is at the center of attention because it offers some hope of meeting a common objective: a diverse, healthy, productive ecosystem in which to live.

Elements of ecosystem management

The foregoing five principles serve as simple statements of fact regarding the nature of ecosystems and the place of people in those ecosystems. Further, these principles lead logically to a set of recommendations as to what must be included in a strategy of ecosystem management. Inclusion of these "elements" (Table 2) in an ecosystem management plan ensures that the plan has accommodated the fundamental principles.

The principle of ecological integrity requires that managers and planners provide for the continued existence of all of the biological and physical elements of ecosystems. This does not require enumeration of every element, but it does require deference to ecosystem complexity in planning; the management objective can no longer simply be the maximization of any single element of the system. Where certain elements of the ecosystem are at risk, such as endangered species or old-growth forest, ecosystem management must provide short-term protection until conditions are established that ensure the continued existence of those elements.

The principle of change requires the accommodation of important ecological processes into the management plan. The strategy must provide for such processes as dispersal and migration, plant succession, and disturbance, such as fires, floods,

Table 2. Elements of Ecosystem Management

1. An analysis of the distribution of elements of biodiversity and a short-term strategy to protect critically imperiled elements.
2. An analysis of the processes that sustain diversity and productivity and a long-term strategy to maintain or restore key ecosystem processes.
3. A hierarchical classification system that recognizes regional ecosystems.
4. A rigorous process of adaptive management aimed at improving our understanding of ecosystems over time.
5. A land system that includes the entire spectrum of human needs, from wilderness to dominantly human use, with allocations made based on conservation needs.

and population interruptions. A key goal of ecosystem management must be the restoration and maintenance of these processes.

The principle of scale demands that an ecosystem management strategy take into account the hierarchical nature of ecosystems and address patterns and processes at large as well as small scales. This requires a land classification system that recognizes ecosystems at multiple scales.

The principle of uncertainty highlights the need to improve understanding as we proceed. Approaching management as a learning process does not overcome the challenges imposed by ignorance, but it begins to address them. The scientific process of "learning to manage by managing to learn" is called adaptive management (FEMAT 1993); it requires integrating research into the design of management experiments. Managers must become researchers; scientists must be involved in management.

The principle of humans as part of ecosystems requires that peoples' needs, from the concept of wilderness to the concrete of the city, be accounted for in ecosystem management plans. One simple way of providing this spectrum is to allocate land to three land management classes: reserves, multiple-use lands, and production or urban areas (Hunter and Calhoun 1993). Production areas are needed for obvious reasons; reserves are necessary for the

conservation of some elements of biodiversity, for their cultural, educational, and scientific value, and for their "ecosystem services", such as flood control and water purification. Multiple-use lands can contribute to both the conservation of nature and to the production of goods.

An ecosystem management strategy that incorporates all five of these essential elements will be well on the way to achieving sustainability. Several efforts have already fulfilled certain of these requirements, but no plan has combined them all. For example, the Chesapeake Bay Program has taken a regional perspective with an open acceptance of people as part of the ecosystem, but it has concentrated more on water quality than on regional biodiversity or ecological processes and has shied away from comprehensive land use designations within the watershed. The effort to restore the Everglades has focussed on reestablishment of hydrological processes as a means of maintaining ecosystem integrity over a broad region, but it is far from implementation. Perhaps the most comprehensive approach was that used by the Forest Ecosystem Management Assessment Team (FEMAT 1993) to resolve the forestry impasse in the Pacific Northwest. Their plan has a regional perspective, utilizes land use designations (including reserves), assesses and seeks to protect species, and explicitly includes adaptive management. However, it has been

criticized for failing to account for ecosystem dynamics by assigning successional stages to static places on the landscape. Progress is being made, but we are still awaiting a plan that incorporates all five elements of ecosystem management.

Conserving biodiversity on the federal lands of the Southern Appalachians

The Southern Appalachian Mountains present both an opportunity and an imperative to pursue sustainability through ecosystem management. This region has been called "one of the two great centers of forest diversity [in] the United States" (along with the Siskiyou Mountains of southwest Oregon) (Whittaker 1972). The Southern Appalachians form the headwaters of all of the South's major rivers, and they provide recreation and respite for millions of people. Great Smoky Mountains National Park, at the heart of the regional ecosystem, is the most visited park in the system. The Park combines with parts or all of six national forests to form the greatest concentration of public land east of the Mississippi River. Various statutes and the Forest Service's own policy of ecosystem management provide the mandate to protect ecosystem integrity, while the core of public lands provides the opportunity to do so with a minimum burden on adjacent landowners.

The Wilderness Society's Bolle Center for Forest Ecosystem Management recently completed an analysis of the Southern Appalachian region to provide some of the elements of an ecosystem management strategy (Boone and Aplet 1994). Using data obtained from federal managers, state natural heritage programs, and the Forest Service's Forest Inventory and Analysis Program, we assessed the status and distribution of various elements of biodiversity at the regional scale and recommended short-term protection measures for at-risk components. We also provided recommendations to begin restoration of ecosystem patterns and processes. It is our hope that these elements will inform other efforts at ecosystem management in the region.

We analyzed the 24 million acre region approximating the southern portion of the Blue Ridge and Ridge and Valley Physiographic Provinces identified by Bayer (1983). It is essentially the same area identified by the United Nations Southern Appalachian Man and the Biosphere Program to help coordinate land-use and land management issues and by the U.S. Forest Service to study regional timber supply. The area extends from the "Roanoke Gap" in west-central Virginia southwest to the Georgia-Alabama border. About one third of the area (8 million acres) is without forest cover, and about one million acres of forest are protected in Great Smoky Mountains National Park (500,000 acres), designated wilderness, and other areas withdrawn from timber production. The remaining 15 million acres are classed as "timberland", meaning that the Forest Service considers them capable of producing commercial timber; approximately 22 percent of the timberland is federal. Overall, the national forests and national parks of the region constitute 3.8 million acres, representing approximately 16 percent of the study area's land base.

We assessed the status and distribution of the four levels of biodiversity (genetic, species, community, and landscape) to the extent that data were available. We found that the federal lands, despite representing only one-sixth of the region, housed the majority of some important elements of biodiversity.

- *Species diversity.* Of the 690 vertebrate species and 2,245 higher plant species native to the Southern Appalachian study area, 551 (80 percent) of the vertebrates and 1,833 (82 percent) of the plants are found to some extent on the region's national forests and parks. Ninety vertebrate species and 225 plants are globally rare, occurring in fewer than 100 known locations worldwide. Sixty-eight percent of these globally rare vertebrates and 66 percent of the plants have been recorded on federal lands. In addition, 60 native vertebrate species and 83 plant species are listed as threatened or endangered or are candidates for listing under the federal Endangered Species

Act. Seventy-two percent of these vertebrates and 61 percent of these plants occur on federal lands.

- *Genetic diversity.* Trees and salamanders are among the most ecologically significant groups of species in the Southern Appalachians. We examined the patterns of distribution of the 159 tree species and 54 salamander species in the study area to try to understand the distribution of genetic diversity in the region. Fifteen tree species and 23 salamander species are endemic to the Southern Appalachians; they are found only in the study area or have more than half of their range in the study area. The genetic diversity represented by these species is unique to the Southern Appalachians. Fourteen of the endemic tree species and 20 of the salamanders are found on federal lands. In addition, 40 tree species and three salamander species occur in populations that are separated from the main range of the species. These populations have evolved in isolation and likely contain unique genes. Thirty-one of these 43 disjunct species occur on federal lands. Other species exhibit different distributions that suggest a need for special conservation. All distributional classes are well represented on the national forests and national parks of the region.
- *Community diversity.* With the exception of low-elevation riparian forest types, the major native forest communities are well represented on federal and non-federal lands; the most prevalent are oak-hickory and shortleaf-loblolly pine. In North Carolina's western mountains, where a more in-depth classification has been done than in the rest of the region, federal lands support 90 percent of all recognized plant communities, including many that are globally rare or found only in the Southern Appalachians. In addition, national forests and Great Smoky Mountains National Park contain over half of the scarce old forest habitat currently existing in the region, despite their relatively small contribution to the land base.
- *Landscape diversity.* Forest fragmentation caused by farming, roads and other developments has resulted in a prevalence of edge conditions across the landscape. Scarce blocks of continuous forest cover are concentrated on the federal lands. Nearly 90 percent of privately owned and industrial timberland is within a half-mile of nonforested farmland, whereas less than 40 percent of federal timberland is that close to an agricultural edge. (Virtually no timberland is located beyond two miles from agricultural fields.) In relation to roads, 99 percent of all timberland is located within one mile of a road. Of the 1.2 million acres of timberland beyond a half mile of a road (about five percent of the region's timberland base), more than 60 percent is on federal lands, though federal land represents only 22 percent of the region's 15 million acres of timberland. Great Smoky Mountains National Park and wilderness areas also contribute crucial large blocks of mature forest to the landscape mosaic.

Conclusions and recommendations

Our assessment of the region indicates that a major share of regional biodiversity can be conserved on the federal lands of the Southern Appalachians. The Endangered Species Act, the National Forest Management Act, and the Forest Service's fledgling policy of ecosystem management provide the mandate to conserve biodiversity. The ecosystem recovery that has taken place since the deforestation and fires of the turn of the century and the concentration of critical elements of biodiversity on the federal estate present federal managers with a tremendous opportunity to contribute to the long-term sustainability of the regional ecosystem. A few key changes in policy would go a long way toward ensuring that end.

Our analysis identified the large block of complex, mature forest as the most immediately threatened element of biological diversity in the Southern Appalachians. The destruction and fragmentation

of interior forest threatens all four levels of biodiversity. Migratory songbirds, wildflowers, native genetic architecture, old-growth habitat, and landscape pattern are all harmed by the fragmentation of intact blocks of older forest. Planned even-aged timber management and road construction on the national forests will continue to fragment the few remaining blocks of intact forest, exposing interior-dwelling species to hostile conditions, isolating and reducing populations, destroying uncommon communities, and homogenizing the landscape. A strategy to protect biodiversity and productive potential through ecosystem management should provide short-term protection to rare mature forest interior. Adopting the following four recommendations would immediately slow the rate of deterioration of Southern Appalachian biodiversity caused by planned timber harvest activities and help conserve this vital element of the landscape:

- o **Significantly reduce timber harvest levels and change forest plans to relieve the pressure to cut older forest;**
- o **Institute a moratorium on all road construction;**
- o **Halt forest type conversions and associated artificial regeneration;**
- o **End the cutting of potential old-growth forest.**

Our analysis provides a regional perspective on biodiversity and recommends short-term protection. It does not provide the assessments of ecological processes, the multiscale analysis, the prescription for adaptive management, or the land-use allocations that would complete an ecosystem management strategy. We hope that as others undertake ecosystem management in the region, they will consider our findings and work to provide additional essential elements.

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Defining Ecosystem Management

Ken Holtje - Ecosystem Management Team, USDA - Forest Service, Eastern Region

Different people have different definitions and impressions of the term "Ecosystem Management." One definition is not necessarily better than another. It is important to define how you are using the term.

When the Chief of the Forest Service announced his Ecosystem Management policy back in June 1992, he used the phrase "taking an ecological approach to the multiple use management of the National Forests and Grasslands."

There is an even simpler and more applied definition, namely that Ecosystem Management means "*Managing by Ecological Unit*," and understanding associated patterns and processes.

An Ecological Unit is a defined area on a map. An Ecological Unit has a **particular** combination of climate, landform, soil, and vegetation. It also has a predictable successional pathway, from pioneer to climax species. We can, and in many cases, already are, "Managing by Ecological Unit," "Managing by Ecological Unit" seems far less presumptuous, and far more pragmatic than saying we "manage ecosystems."

The Ecological Classification System provides a framework for mapping Ecological Units at different scales. This framework allows larger landscape units that cover multiple ownerships to be progressively subdivided into smaller units depending on the issues and types of decisions that need to be made.

At the largest scale, Dr. Bob Bailey has mapped the Ecoregions of the United States. At the next finer scale, the Province and Sections have been mapped for the eastern United States. Sections are not being subdivided into Subsections at a multi-States statewide scale.

In 1990, the Upper Great Lakes Biological Diversity Committee formed a coalition of 17 representatives from Federal and State agencies, the forest industry, environmental groups and the academic community. They reached consensus and have prepared an Ecological Unit map of the tri-state area of Michigan, Wisconsin and Minnesota. Similar efforts are now underway for the Central States, the New England area, and the Middle Atlantic States. Most National Forests in the east have subdivided these Units into three finer levels, namely Land Type Associations, Ecological Land Types and Ecological Land Type Phases. These finer levels are suitable for Forest Plan and project level decisions.

This "nesting" or "subdivision" of Units is described in the *National Hierarchical Framework of Ecological Units* adopted for service-wide use by Acting Chief of the Forest Service, Dave Unger in November 1993. Many other Federal and State agencies have adopted or are evaluating this system for their purposes.

This *Hierarchical Framework* is a way to organize our thinking, our analysis, and our decision making on the landscapes we manage. Larger units are used to address issues at the landscape level across large areas of multiple ownerships and multiple jurisdictions, such as the migration of wolf packs from the Boundary Waters Canoe Area Wilderness into western Wisconsin and the Upper Peninsula of Michigan. Another example at the large landscape level is the management of Jack Pine and the restoration of native prairies and oak savannas across Michigan, Wisconsin and Minnesota.

Smaller units are used to make project level decisions at the local level, such as individual timber sales or the protection and restoration of scarce, endangered or unique species.

The hierarchical framework of Ecological Units is a "tool" for managers to use to relate decisions at one level to those at another level. "Managing by Ecological Unit" is also a way to address the complex issue of sustaining and enhancing biological diversity.

Operating principles for ecosystem management

There are some simple operating principles for Ecosystem Management.

- Manage ecological systems, not individual resources
- Manage habitats, not individual species
- Humans are part of the ecosystem, and their needs must be met
- Concept of relative scarcity or abundance
- Concept of managing across larger landscapes

The last two principles or concepts need further definition.

The concept of "relative scarcity and abundance" is key to the issue of conserving or enhancing biological diversity. This is the underlying issue in the Pacific Northwest with the Spotted Owl. For the general public, the issue is protecting and preserving that cute little owl. For the more informed, the issue is protection and preserving the entire old growth habitat which the owl occupies. It's not just the owl, but rather all of the associated plants and animals. Old growth habitat is relatively "scarce." Other habitats are relatively "abundance." It seems logical that to determine relative scarcity or abundance, you must first put it in the context of the Ecological Unit in which it occurs.

Picture an Ecological Unit of several thousands of acres. To maximize biological diversity, you would want all serial stages to be represented on that landscape, from pioneer to climax. If you inventory the current vegetation, or areas in different serial stages, it should give you a feeling of what's relatively abundant, and what's scarce or missing.

Now you can develop some management strategies. On those areas that are relatively abundance, you have a wider range of management options, including timber harvest. For those areas that are relatively scarce or underrepresented, perhaps your management strategy should be to protect or restore those areas.

We can build on this concept of "relative scarcity or abundance and move to the concept of managing across larger landscapes. Picture again that Ecological Unit of several thousands of acres. It crosses multiple ownerships and multiple jurisdictions. It includes Federal lands, State lands, corporate lands and private lands. Each are contributing some type of habitat and each contributes to the overall biological diversity. So then the question becomes "Who should supply what portion of which ecological systems at what successional stage?"

Consider a very simplistic example. An Ecological Unit half of which is in corporate ownership and half of which is National forest. Suppose the corporate portion is being managed for shorter rotation species that provides a pioneer to mid-successional habitat. Perhaps, then, the National Forest portion should emphasize a mid-to-late successional habitat. The net result is that all serial stages are represented within the Ecological Unit, resulting in the highest degree of biological diversity.

This does not infer in any way, shape or form, any implication of regulation of private property rights. That's not the point. The point is that we have an opportunity to look at complimentary management strategies across larger landscapes and multiple ownerships.

All natural landscapes contribute something to biological diversity, whether they may be public, private, or corporate. The National Forests can not provide 100% of society's needs for biological diversity.

East of the Mississippi, only 8% of the forested landscape is in National forests. Not all ecological systems are represented on National Forests.

East of the Mississippi, less than 30% of the forested landscape is in public ownership. Not all ecological systems are represented on public lands.

Furthermore, public lands serve a variety of purposes. How much of these public lands should be managed for those species needing minimally disturbed conditions - a highly controversial issue as we know from the Spotted Owl controversy in the Pacific Northwest. What should be the role of the 70% of private and corporate lands?

The Northern Forest Lands *Council*, commissioned by the Governors of Maine, New Hampshire, Vermont and New York has been addressing that question for the past 3 years. Their Biological Resources Subcommittee is working on a biological diversity assessment of the New York and New England area, and characterizing those representative ecological systems that occur on public land, and those found only on private and corporate lands.

In conjunction with this study, the State of Maine recently mapped the State's dozen or so major biophysical provinces or ecological units. They then listed the State's 130-140 or so "ecological systems" and inventoried how many of these systems were represented on public lands. They concluded that *less than half* of the States' ecological types occurred on public lands. That means that *more than half* of the State's ecological types occur only on private lands. The Report of the Northern Forest Lands Council outlines in great detail a number of strategies for preserving representative areas of these ecological types.

There are other examples of how Ecosystem Management is being applied at a landscape scale. The Mark Twain National forest and the Missouri Department of Conservation have recently completed a statewide assessment of biological diversity. It identifies and maps the major

ecological units in the State. It describes each ecological unit in terms of topography and soils, pre 1850 vegetative communities, present vegetative conditions, the unit's contribution to Statewide diversity, and a conservation strategy for each Ecological Unit.

There are many other collaborative efforts that we can point to.

In the Midwest, 20 Federal and State agencies have come together and formed an Interagency Committee on Ecosystem Management. The purpose of this Committee is to reach consensus and develop strategies for: a common Ecological Classification and Inventory system; sharing Data bases and GIS systems; transferring Research technology; internal and external education programs; developing complimentary multiple agency management strategies for large areas of adjoining public lands; and assessing regional biological diversity.

The State of New Hampshire, in cooperation with the White Mountain National Forest is developing a comprehensive Forest Management Plan for all lands within the State.

In Michigan's Upper Peninsula, the Hiawatha National Forest in cooperation with the Michigan Department of Natural Resources, the Seney Wildlife Refuge, the Pictures Rocks National Lakeshore and Mead Paper Company are developing complimentary management strategies for the entire eastern half of the Peninsula. Similar efforts are underway in Wisconsin and Minnesota.

Another strategy of Ecosystem Management is ecological restoration. Major ecological restoration projects are underway on many public lands, particularly in the Midwest, where 98% of the original pine barrens, oak savannas and native tall grass prairies have disappeared.

For example, on the Mark Twain National Forest in Missouri, 10,000 acres of native tall grass prairies is being restored through the use of prescribed fire

and removal of encroaching red cedar. On the Chequamegon National Forest in northwestern Wisconsin, 6,000 acres of native grass prairie and oak savanna have been restored. A similar project is underway on the Hiawatha National Forest in northern Michigan to restore sharp-tailed grouse habitat.

Native tall grass prairies and open oak savannas are even being restored in the suburbs of Chicago through a cooperative project with the Forest Preserve District of Cook County, the Forest Service, the Nature Conservancy and the Illinois Department of Conservation. Forty miles southwest of Chicago is Joliet Arsenal, which is due to be closed as a military installation. This 23,500 acres tract has tremendous potential for restoration. This tract and the adjoining 20,000 acres of corporate and State of Illinois lands could form the largest prairie and wetland complex east of the Mississippi.

Ecosystem management - strategy

Ecosystem Management should also be discussed in another context. Ecosystem Management is not a Goal. You don't say "our Goal is to do Ecosystem Management." You can say that our Goal is to maintain healthy and sustainable forests; or, our Goal is to protect threatened and endangered species; or, our Goal is to enhance biological diversity. You don't just jump in your pickup truck in the morning and say "I'm going out to do Ecosystem Management today."

Ecosystem Management is really a *Strategy*. It is a way of thinking about the landscapes we manage. It is a way to organize our thinking and maybe our land management plans. It is thinking about things like Time and Space, or as some more eloquent associates would say - "spatial and temporal relationships."

Consider *spatial* relationships for a moment. As we look across the landscape, we know that areas transition from: wet to dry; from cold to warm; and from high elevation to low elevation. We also know

plants and animals change in response to these physical changes.

There are also *temporal* changes. Landscapes change over time - we call it natural succession. A typical successional pathway in the midwest would be aspen in the early seral stage, transitioning to oak and maple after 60-80 years, and possibly to maple/hemlock after several hundred years. Ecosystem Management should imply an understanding of these Time and Space relationships, and their consideration in our management decisions.

Incorporating ecosystem management into land management plans

The final topic to be discussed is Incorporating Ecosystem management strategies into Forest Plans. This is a key and essential element to insure that Ecosystem Management principles are consistently reflected in on-the-ground management decisions.

Our vision is that as we revise our Forest Plans for the second decade, we will adjust our current Management Area boundaries to correspond with Ecological Units. We will describe the natural successional pathway for each Ecological Unit. We will specify Standards and Guidelines by Ecological Unit. By comparing the existing vegetation with the potential vegetation (Ecological Unit map), we will be able to identify off-site species. Through public involvement, we will identify the Desired Future Condition in terms of a desired seral stage, and a balance of seral stages within an Ecological Unit.

Using silviculture treatments and techniques such as prescribed fire, we can move the Unit toward the desired seral stage. A flow of forest products to meet society's needs will be one of the considerations in determining Desired Future Condition.

One of our biggest challenges will be to define management opportunities and limitations by Ecological Unit.

Summary

In summary, taking an "Ecological Approach to Management" has been described in terms of:

- defining Ecosystem Management as "Managing by Ecological Unit"
- describing some Operating Principles and examples of applying Ecosystem Management at the landscape level
- defining Ecosystem management as a Strategy rather than a Goal
- sharing our vision of how to incorporate Ecosystem Management into Forest Plans

Finally, it is important to reinforce why we are moving to an ecological approach to multiple use management. Ecosystems are great integrators, and a way to reflect the combined effects of soil, water, geology, climate, landform and vegetation. Ecosystem Management appears to be the next logical step in the evolution of our thinking about the landscapes we manage.

Ecological Units can tell us: what can be, what will be, or what should be!

THE USDA FOREST SERVICE PERSPECTIVE ON ENVIRONMENTAL FORESTRY ISSUES IN THE EASTERN UNITED STATES

(Remarks prepared for Jack Ward Thomas, Chief, Forest Service)

I appreciate the opportunity to address you this morning on a topic that is central to the future of this region, the country, and the world. The health, diversity, and productivity of all ecosystems is being threatened for a variety of reasons. This conference, and the many ongoing actions by individuals, groups, and governments, are key steps to ensuring that future generations can enjoy the bounty of these resources. If never before, the adage "no person is an island" stands as testament to the nature of task lying before us. We got into this together, we must get out together!

Today, I want to briefly address the challenges facing us, share with you the path the Forest Service is taking as stewards of our National Forests, and finally, stress the partnerships needed to achieve the goal of sustainability. I also want to hear from you, and will leave time for us to discuss some issues of special interest to you.

Why worry about eastern forests?

Certainly forests of the eastern United States have evolved from how they looked 200 years ago. Having worked in the northeast earlier in my career, I have observed the changes brought about by this evolution. Conditions today are not always as we want them, yet the forests of the East are among the most beautiful in the country and provide a wealth of values and uses for a growing population. A testament to resilience of these forests. You will be hearing about the evolution of these forests later in this conference.

As we look to the future, and more carefully at the structure, diversity, and demands being placed on eastern forests, all is not well. Pressures on the forests to provide a broad range of values and uses are increasing, and will continue to do so. If for no

other reason, the number of people wanting to share the wealth of these ecosystems is increasing. In many areas, people are moving to the wooded areas to enjoy solitude and quietness not afforded by our cities. The wildland/urban interface, as it is often called, further exacerbates an already tough job for decision makers and managers. Protection from fire is just one implication that comes to mind.

There is also an increasing call to preserve forests to protect the many natural attributes they provide. A common concern expressed by these interests is that continued use and "exploitation" will degrade both esthetics and health. The extent we can "preserve" current conditions may be a question. What is not in doubt, however, is that additional acres in protected status will push many demands and uses to other areas, thus raising the intensity of trade-off questions.

There is another situation that may affect eastern forests in the near future, if it is not already underway. As you are aware, the production of wood products from western forests is down considerably from previous levels. Following this down trend has been an increase in harvesting of softwoods in the south. This has raised concern among some that the increased rate of harvest is not consistent with long term ecological health of southern forests. Eastern forests have considerable productive potential that is generally overlooked, particularly for hardwoods. Should we see an increase in harvesting of those forests, issues associated with ecosystem health and productivity will become more heated. A question is healthier for what? Or maybe sustainable for what?

Sustainability as the base issue

There are many separate issues identified with the management and use of eastern forests. During this

conference you will be identifying, assessing the impacts, and searching for possible solutions to some of these issues. While we must examine each issue carefully to ensure that appropriate actions are taken, there is an overarching issue that can provide a philosophical foundation for more effective and far reaching collaborative efforts. That issue is *sustainability*. There are various definitions and applications of sustainability. It is less important to reach consensus on a specific definition, that it is to grasp the underlying tenet. That is -- we must sustain ecosystems and we must sustain people. Both must be achieved if we are to pass on the legacy of our forests to future generations. The old adage of protecting the "goose that lays the golden eggs" comes to mind. We certainly like the eggs, therefore, it makes a lot of sense to protect the goose. It takes considerable care and feeding, but more on that later. Using sustainability as a base tenet will provide useful in keeping the debate on specific issues in the proper context.

Challenges to a simple solution

There has not been a more challenging time facing our country and the world. Providing for the needs and values of some 275 million people in the U. S. and over 5 billion in the world tells us this is a situation calling for immediate attention. The problem, however, is that this thing is COMPLEX! Ecosystems are exceedingly complex, as are humans and societies. The rules, laws, and agreements that govern and guide management of our forests are also complex, and are sometimes at conflict with one another. Although beltway politicians like to reduce issues to seductively simple solutions, we recognize that real life solutions are not simple, but neither are they intractable, unless WE make them that way.

As if this was not enough to complicate new approaches, we have learned through the evolution of ecosystem management that we need to think and act at larger scales and over longer time frames than in the past. This may well be the most significant factor separating good practices from the past from

sustainable practices of the future. In some cases a given practice may have looked good at the site level, but had detrimental effects when applied at the landscape level. We also need to monitor activities very carefully to make sure they continue to provide the forest conditions we desire over the long haul.

We need to listen very carefully to the public--to better understand their needs and values, and what they want the forests to look like. We also need to increase the flow of information provided the public, to ensure they have the best possible basis for understanding the issues and making choices. As you know, this is quite a challenge in itself. A further complication is that management activities will continue to be challenged by people and groups with tightly defined objectives and values -- a single issue mentality.

Another challenge is a financial one. We need to recognize and accommodate as best possible the reality that activities needed to sustain ecosystems will cost, and in some situations without a return from commodity values. In a recent article in the *Journal of Forestry*, John Gordon and "the central issue regarding EM emerges: when can we afford to apply it?" A very good question, but we are facing another truth, that is, we cannot afford not to apply it! Our agency, and I am sure others, is now examining the financial implications of funding activities under the ecosystem management umbrella.

While the task is formidable and seemingly impossible at times, I remain optimistic. Change never comes easy, certainly change that alters the very understanding of social, physical, and biological interactions. Yet, we are on the correct path. Demonstrated by this conference, and similar activities elsewhere, is the recognition that collaborative efforts provide the only sound approach. This is well summarized by comments of Barbara Todd, President of NACo (National Association of Counties), at an Earth Day celebration this past April. Her statements put the context of our challenge clearly into perspective.

She said "while federal and state governments will play a role, sustainability is not a federal problem with a federal solution; our future will be defined by our local actions."

What the Forest Service can and will do

As Ms. Todd so aptly put it, no agency will provide the silver bullet for sustainability. Even if the Forest Service had such a solution for the National Forests, it would not suffice to ensure sustainability for all ecosystems. I am confident, however, that the evolution of ecosystem based management in the Forest Service can provide some good examples and experiences for building a broader based approach.

Before I begin outlining the principles associated with our Ecosystem Management policy, let me first bring another perspective to the table. All of our natural resources are undergoing pressures unknown in the history of human existence. Which leads me to what I believe is a cornerstone of sustainability. Before we do anything else *we must begin with conservation*. Though conservation cannot ensure sustainability, I believe it is a necessary condition. We must take the best use of every resource. When we undertake an activity, we must conduct it as efficiently as possible. Once we are sure on-site needs are met, we must effectively utilize wood that is available to meet peoples needs. We must make each product last as long as possible; recycling as often as possible for example. Like other goals, conservation is not always easy, inexpensive, or without detractors. Doing otherwise, however, would simply be foolish.

The Forest Service is committed to ecosystem based management. Recognizing that is not a goal unto itself, but a process for attaining the goal of sustainability. We have a mandate from the public, supported by legislation, that establishes the benefits and values for which we are to manage. Through ecosystem sustainability, present and future generations will reap the benefits that healthy, diverse, and productivity that these ecosystem provide. While we will not put ecosystems at risk,

our land ethic includes the active use of ecosystems, both through preservation and manipulation. EM is not an euphemism for preservation! Active management is essential if we are to meet our goals.

Our strategy, which is evolving and will continue to do so, integrates the human, biological, and physical dimensions of forest resources. Only through this integration and by managing across a larger scale than in the past can we be successful. Strategically, we are applying our EM principles to achieve three desired outcomes. These are:

1. Enhance protection of ecosystems
2. Restore deteriorated ecosystems
3. Provide a variety of benefits within the capabilities of ecosystems

I am sure you recognize the complexity and challenges associated with achieving these outcomes. We still have a lot to learn about ecosystem management, and we will make some wrong turns. But we cannot wait all the uncertainties become clear. We are moving ahead as quickly as possible, keeping the ultimate goal of sustaining our ecosystems clearly in front of us.

I would like to say a little more about the third outcome; providing a variety of benefits. Managing for multiple benefits is certainly not a new concept for the Forest Service. We are currently guided by the Multiple-Use Sustained Yield Act in doing this. There is no inconsistency, however, between this guiding act and ecosystem based management. Ecosystem based management is a process to achieve our goals, not an end in itself. The difference today is that we recognize that sustaining ecosystems is the underlying principle to ensure the benefits are available for future generations.

Will harvesting trees be a component of our strategy? Yes, where consistent with sustainability. We will not be target driven as in the past. What is often overlooked, however, is that recovery of wood products will be an option during activities aimed at providing other resource values. Meeting many of our resource goals will require vegetation

management. Thinning to improve forest health is one that quickly comes to mind. We are not sure today what the flow of wood products from these activities will be, just that it makes sense. Not taking advantage of removing wood products could have negative effects, such as creating a fire hazard or precipitating insects infestations. Thinking back to the "golden goose," this may be one way to help buy food for the goose. Taking advantage of wood markets can provide financial incentives to undertake our activities. Possibly a partial answer to John Gordon's question of "when can we afford to apply it?"

An underpinning of science is mandatory for us, anyone for that matter, to achieve our management goals. We will continue to emphasize use of the best science and technologies available in all decisions and actions. We will also continue to support fundamental and applied science across all disciplines to close the gap between what we want to do and the knowledge of what to do and how to do it. We will probably never have complete knowledge needed to undertake ecosystem management, but we cannot wait. Thus, through a process we call *adaptive management* we are moving ahead all activities to achieve our management objectives. Adaptive management means we will identify a strategy and appropriate technologies, monitor to see if the results were as intended, adapt if otherwise, and then move ahead. Innovation, uncertainty, and risk will be companions along this path, as will be successes.

This is a path that we cannot travel alone. Achieving ecosystem sustainability is not within the purvey of us or any single organization. Only by working together can we hope to find answers for that worthy goal. This brings me to my last point. The role of partnerships.

Fostering partnerships

It is often said, but important to keep in mind, that ecosystems do not recognize boundaries. The implications of this understanding are far from trite.

It tells us that if we want to sustain ecosystems we must work together. It is not required, or necessarily desirable, that all owners follow the same plan and undertake the same activities. Our forest ecosystems and benefits derived from them are too variable for such a solution to exist. It does mean that we need to act with a better understanding of those plans and look for ways in which we can collectively make our actions more effective in attaining sustainability.

The term partner can have different meanings, depending on the reasons for and nature of the relationships. Without getting into semantics of the term, I see four reasons why partnering is critical to achieving the Forest Service mission and goal of ecosystem sustainability.

First among these is developing a better understanding of the values, needs, and perceptions of the owners of our National Forests -- the American public. As stewards of these lands we must understand as fully as possible what benefits the public desires and what they want their forests to look like. Management means undertaking actions to achieve stated objectives. The public defines our objectives.

The second type of partnering is undertaken to help gain a better understanding of what others are planning and doing. Our decisions depend to some degree on the plans and management strategies of other land owners. If we are to maintain diversity across the landscape, for example, our strategy needs to take into consideration that of our land owners within that ecosystem.

The third reason for partnering is to share information and provide assistance. We have a long history of this, among and between the public and private sectors. Ecosystem sustainability, however, requires a greater intensity and scope of information and sharing than we have ever encountered.

Within the Forest Service, our State & Private Forestry arm has been playing a key role in assisting land owners, and we see this growing in importance.

The fourth reason for developing partnerships is to work together to jointly plan and implement ecosystem management strategies. This has and will continue to occur where managers share common goals. We also need to extend these partnerships into the rule and regulation arena, to ensure that these mechanisms consider ecosystem perspectives.

technologies and assist others who want our help. We will develop and use the latest science in this endeavor, and share this with all people. We will employ adaptive management and share both our successes and failures. We will work across boundaries to develop better understanding of the collective strategies for managing our ecosystems. We will gladly work to develop collaborative management strategies with partners sharing common objectives. Finally, we are reaching out more aggressively to the American public to help learn their needs and desires for the National Forests.

Conclusion

Few things have been untouched by the evolution of sustainability. The entire world is wrestling with the concept of sustainable development, trying to find a balance between meeting peoples needs and sustaining the very source of those needs. Here in the east, and throughout our country, pressures will continue to mount on our forest resources to meet the needs of a growing populace. Fortunately, we now understand that sustaining these ecosystems requires new thinking and approaches. As my friend John Gordon indicates, we need a new paradigm to deal with this new order, I suggest it is well underway.

The Forest Service is ready to join you and others across the country to accomplish the goal of sustainability -- of our ecosystems and of our people. As this conference demonstrates, we cannot afford to wait until all questions are answered. Through our Ecosystem Management policy, we will direct our management to restore and protect ecosystems and provide the multiple benefits desired by society. Always starting with conservation as the cornerstone for this mission. We are committed to being an active manager of our resources.

We are fully dedicated to being an active partner in this new frontier. We will share our knowledge and

Historical - Future Performance Panel - An Academic Perspective on Environmental Issues

Edward Buckner, Overton Professor of Forestry, Department of Forestry, Wildlife & Fisheries
University of Tennessee, Knoxville, Tennessee 37901-1071, USA

The academic perspective on environmental issues must encompass the "big picture." Academicians are charged with training the next generation of resource managers and providing at least a portion of the basic research on which responsible resource management rests. Critical to accomplishing this task are: 1) an understanding of the forces that shape natural resource conditions, and 2) a "vision" as to what the desired future landscape condition should be. While study and research can equip us with the necessary understanding of the forces that drive ecosystem dynamics, lack of consensus as to what future landscape conditions should be will continue to confuse both academicians and resource managers. Compromises between production concerns and the aesthetics of landscape condition will likely characterize the output of bargaining sessions into the foreseeable future.

A source of much of the confusion/disagreement stems from fuzzy semantics - in particular, implications of the word "natural." While its use is deeply imbedded in our rhetoric, its meaning is vague. We are, after all, natural resource managers, and certainly we manage for the natural attributes of our environment; the food we eat and cosmetics we use are full of natural ingredients. Of the 15 definitions given in the unabridged version of Webster (1983), the best fit for its apparent meaning in the environmental arena is "... without man-made changes;.." (e.g., no cultural influence). Examples of its use in this context are found in National Park management guidelines and the Wilderness Act. A misconception inherent in the development of these directives was that the North American landscape was without cultural impacts prior to 1492.

That the pre-Columbian landscape was as much the result of cultural impacts as it was of natural processes (with their interactions determining landscape design over most of the continent) is

firmly documented in recent archaeological, geographical and historical literature (Butzer 1992, Fiedel 1992 and Williams 1989). Further complicating the scene were the rapid changes underway in both the natural and cultural components. In the 18,000 years since full-glacial conditions of the Wisconsin Ice Age climatic periods warmer than today's have prevailed. Superimpose on this cultural impacts that go back at least 12,000 years (Chapman 1985) - prior to the arrival of the extant vegetative cover, and the dynamic disequilibrium of the system becomes apparent.

In Eastern North America the "natural" (no human impacts) landscape will be a closed forest generally having 2 or more canopy layers. This condition essentially precludes grasses - the primary food source for large animals which, in turn, were the primary food source for the early cultures of North America. Preventing stand closure was, and continues to be, an essential activity necessary for human survival in this (or any other) region.

Fortunately, the original settlers of North America brought with them across Beringia the tool that allowed them to maintain an open landscape - fire (Fiedel 1987). Interacting with natural processes, human-caused fires were a primary vector shaping the pre-Columbian landscape of Eastern North America, which was likely a mosaic of grasslands, open woodlands and closed forests. This diversity in landscape components provided habitat diversity that, in turn, accommodated wide species diversity of both plants and animals.

The "wilderness" described in early American writings (Williams 1989) depict closed forests, a condition that likely developed only after European diseases killed most of the native American population (Dobyns 1983, Josephy 1992) during the early part of the 16th century (mortality estimates

go as high as 90 percent). This was some 150-200 years prior to the earliest historical writings (late 18th century), on forest conditions in the interior regions (Van Doren 1928) - ample time for the development of the wilderness conditions commonly described.

The exploitation of the forest resource during the 19th and 20th centuries is a matter of historical record, as is its recovery over the past half century. Contributing significantly to the rapid recovery has been the large population of pioneer species that were dispersed throughout the landscape - species that are well-suited to disturbed conditions enabling them to rapidly occupy disturbed sites. These species were maintained in the pre-historic landscape by both natural and cultural disturbances.

As we go about molding future forested landscapes it is important that we realize that the "hand of man" has been a part of the landscape dynamic for as long as the extant trees have been here. That future forested landscapes will have a strong cultural component - "is a given," if not by intent, then by default. The measure of responsible stewardship will be the extent to which these landscapes are attractive, healthy and productive of the goods and services needed by society.

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“Past, Present and Future of Industrial Forestry”

John F. Razor, Group Vice President, Forest Resources, Georgia-Pacific Corporation

As an industry, we are currently facing unprecedented pressures. We are challenged with managing our forests in an environmentally sound way without compromising our competitive position in a global market for forest products. We have embraced the concept of forest sustainability, but forest sustainability has to be integrated with long-term economic goals.

Today, I will provide you with a perspective on industrial forestry -- reviewing the history of the forest industry and industrial forestry in this country -- then looking at the current challenges facing the industry and how we plan to address those challenges. Population growth, regulatory programs, taxation, and shifts in public opinion -- when combined with the growth of the industry -- have had major impacts on land-use and the practice of forestry. Over the years, the industry has had to modify its practices and management in response to these factors.

The early history of industrial forest management and land use was “utilitarian” in focus. People used the land for economic gain -- for production. Over the last 50 years, as our society has changed from an agricultural-based rural society to an urban society, the utilitarian view of land use and management has given way to a biological-centered point of view which is often incompatible with economic or utilitarian land use. This shift has definitely affected forest management in the United States

The forest industry currently owns and manages more than 71 million acres of forest land in North America -- with an estimated investment value of \$82 billion dollars (Shallau, American Forest & Paper Assoc.). As we review the past, present and future of industrial forestry, the one thing that must remain constant is the industry’s ability to manage its forests for an economic return. We are committed to forest sustainability, but we must seek

a position of “competitive sustainability” that balances the need for environmental and economic stability. A reasonable balance can assure sustainability.

With that in mind, I’ll begin today by taking a brief historical look at industrial forest management and the forest products industry.

Total forest land area in the United States has decreased to roughly 70 percent of that which was present in the year 1600. Much of this forest conversion occurred between the years 1850 and 1910, when American farmers cleared about 190 million acres (MacCleery, 1992).

By 1920, the clearing of timberlands for agricultural use had begun to stabilize. The 1920s also marked the beginning of interest in industrial forest management. Before that time, timber companies often sold cutover tracts for farmland or let ownership revert to local governments for non-payment of taxes.

It was often considered folly to buy these cutover lands. Ben Cone, a private landowner near Wilmington, N.C. currently manages 7,000 acres of prime forest land and red-cockaded woodpecker habitat; however, when his grandfather bought this cutover acreage around the turn of the century, people referred to it as “Cone’s Folly,” a name that has stuck to this day.

G-P’s Crossett Forest in southeast Arkansas and Northern Louisiana, where I had the privilege of working during my career, is an example of this emerging interest in industrial forest management. The family-owned Crossett Company began to invest in timberlands around the turn of the century and Southern pine management was practically pioneered there in the early part of the century.

It really wasn't until the end of World War II that tree planting and extensive industrial forest management came into existence. Many factors influenced this new emphasis on forest management. States began to modify tax codes making them more favorable for timberland investment --- government laws and programs provided an impetus for reforestation. Increased demand and prices for wood and wood products also gave landowners -- industrial and non-industrial -- an incentive for managing timberland. Timber became viewed as a valuable commodity.

The increased emphasis on industrial forest management was also largely driven by the development of the forest products industry during this same era. The industry, as we know it today, is relatively young.

Wood was not widely used as the primary raw material for papermaking until the last half of the 19th century. Once the technology was developed to process wood fiber for production, it was quickly accepted as the preferred raw material for paper production. By the turn of the 20th century, the age of economical, mass-produced paper was launched in America. (American Forest & Paper Assoc., 1993.)

The paper industry began in the northeastern United States. In fact, quite a few of these mills built in the early part of the century are still in operation today. Paper production and capacity expanded westward to Wisconsin, Michigan and Minnesota -- and then later to the Pacific Northwest. It was not until the late '20s and '30s that the sulfate paper industry became firmly established in the South.

The demand for lumber and other building products was fueled by the two World Wars. The period following World War II was a time of rapid economic growth in the United States. To meet this demand, the forest products industry went through a major expansion period -- building mills at every crossroads in the nation's woodbaskets. The '50s and '60s brought rapid growth for the industry in the Pacific Northwest.

Then, in the early '60s, manufacturing processes were developed to utilize fast-growing Southern yellow pine for the production of pine plywood. Structural panel production, utilizing Douglas fir as the preferred species, was a west coast business. Southern pine was eventually accepted as an alternative to fir panels, thus beginning a major shift in industry production capacity and adding to industrial forest land ownership in the east.

My early career paralleled the growth of the solid wood products industry in the '60s and '70s. I had started my career in Springfield, Oregon making plywood and lumber from Douglas fir, but moved to the South in the '70s to work in this emerging woodbasket.

The role of industrial forestry was evolving during this same time period. Government initiatives like Soil Bank and the Conservation Reserve Program encouraged reforestation on the nation's private lands. Tree planting on industrial forest lands grew from 7,000 acres annually in 1945 to more than 1.2 million acres a year during the 1980s. Industrial forest ownership grew to its present level of 71 million acres, representing 14 percent of the nation's commercial timberlands.

Although there was a greater emphasis on reforestation and improving forest growth and productivity, the resource was largely viewed as plentiful by the industry. For the most part, in the '60s and '70s, new mills were built without the kind of comprehensive resource availability study that we consider necessary today.

Industry manufacturing capacity expanded rapidly to meet growing consumer demand for wood and paper products which was fueled by 20th century population growth. During this time, there were companies who took a long-term view of resource use and availability; however, a short-term view was often taken. As the industry's growth stabilized, our business has had to become more deliberate and take a longer-term view in its planning, especially as it relates to issues of resource use and availability.

Many other outside factors influenced the need for greater resource planning. U.S. population more than doubled from 1920 to 1990, growing from 106 million people to more than 250 million people today. Eastern states like Florida experienced tremendous population growth, increasing from less than a million people in 1920 to almost 13 million in 1990. (U.S. Census Data)

The corresponding increase in development and urbanization affected the state's timberland, with a loss of almost 3.5 million acres occurring between 1952 and 1987 (Powell, Faulkner, et al., 1993).

In the '70s and '80s, an industry that had been generally self-regulated began to cope with new regulatory programs at the state and national level. Protection of water quality and endangered species were lead issues.

Following the passage of the Federal Clean Water Act in 1972, states began to develop voluntary forestry Best Management Practices to address non-point source pollution. BMPs are still voluntary in a few states in the Southeast. On the heels of the Clean Water Act came the Endangered Species Act a year later.

State laws regulating forestry on private lands became prevalent in the Pacific Northwest and the Northeast. These new regulations were largely a reflection of population growth pressures and the changing view of how national forests should be managed.

Environmental activism grew rapidly beginning in the '70s. An urban populace challenged traditional multiple-use management of national forests. Recreation, species protection, biological diversity, and wilderness designation were advocated over timber production.

Earlier in the century, the federal government endorsed special forestry laws to encourage "good" forestry and long-term investment in timberlands. In the last 20 years, the tax structure has been less favorable for long-term timber investments

especially, as it relates to capital gains treatment. Uncertainty around tax considerations has often discouraged investment in timberlands.

This brings us to our current situation and challenges. The industry has changed -- it has gone high tech -- and it's gone global. And the industry has improved resource use and efficiency. A classic example is the growth of engineered wood products like OSB, wood I-joists and other engineered lumber products. New technology has allowed the industry to make high-quality engineered wood products with the lower-quality, smaller and faster-growing trees that are available in the eastern half of the U.S.

Many of these new products use less wood fiber. An engineered wood I-joist or I-beam uses half the wood fiber of a sawn 2x10 or 2x12 wood beam. In 1994, composite panels like oriented strand board represent 36 percent of the total demand for structural panels; growing from only 26 percent in 1991 (American Plywood Association, 1994).

Just as we have improved manufacturing efficiencies, we have also improved growth and productivity on industrial forest lands. The nation's 71 million acres of industrial ownership is concentrated in the East -- with 55 percent in the South and 23 percent in the North. Another 18 percent is located on the Pacific Coast and another four percent in the Rocky Mountains.

Forest industry lands represent 14 percent of the nation's commercial timberland, but account for one-third of the total timber harvest. In terms of softwood volumes, national forests represent 41 percent of the total volume; non-industrial private lands have 32 percent; and industry lands represent 27 percent of the volume (Powell, Faulkner, et al., 1993).

Increasing reductions in timber harvests from government lands logically means that industry has a vested interest in ensuring the productivity of its lands in the future as well as the productivity of all private lands.

Eastern forest lands are under increasing pressure to offset the reduction in timber harvest in the West. By 1992, it was becoming clear that softwood inventories for the South, as a whole, were declining.

In a time when forest productivity is critical, the industry and all private landowners are faced with the potential of increased environmental constraints related to federal regulatory programs.

Single-issue programs like endangered species protection and wetlands are moving to comprehensive landscape management concepts embracing forest sustainability and ecosystem management. These concepts challenge even the most brilliant scientific minds and have spawned more definitions than we could review in this three-day session.

The biologically-centered definition of ecosystem management focuses on the desired state of the total forest, not on the forest outputs; (Moote, et al., 1994) whereas, some definitions do recognize economic and human needs.

With private lands making up the largest share of commercial timberlands in the East, these landscape management concepts immediately raise questions related to private property rights like "Who has the authority -- or the knowledge -- to make landscape level decisions that can ultimately impact all ownerships? And, how do landscape management concepts like ecosystem management affect the productivity of industrial and other privately-owned forests?

Industrial foresters have traditionally measured forest management success based on sustaining a given forest's timber production and yield over a period of time. Managing for other non-timber values can reduce the acre-by-acre productive capacity of industrial forestlands.

Industry realizes that some of the non-timber values are essential and should not be ignored, but we cannot forget that the purpose of industry ownership

is to supply raw materials to manufacture forest products.

As I indicated earlier, for industry to continue to invest in timberland management, we have to continue to produce acceptable levels of wood fiber to generate an economic return either recognized on the forest management or manufacturing balance sheets.

We need to maintain the ability to replant and manage pine plantations and to intensively manage them and improve their productivity with site-specific silvicultural applications like forest fertilization, prescribed burning or herbicide applications. Hardwood sites will also have to be managed in a manner that economically produces fiber for pulp, paper and wood products.

These types of forest management practices have made the Southeast and the East one of the most productive timber-growing regions of the country. An example of that can be found in recent production figures related to Southern yellow pine lumber.

In 1993, a modern day record for southern yellow pine lumber was set with the production of 14.4 billion board feet (Southern Forest Products Assoc., 1994). Lumber production had not reached that level since 1914. This truly demonstrates the renewability of our forests; yet, we recognize that sustainability of these forests in the face of declining Southern pine inventories will require site-specific management of pine forests on industry and other private lands.

However, as resource managers, we are challenged with building credibility with an increasingly vocal segment of the population that does not understand forestry -- some of whom think that all timber harvesting should be increasingly regulated or even stopped completely.

Although industrial forest lands should not be expected to provide the same level of non-timber values as currently expected from federally-owned

forests, we are having to demonstrate that our industry forests do provide other non-timber values like wildlife habitat, recreation and species diversity.

Forest products customers and the ultimate consumers of the products we produce are also wanting proof of environmental performance.

As owners and managers of forests, we must move into a mode of thinking that is both deeper and broader than evidenced by our past history of land use. And our planning must be economically and environmentally sound.

As an industry, we have to collectively develop guidelines and principles for forest management into the future. In a recent lecture at the University of Idaho, Gene Bryan, president and founder of Decision Dynamics in Lake Oswego, Oregon, encouraged the industry to embrace the type of "principle-centered" leadership as advocated by Stephen Covey, author of the book by the same name.

Principle-centered leadership is an approach to business and life based on natural social laws and principles including such things as fairness, equity, honesty, trust, integrity, reason and balance.

I have known Gene over 25 years and have seen his business and life prosper with this kind of view. He knows our industry and makes a strong statement.

Industry leadership has recognized the need for comprehensive planning to deal with the emerging issues related to resource management and land use. Over the past nine months, through the American Forest & Paper Association, groups of forest industry and private forestry leaders have been working to develop governing principles and guidelines based on the concept of sustainable forestry.

For industry lands, we have defined sustainable forestry as: "The practice of forestry that integrates the reforestation, growing, nurturing and harvesting of trees for useful products with the conservation of

soil, air and water quality, wildlife and fish habitat, and aesthetics."

Our commitment is much broader than anything we have ever attempted and will be supported with implementation plans. The industry, as represented by American Forest & Paper Association members will finalize its work on the new principles and implementation plans within the next few months.

The effort is being led by Scott Wallinger of Westvaco Corp. In recent correspondence, he communicated the intent of the new program:

"This is an AT&PA program, devised by the association and mandatory for its members, which is designed to perceptibly change a number of forestry practices on member companies' forest land. Its objective is to broaden the practice of sustainable forestry on member companies' forest land.

These practices all effect the ability of members' forests to produce sustainable crops of wood and fiber while addressing broad public concerns about how industrial forests are managed with respect to water and wildlife and the needs of future generations."

In addition to addressing specific requirements for AT&PA members on their own land, a parallel objective of the program is to change the impact of AT&PA member companies wood procurement practices on private non-industrial forest land by encouraging member companies to promote similar initiatives with loggers and private landowners.

For industry member lands, the program will embrace a wide range of issues and objectives including reforestation, forest health and productivity, water quality, and biodiversity. It will also provide for a greater emphasis on forestry research and managing lands with special biological, geological or historical significance.

Specific issues addressed on private non-industrial lands will include: reforestation following harvest;

adherence to forestry BMPs; and reduction of poor visual impacts of harvesting.

Forest land ownership and management is fragmented in the east —representing large and small landowners with varying forest management objectives. Our plans recognize that the advocacy program we initiate with other private forest landowners and independent logging contractors will take time to implement.

This new set of principles will become the cornerstone for defining industrial forestry as we move into the next century. It is a significant effort that you will be hearing more about as we begin to implement the program over the next year.

It is in the industry's best interests to sustain our forest land. Gene Bryan, in the speech I mentioned earlier refers to Aesop's fable about the goose and the golden egg. When the greedy farmer killed the goose to get golden eggs more quickly, he found no eggs and sadly realized he had destroyed his production capacity. Gene points out that "our forests are like the goose; we must guard and manage their health if they are to remain available to produce the products that are so important to our life on earth."

At the same time, we must also provide economic incentives that encourage private landowners, industrial and non-industrial, to continue to invest in timberlands — regenerating and managing their lands for the future.

As the Business Council for Sustainable Development recently pronounced: "Business will play a vital role in the future health of this planet. As business leaders, we are committed to sustainable development . . . This concept recognizes that economic growth and environmental protection are inextricably linked, and that the quality of present and future life rests on meeting basic human needs without destroying the environment on which all life depends. New forms of cooperation between government and business,

and society are required to achieve this goal." (Schmidheiny, S., Changing Course)

The industry is willing to cooperate. Within the last few years, we have seen companies like Weyerhaeuser, Westvaco, Boise Cascade, Georgia-Pacific and many more, work with public and private interests to protect endangered species habitat, unique areas and entire watersheds.

The forest industry wants to be part of the solution. The industry's 71 million acres of forest land is not the problem, but part of the solution — providing green buffers from increasing pressures of urbanization and population growth — providing wildlife habitat and recreation opportunities — and efficiently growing and managing forests for forest products that our society needs.

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