

Proceedings of

**Enhancement of Reforestation
at Surface Coal Mines:
Technical Interactive Forum**

Proceedings of the Enhancement of Reforestation at Surface Coal Mines:
Technical Interactive Forum held March 23-24, 1999
at the Drawbridge Inn and Convention Center in Fort Mitchell, Kentucky.

Edited by:
Kimery C. Vories
Dianne Throgmorton

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FOREWORD

The Office of Surface Mining (OSM) is examining methods that would enhance post mining land use plans that promote the planting of trees on active and abandoned surface coal mines. Benefits of reforestation are many and would include: improving wildlife habitat; recreation opportunities; restoration of clean water resources; erosion prevention; and the creation of new economies based on forest products.

Based on input from the states, industry, academic research, consultants, environmental agencies, and the public, OSM has determined that although some companies have found ways to successfully establish trees on their reclaimed mine sites, there is a large concern that the potential for planting trees on reclaimed mine sites is not being realized for a wide variety of reasons.

On May 13, 1998, OSM held a planning session on Reforestation of Mined Lands and Carbon Emission Offsets in order to better define the issues and possible roles for OSM. Based on the results of this session, OSM has focused its efforts on the following activities. On January 14, 1999, OSM held a policy outreach symposium in Washington, D.C. to provide clarification on current OSM policy on tree planting. On March 23 and 24, 1999, OSM cosponsored with the Coal Research Center of Southern Illinois University, Carbondale, a technical interactive forum on enhancement of reforestation at surface coal mines. The forum, held in Fort Mitchell, Kentucky, was designed to (1) highlight information on successful reforestation efforts and technologies that are currently being used to enhance reforestation on active and abandoned coal mined lands; (2) identify region specific impediments to tree planting; and (3) review recommendations both for removing unnecessary barriers to tree planting and for promoting technologies with potential for enhancing tree planting efforts.

Based on the results of the above efforts an OSM/State Revegetation Team will assess the outcomes of the symposia and forum and make recommendations on potential revisions to OSM/State policy and plans for enhancement of outreach efforts.

I would like to sincerely thank the speakers, authors, steering committee members, and participants for their time and efforts devoted to making this program a success.



STEERING COMMITTEE MEMBERS

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*Virginia Technical Institute and
State University*

REFORESTATION STEERING COMMITTEE RECOMMENDATIONS

The following are recommendations made by the Reforestation Forum Steering Committee immediately following the end of the forum. The recommendations represent areas that have potential for future efforts but do not reflect any particular priority or consensus.

OSM HEADQUARTERS LEADERSHIP ROLES

- OSM headquarters needs to produce a policy statement in writing from the Director encouraging reforestation efforts.
- OSM needs to provide a special annual award to highlight innovations in reforestation. Awards should consider several categories such as Hardwoods, Softwood, Bottomland, Riparian, Appalachian, Midwest, Arid West.
- OSM needs to continue to take the lead and keep the pressure on to produce actual change in reforestation efforts.
- OSM needs to develop a budget and plan for implementation.
- OSM needs to provide specific funding options so that State AML programs will be encouraged to plant more trees.
- OSM should have a team to evaluate regulations in light of forum results.
- OSM needs to identify one or more appropriate teams of people that will ensure that this initiative makes satisfactory progress.

OSM NTP EDUCATION LEADERSHIP ROLES

- Develop an educational program for presentation to local schools. Could be used for Earth Day programs.
- Need to make sure that current OSM Technical Training Program classes incorporate recommendations from the forum concerning reforestation.
- Develop a specific OSM Technical Training Program class directed to field inspectors and coal operators along the lines of the Wetland course that should be very region specific.
- Emphasize efforts that promote education opportunities and communication for field people.
- Partner with industry to develop demonstration sites for educational purposes.

OSM REGIONAL LEADERSHIP ROLES—STATE-BY-STATE INITIATIVES

- Solutions need to be developed on a state-by-state basis. This is not a one size fits all issue.
- Develop state-by-state policies and guidance for reforestation enhancement.
- Need to provide state-by-state cost comparisons for producing productive forests versus low value compacted pastures.
- Need to get top levels of state governments to buy into the process.
- Attention needs to be given to developing approvable methods for reducing grading that results in lower compaction rates.
- Assess potential for approving state amendments that allow for proof of revegetation success earlier in the liability period.
- Forestry needs to be seen as a multiple land use that is favorable to wildlife.
- Plant high quality trees and shrubs and allow for including for purposes of bond release the counting of acceptable invaders.
- Look for positive incentives to encourage reforestation.
- Need to get OSM field offices on board.
- Need to sell the economic advantages of forestry.
- Need to develop native seed mixes that will enhance reforestation because of low maintenance requirements and compatibility with trees.

- Need to determine how the planting of high value trees for commercial forestry can be approved as a land use option on mountain top removal sites.

REFORESTATION STEERING COMMITTEE LEADERSHIP ROLES

- OSM needs to develop a Reforestation Website similar to the CCB Information Network Website to provide a means for maintaining ongoing communication concerning sources of information, research, upcoming events, state initiatives, educational opportunities, etc.
- OSM needs to maintain the reforestation steering committee or like national team to ensure continued progress of initiative.

WHAT IS A TECHNICAL INTERACTIVE FORUM?

Kimery C. Vories
USDI Office of Surface Mining
Alton, Illinois

I would like to set the stage for what our expectations should be for this event. The steering committee has worked hard to provide you with the opportunity for a free, frank, and open discussion on issues related to the establishment of trees on lands reclaimed after coal mining in an atmosphere that is both professional and productive. Our rationale for the format of the technical interactive forum is that, unlike other professional symposia, we measure the success of the event on the ability of the participants to question, comment, challenge, and provide information in hopes that by the end of the event a consensus will emerge concerning the issues discussed.

It has been my personal experience that the most progress I have seen toward making advances in the field of surface mining reclamation has come when we have been able to work as a team of professionals toward a consensus on (1) the facts related to the actions we have proposed, and (2) the state of the science in terms of what are our most workable options and alternatives.

During the course of participating in this discussion, we have the opportunity to talk about technical, regional, and local issues, while examining new and existing methods for finding solutions, identifying problems, and resolving issues. The forum gives us the opportunity to:

- C share our experiences and expertise concerning the establishment of trees and forestry land uses,
- C outline our reasons for taking specific actions, and
- C give a rationale for why we should or should not be promoting the planting of trees at our mines in a specific manner.

A basic assumption of this interactive forum is that no person present has all the answers or understands all of the issues. It is also assumed that issues, solutions, and concerns may be very site, regional, or state specific.

The purpose of the forum is to:

1. present you with the best possible ideas and knowledge, during each of the sessions;
2. promote the opportunity for questions and discussion by you, the participants; and
3. let each person decide what is most applicable to their situation.

We are not here to encourage the imposition of policy or regulation, but rather to empower you, the participants, with better knowledge, new contacts, and new opportunities for problem solving and issue resolution.

The format of the interactive forum strives to improve the efficiency of the discussion by providing the following:

- C A copy of the abstract for each speaker's talk which you may want to read before the presentation in order to improve your familiarity with the subject matter.

- C The talks and discussions are all recorded on tape for later inclusion in a post forum publication so that you do not have to worry about taking notes. For this reason, we will require that all participants speak into a microphone during the discussions.

- C In the post forum publication, issues raised during the discussions will be categorized by affiliation, such as government, industry, academic, or public, and will not identify individual names. All registrants will receive one copy of this publication. This publication will be very similar to the coal combustion by-product and prime farmland publications that are available at the OSM exhibit. Additional copies will be made available for distribution to nonparticipants by the OSM Alton office. This year we will be offering the publication by CD-ROM as well as by hard copy.

It is important to remember that there are three separate opportunities for you, the participants, to be heard.

- Five minutes will be provided for questions at the end of each speaker's talk.
- Twenty minutes will be provided at the end of each topic session. The chairperson will recognize each participant that wishes to speak, and each will be required to identify him/herself and speak into one of the portable microphones so that everyone can hear the question.
- Finally you will be asked to rate the usefulness of each speaker and provide individual written comments concerning any aspect of the forum at its conclusion. The results of this forum evaluation will be analyzed and included in the final publication.

Finally, the steering committee and I would like to thank all of the speakers who have been so gracious to help us with this effort and whose only reward has been the virtue of the effort. I would also like to thank all of our participants for your willingness to work with us on this important issue.

ENCOURAGING INTERAGENCY COOPERATION AND INNOVATIVE REFORESTATION STRATEGIES

Kathy Karpan, Director¹
Office of Surface Mining
Washington, D.C.

I would like to comment on what a remarkable change in relationships I have seen between government and the private sector and between nonprofit and profit organizations in the 30 years I have been in and out of government service. I think this is a perfect backdrop for what we are doing today. My topic is to encourage all of you to continue to extend our discussions to all of our potential constituency groups.

I loved Alvin Tofler's books *Future Shock* and *Third Wave*. One of the most important points that I got out of them was the effect that our economic order had on the way that we govern ourselves. In an earlier industrial age, when we were mobilizing great forces, building factories, establishing strong bureaucracies, and developing hierarchical relationships in order to move mass industries, we had political parties and political activities that fell into that model. There we focused on hierarchy, right and wrong, the chain of command, and orthodoxies. As we have currently given way to a brand new kind of economy, so we have seen a transformation in the kind of relationships that govern us. The old hierarchical relationships are giving way and being transformed. It began first in the private sector management and now it is occurring in government. It is more than the notion that we will have more teamwork, set goals together, and be more adaptable and permeable. It has to do with the fundamental ways that our federal government interacts with our state government, how state government interacts with local government, and all of us with the public that we serve.

It seems to me that this reforestation initiative that we have launched is a wonderful example of where we are trying to go in setting government policy. This is not reactive. We have not been forced to do this by congress, legislation, or any directive. Although the Keoto Clean Air accord is part of the context of this discussion, it by no means mandates that the agency that helps regulate the surface mining of coal should suddenly become allied with the U.S. Forest Service in trying to understand forest issues. We are also trying to look beyond the narrow confines of what we do every day. I do not look at my job as "How the surface coal mining industry is doing in terms of active mining and the abandoned mine lands programs?" and anything beyond that is not my business. That is part of the old nonpermeable world of the past.

When I went to our first National Coal Symposium, held in January 1998, we had invited all of our constituency groups to attend. We heard so much concern about the possible outcomes of the Keoto accords and what that might mean in terms of reducing coal production in this country and its potential to become a problem in meeting our energy needs. One of the ideas that began at that symposium was that our clean coal technology will finally deliver for us in controlling power plant emissions. I do not know how many decades out that is, but coal will continue to be a part of our energy picture well into the 21st century. One of the things that should occur to us is that, given how we have dealt with the clean air issues, some type of credit trading system might emerge. In that process, some policy makers might want to know, "Where do we have carbon sinks, and how can we measure them?" In trying to think beyond our narrow boundaries and pursue an energy policy that recognizes that we must produce cleaner air, we have launched a series of discussions that you have been hearing a lot about recently.

At our meeting on reforestation policy in Washington, D.C. in January, it was fascinating to me that there was not any clear information on how many trees were being planted on both active and abandoned mined lands as a result of the surface mining and reclamation programs. We do not even know as an agency how many trees are being planted, let alone how to measure the amount of carbon sequestration that is occurring.

Another thing that we must ask ourselves is, assuming we can learn about how many trees are already being planted, "Is it possible that we will learn that there is not enough reforestation occurring?" Is it possible that OSM is part of that outcome? Is there something in the way our regulations are perceived, administrated, or written that

is having the unintended consequence of discouraging reforestation, where it would otherwise be appropriate or make sense. I do not think it is out of the limits of this discussion that we think about changes to our rules even though we will not do it today. I have just been talking to the head of the National Mining Association, and he thought that there has been a lot of good discussion on this issue and that perhaps the time has come where we can think cooperatively about making some regulatory changes in the near future. This point would only be reached after we thoroughly examine our existing regulatory scheme. This should be in the context that it is possible within government that we can change the way we do business without having to run to congress for a new law or to the rule writers and consume ourselves with months and months of work.

The most recent example of how that can happen is how we have worked with the states involved with mountain top removal. These states are all part of something very different but exciting that we are doing. "Are we really achieving approximate original contour in these mountainous areas?" Our agency, for a lot of reasons over the last 20 years, has not provided the fine print for this definition because it had to be a very flexible concept. It has become clear to us that we have a better job to do in understanding how approximate original contour should work and how we should explain it and enforce it with the industry. We have been under the gun, not so much from congress or even the litigation, but because the people in the affected states wanted us to do a better job. We need to look at the way we are doing business and first and foremost find a better way to communicate the concept of approximate original contour without going through years of rule making and years of litigation. We put our best people together and came up with a way of looking at our rules and standards. We have worked with the state engineering staffs and because of it the states are implementing a much better analysis of evaluating permit applications involving approximate original contour. We did it not by rushing to rule making, or because the agency had sent word down to us, but just as we are doing here; we put everyone together who was impacted by this issue and tried to determine (1) what the facts were, and (2) what the science of the issue was. We then worked toward building a consensus that we can all sign off on and a commitment to work together, not imposed by anyone, but agreed to by everyone.

We have had a nonstop series of meetings on the reforestation issue adding new participants at each step of the process. I am glad to see the U.S. Forest Service on this agenda because you can not speak on this issue without their involvement. We also have been in touch with the Department of Energy and are excited about some of their ideas in the area of energy related to trees and their plans for identifying future research needs. We have been in touch with the Environmental Protection Agency who would be involved with the quantifying of carbon sequestration. We have recently signed an agreement with the Wildlife Habitat Council to cooperate on wildlife enhancement of reclaimed lands.

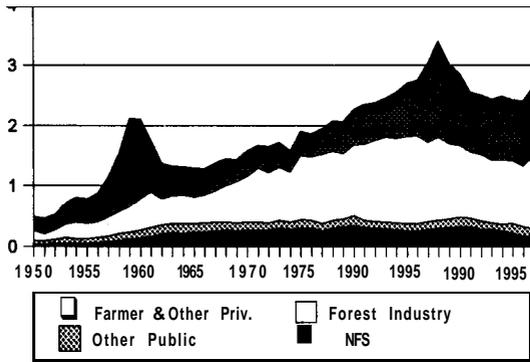
Planting trees is a good idea in the right circumstances, whether or not it ever gets linked to higher air quality standards. We ought to be reforesting where ever possible in areas that were previously forested. That should be an enduring value of our agency. Although part of our interest in this area is due to contemporary concerns about clean air issues, part of it is a fundamental interest in the value of planting trees for better reclamation. We see this effort as a tremendous opportunity for our agency to benefit from your input on this issue. We are ready where ever and when ever you want us as an agency to be involved in these kinds of discussions.

I would like to put forward, as one of the possible suggestions that could come from these discussions, that a balanced team should be assembled that would consider possible changes to our regulations and policies so that the broad general goals that we are all pursuing could be put into effect.

¹ Director Karpan is from the state of Wyoming where she has a long family background in coal mining. She has a long and distinguished record of public service at both the state and federal levels including serving as:

1. Assistant Attorney General for Wyoming,
2. Director of the Wyoming Department of Health and Human Services, and
3. Secretary of State for Wyoming.

She received her Bachelor's and Master's Degrees from the University of Wyoming and her Juris Doctor from the University of Oregon.



**Tree Planting in the U.S.
(Millions of acres)**

States that planted more than 100,000 acres of trees in FY 1997

State	Thousand Acres
Alabama	438
Georgia	397
Mississippi	282
Florida	193
South Carolina	166
Washington	158
Louisiana	144
Oregon	134
North Carolina	114
Arkansas	110
Texas	108

Tree planting by ownership

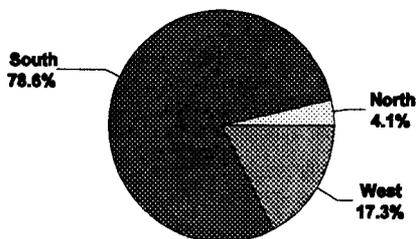
category in FY 1997:

	Acres	Percent of All Planting
Federal Government		
National Forests	158,918	6.0
Department of the Interior	13,956	0.5
Other Federal Agencies	<u>15,571</u>	<u>0.6</u>
Total	188,445	7.1
Non-Federal Public		
State Forests	37,430	1.4
Other State Land	15,732	0.6
Local Government	<u>49,551</u>	<u>1.9</u>
Total	102,713	3.9
Private		
Forest Industry	1,188,362	45.1
Other Industry	56,971	2.2
Nonindustrial Private	<u>1,099,611</u>	<u>41.7</u>
Total	2,344,944	89.0
Grand Total	2,636,102	100.0

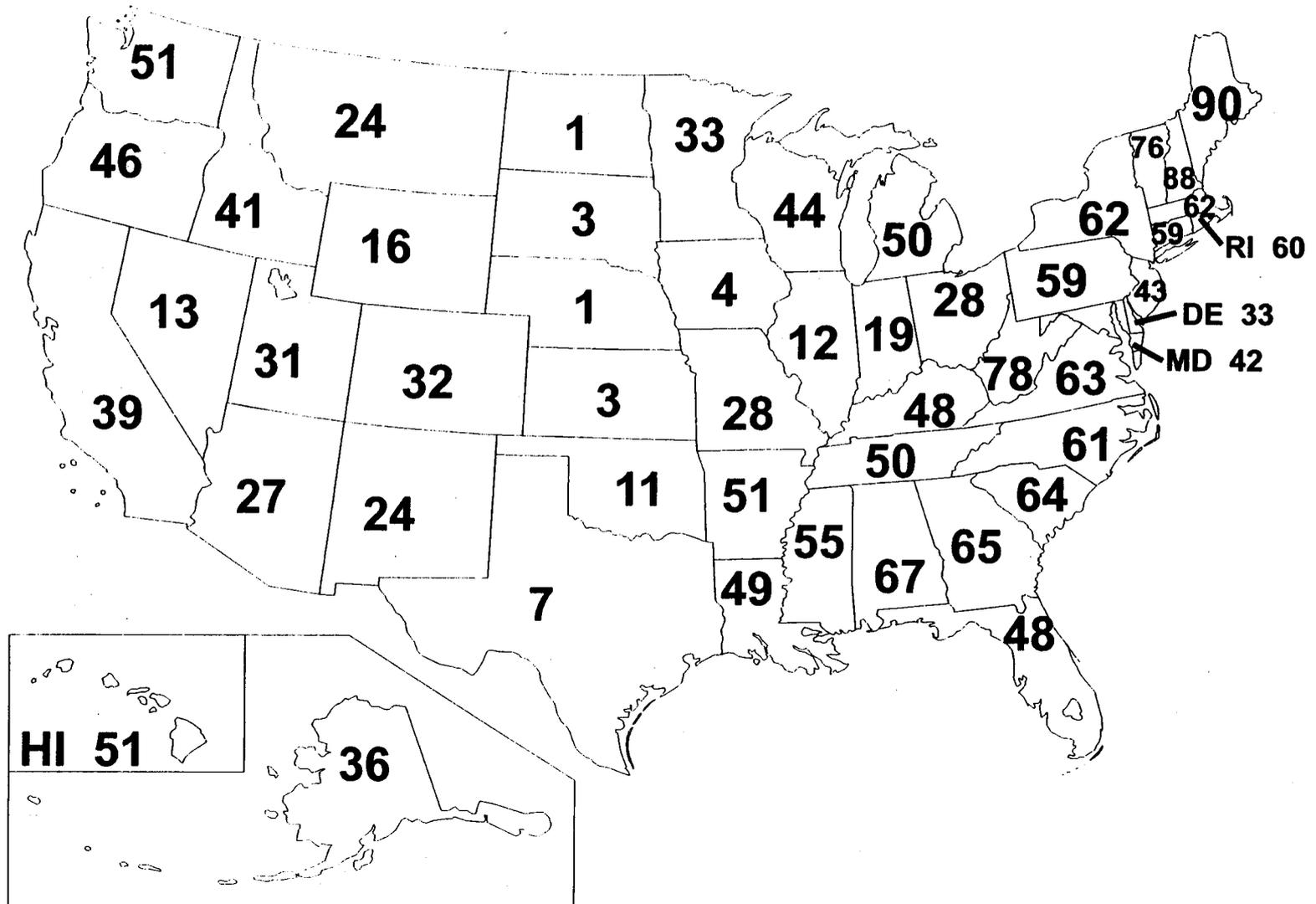
Total planting and seeding by region in

FY 1997:

	Acres	Percent of All Planting
Region		
North	108,230	4.1
South	2,070,849	78.6
West	<u>457,023</u>	<u>17.3</u>
Total	2,636,102	100.0



FOREST LAND AS A PERCENT OF TOTAL LAND AREA



TIMBERLAND, HARVEST, AND TREE PLANTING BY OWNERSHIP IN U.S.

Ownerships	Timberland Area 1	Harvest 2			Tree Planting 3
		All Species	Softwood	Hardwood	
Percent					
National Forest	17	12	16	4	11
Other Public	10	6	6	6	5
Forest Industry	14	33	38	23	43
Farmer & Other Pvt	59	49	40	67	41
	100	100	100	100	100

1 Timberland (1992): 490 Million Acres

2 Timber Harvest, All Species (1991): 16.3 Billion Cu. Ft.

3 Tree Planting (1992): 2.5 Million Acres

WHY PLANT TREES?

Robert J. Moulton¹, Resource Economist
USDA Forest Service
Research Triangle Park, North Carolina

Introduction

This forum features an outstanding slate of experts on the science and art of reforesting strip mined lands. They will give you information on the status of reforestation efforts and the latest on emerging new technologies, address how to overcome barriers, and talk about opportunities.

This paper does not address these topics. Rather, its purpose is to establish the forestry context to set the stage for OSM/State reforestation efforts by providing an overview of the extent, condition, trends, and importance of America's forest resources and to provide an overview of tree planting in the United States.

The Forest Land Base

The United States currently has 737 million acres of forest land, one third of its total land area. This compares with just over one billion acres (1,044,000,000 acres), or 50 percent of the U.S. land area, in 1630, when European settlement of the nation first started. Stated in another way, the United States still has almost 75 percent of its original forest area.

The natural range of forest in the United States includes most of the land area in the eastern half of the nation and significant areas in the Rocky Mountain states, the Cascades and other western mountain ranges, and the Pacific Coast states. Maine is the most heavily forested state with 90 percent of its area in forests, followed by New Hampshire (88 percent) and West Virginia (78 percent). Forests are the dominant land use in all of the eastern states (see map) with the exception of Minnesota (44 percent forested), Illinois (12 percent forested), Indiana (19 percent forested), and Ohio (28 percent forested) due to the eastern extension of natural prairies and large scale conversion of forest land to agriculture, which has occurred in all but the rougher topographic and shallower soils regions of these states.

The Great Plains states have the lowest occurrence of forests because rangeland is an important resource in its own right. It is the natural cover in these states. North Dakota and Nebraska each have only one percent of their land area in forests, and South Dakota and Kansas but three percent. Low amounts of precipitation, especially during the critical growing season, has long been recognized as a limiting factor for forests in the Great Plains and, hence, trees occur mainly along water courses where moisture is more readily available. Soil chemistry, especially excessive salinity, is also a limiting factor for trees in some areas, and recent research indicates that desiccation or drying of trees by incessant dry winds during the winter months when the ground is frozen and the tree roots cannot replace lost moisture, accounts for much tree mortality in the Northern Plains. Thus, trees may be found in river and stream bottoms because these locations provide both additional moisture and shelter from wind.

During most of the course of our nation's history, forests have been a residual use of the land. While forests that have been retained in public ownerships have remained in forest cover, most forest land was quickly granted to private owners by the government, and numerous public programs and policies were implemented to encourage the conversion of forest land to agriculture and to urban and other developed uses. Forests in private hands usually remained in forest cover only if they were not well-suited to other uses.

Conversion of forests to agricultural uses, which clearly has had the greatest impact on forest land area, reached its zenith in the decade 1870-1879 when 50 million acres of forest land were converted. However, the rate of conversion declined to just over 20 million acres during the decade 1900-1909 as the supply of available forest

lands declined. Net conversion of forests to agricultural uses essentially halted by 1920 with forests on 732 million acres. Since its historic all time low, as industrialization got under way and people began to leave the land for jobs in the growing cities. Public programs helped reforest many of the idled agricultural lands, but for the most part these acres, which had been marginal for agriculture, reverted naturally to forests.

By 1960, forest land area had increased to 762 million acres, but again started to decline slowly in response to expanded agricultural production as soybeans became a major crop (10 million acres of bottomland hardwoods were cleared for this crop). The export boom for major agricultural crops of the late 1970s and early 1980s prompted still more land use changes until forest land stood at 736 million acres in 1987. The export market then suffered a major collapse and forest land increased to its current level of 737 million acres.

There is reason to believe that forest land will hold its own or even increase in extent in the years to come. The Conservation Title of the 1985 and 1990 Farm Bills laid the foundation by creating disincentives for agricultural producers to convert fragile forest and range land wetlands (many of which are forested) to croplands, and the federal income tax code was revised to eliminate tax incentives that formerly had encouraged these land use conversions. The 1996 Farm Bill went farther by eliminating base acres and annual acreage set asides, which served to keep excessive land in crop production, and the legislation also eliminated production constraints on most major crops with the result that production likely will shift to those regions with the best soils and other competitive advantages, leaving less competitive areas to revert or to be converted to forest lands.

Urban and other developed uses also consume forest land, and these changes are largely irreversible. However, the acreage is relatively small. Of much greater concern is the continued pattern of larger forest ownership being broken into many smaller ownerships. This will be discussed later in this paper.

The Global Importance of U.S. Forests

With 737 million acres of forests, the United States has but seven percent of all the forest land in the world. Notwithstanding,

- C ***The United States is the world's leading producer of wood and wood products.*** It accounts for 25 percent of all industrial wood harvested.
- C ***The United States is the world's leading consumer of wood and wood products.*** Per capita consumption of wood in the United States is four times the world average and two times the average for all developed countries. The United States uses relatively more wood for housing and many other products and relatively less energy intensive materials like concrete and steel. This has a double climate change benefit due to the storage of carbon in wood products and the significant avoidance of emissions in production.
- C ***The United States is the world's leading importer of wood and wood products and is second only to Canada as an exporter of wood and wood products.*** The United States is a net importer of wood on both a volume and value basis.
- C ***The United States has 25 percent of the world's forests that are protected from timber harvest.*** Ten percent of U.S. forests are in this category.
- C ***The United States has 40 percent of the world's privately owned forests.***

Forest Ownership

Private landowners own 58 percent of all U.S. forest lands and 73 percent of forest lands (timberlands) that are capable of producing sustained annual crops of wood products and that are not excluded from timber harvesting due to their location within parks, wilderness, or other specially designated areas. Private forest lands provide over

80 percent of our domestic timber supply, and about 85 percent of all tree planting occurs on these private ownerships.

Forest industry. Private landowners with wood processing facilities are collectively known as the forest industry. These forest products companies acquired lands that are especially well-suited for growing timber, and these lands are typically actively managed. The forest industry owns 14 percent of U.S. timberlands but produces 33 percent of our timber harvest volume and each year does 40 percent or more of all tree planting.

Nonindustrial private forest (NIPF) landowners. NIPF landowners own 59 percent of United States timberlands, annually produce about 50 percent our domestic timber supply, and plant 40 to 45 percent of all trees. Farmers were once predominant as NIPF owners, but today only 8 percent of these private forest landowners are farmers. Instead, white collar workers (32 percent), retirees (29 percent), and blue collar workers (16 percent) account for the bulk of NIPF owners.

There are currently 9.9 million private forest land ownerships in the United States, an increase of 28 percent since the last complete survey of private landowners was made in 1978. Most of these owners (59 percent) have forest land holdings of less than 10 acres, and 94 percent have ownership of less than 100 acres. In contrast, the remaining 6 percent of NIPF ownerships contain 68 percent of the forest acres.

The loss of green space to urban sprawl and development has become an important national and local issue and, clearly forest lands are not an exception. Since 1978, the amount of private forest land in ownerships of less than 100 acres has increased by 73 percent, a process known as parcelization. With it comes the threat of disruptive effects on forest ecosystems and their abilities to perform important functions as part of the hydrologic cycle, such as homes for forest wildlife and plants, timber, and other goods and services they provide to society.

Public Forests. Public forests in federal, state, and local government ownership account for 42 percent of U.S. forests and 27 percent of its timberlands. The national forests are the largest of the public ownerships with 17 percent of the United States timberlands. In 1992, the latest year for which timber harvesting data for all ownerships are available, the national forests provided 7.3 billion board feet of timber (down from a peak of 12.71 in 1987), 12 percent of the United States total, with the bulk of this timber coming from the old growth forests of the Pacific Northwest. By 1996, only 3.72 billion board feet were harvested from the national forests, due to decreased emphasis on timber production and greater emphasis on recreation, watershed, and wildlife. Because most tree planting on the national forests was done to reestablish trees on harvested areas, tree planting on these forests dropped from 11 percent of the United States total in 1992 to 6 percent in 1997.

Tree Planting

The prompt regeneration of forest stand following timber harvests and other disturbances, such as fire and weather events (e.g., drought and hurricanes), is the major reason that the United States is the global leader in forestry, and regeneration activities must be maintained if we are to be assured of adequate supplies of wood and wood products in the future.

The South leads the nation in tree planting with almost 80 percent of annual planting. There are a number of reasons for this, including abundant rainfall, a long growing season, and soils that are often marginal for agricultural crops but excellent for trees. Moreover, the South is the lowest cost region for establishing trees and has excellent markets, as the south has the highest concentration of forest industrial capacity of any region of the world. The South is the leading region for the production of softwood lumber and construction plywood used for homes.

The major tree species planted in the South are loblolly pine, slash pine, and long leaf pine, which are used to produce softwood lumber products. Hardwood trees with the exception of bottomland hardwood species used to recover lands previously converted to agriculture are rarely planted, even though hardwoods are abundant in the

South and are also harvested in large amounts because established stands of hardwood trees with few exceptions regenerate naturally and do not required planting.

Very little tree planting occurs in the North, because northern hardwood trees and trees of other species generally reproduce naturally in abundance following timber harvests and other disturbances.

The West is also an important producer of softwood lumber and species like douglas fir and ponderosa pine are widely planted. Note that Oregon and Washington are listed among the top tree planting states in the addenda materials.

Closing Comments

In closing, it is interesting to observe the trend in tree planting accomplishments over the past three quarters of this century. In the late 1920s and early 1930s, the planting of 100,000 acres in a single year was a major accomplishment. Currently, we are planting in excess of 2.5 million acres every year. Generally, tree planting has increased at a moderate pace from year to year, but there have been significant peak periods. The Civilian Conservation Corps (CCC) planted 2.3 million acres in nine years in the late 1930s and early 1940s; the Soil Bank Program planted 2.2 million acres on former farmland between 1956 and 1960; and the Conservation Reserve Program (CRP) has planted over 2.5 million acres, mainly during the late 1980s. All of these programs planted many trees and provided many other environmental benefits, but none of these programs were actually created for these reasons.

The driving force behind the creation of the CCC was the Great Depression; young men were taken out of soup lines in the cities and set to work planting trees and doing other conservation work in the great outdoors. Both the Soil Bank and the CRP were created to take excess agricultural cropland out of production to relieve economic stress on our farmers. Today our nation and the world is faced with the prospect of global climate change. This might just be the driver for the largest tree planting effort of all time.

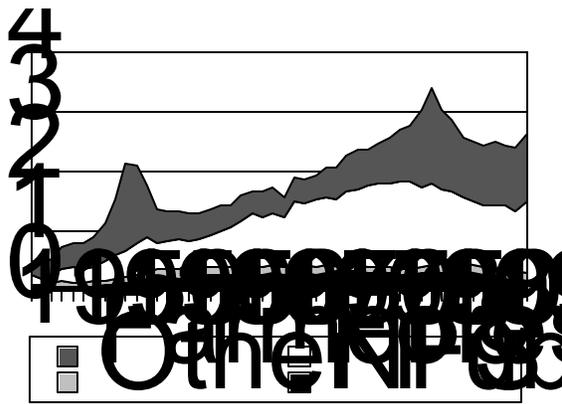
I am pleased to be here at this Reforestation Forum and I salute the leadership role that OSM is taking in promoting increased reforestation.

¹Dr. Moulton has recently:

- briefed the White House and congressional staff on *Sequestering Forest Carbon to Offset Global Climate Change*,
- been an advisor to the National Academy of Sciences for their study, *Forested Landscapes in Perspective*, and
- was the architect of the tree planting and improved forest management programs in the *President's 1993 Climate Change Action Plan*.

He served as the principal advisor to the Secretary of Agriculture in the design of the tree planting provisions of the *Conservation Reserve Program*, as authorized by the 1985 Farm Bill.

He has 15 years experience as a field forester in the lake states, Missouri Ozarks, Idaho, and Oregon, and is the author of more than 60 forestry publications.



Tree Planting in the U.S.
(Millions of acres)

States that planted more than 100,000 acres of trees in FY 1997	
State	Thousand Acres
Alabama	438
Georgia	397
Mississippi	282
Florida	193
South Carolina	166
Washington	158
Louisiana	144
Oregon	134
North Carolina	114
Arkansas	110
Texas	108

Tree planting by ownership

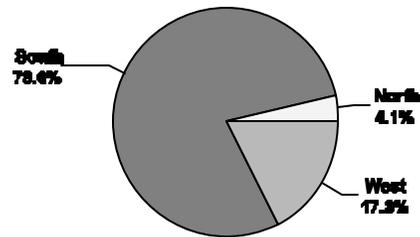
category in FY 1997:

	Acres	Percent of All Planting
Federal Government		
National Forests	158,918	6.0
Department of the Interior	13,956	0.5
Other Federal Agencies	<u>15,571</u>	<u>0.6</u>
Total	188,445	7.1
Non-Federal Public		
State Forests	37,430	1.4
Other State Land	15,732	0.6
Local Government	<u>49,551</u>	<u>1.9</u>
Total	102,713	3.9
Private		
Forest Industry	1,188,362	45.1
Other Industry	56,971	2.2
Nonindustrial Private	<u>1,099,611</u>	<u>41.7</u>
Total	2,344,944	89.0
Grand Total	2,636,102	100.0

Total planting and seeding by region in

FY 1997:

Region	Acres	Percent of All Planting
North	108,230	4.1
South	2,070,849	78.6
West	<u>457,023</u>	<u>17.3</u>
Total	2,636,102	100.0



FOREST BANKING

Kent Gilges¹
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Mission Statement

The mission of the Forest Bank is to promote, in partnership with private landowners, the economic productivity of working forests while protecting the biological diversity of the landscapes in which they occur.

Background

The Nature Conservancy

Since 1951, The Nature Conservancy has been pursuing its mission of preserving biodiversity through a range of land protection strategies: ownership, conservation easements, and related management agreements that ensure conservation-oriented stewardship of ecologically sensitive places. In the past year, the Conservancy surpassed a major milestone—successful protection of over 10 million acres of important natural habitat for a variety of plant and animal species.

Although the Conservancy's track record in land protection is noteworthy, the organization has come to recognize that in order to meet its mission with greater effectiveness and broader impact in the decades ahead, it must become even more strategic and creative in developing tools for accomplishing its conservation goals. Recently, a science-based planning exercise enabled the Conservancy to pinpoint the highest priority sites within distinct ecoregions of the United States. Given the interdependent nature of ecosystems, leadership within the Conservancy has come to recognize that land acquisition will be a necessary but not sufficient approach to the abatement of critical threats in these priority sites. Indeed, the task of developing additional, genuinely innovative and replicable strategies for conservation that can be effectively deployed in hundreds of communities may well be the Conservancy's greatest challenge in the coming years.

The Center for Compatible Economic Development

In 1995, the Conservancy created a special operating unit called the Center for Compatible Economic Development (CCED) to be an incubator of new ideas and strategies for achieving conservation goals by developing land uses, businesses, and products that protect important ecosystems while enhancing local economies and achieving community goals. CCED began working toward this purpose by collaborating with local Conservancy staff in a handful of selected locations to plan and execute initiatives that will simultaneously accomplish conservation and development goals.

Now in its third year, CCED is expanding its reach through fellowship programs that will bring in 20 new partner sites over the next several years. CCED will select some of these Conservancy sites, as appropriate, for implementation of compatible economic development initiatives in forestry, agriculture, tourism, and related business areas. The Forest Bank idea, which is described in the pages that follow, will be piloted in several regions, beginning with the Clinch Valley in central Appalachia, and most likely followed by sites in the Great Lakes region as well as southern Indiana.

Overview

Genesis of a New Strategy for Forest Stewardship

For the past several years, CCED has been undertaking a series of assessments focused on various aspects of the forest industry in a central Appalachian region known as the Clinch Valley. As CCED and Virginia Chapter staff developed ideas for promoting sustainable forestry practices in this region, a new concept evolved. Combining The Nature Conservancy's proven land protection strategies with current forest management and marketing ideas, CCED created an innovative concept called the Forest Bank. Designed to offer landowners a new tool for managing forest land in an ecologically sound and economically productive fashion, the Forest Bank idea has been developed and refined over an eighteen month period.

An Old Problem

Forested land often provides the ecological buffer surrounding and supporting critically threatened species and habitats. As the intensity of human use of the forest increases, the conservation buffer provided by the forest decreases. Threats such as fragmentation, erosion, and unsound harvest practice can affect many aspects of a forest, from its viability for threatened species to the secondary impacts on surrounding watersheds.

Over the coming decades, demand for domestic forest supplies is expected to outstrip supply, particularly given severe cut backs in production from the Pacific Northwest. Demand for wood products is driving prices up. And this demand for wood often hits hard on the nonindustrial private landowners—those who have traditionally faced a very limited array of options for managing their valuable resources. A recent study by the United States Forest Service found that 90 percent of forest owners nationwide have holdings of 100 acres or less. Choices regarding harvest and development of such forest land are often made for reasons unconnected to ecological concerns. The need for cash to meet estate, education, or medical needs may force a landowner to liquidate his/her forest asset. Often, the landowner does not have the knowledge or time to monitor the cut to ensure it is done in a sustainable way. When this happens, the resource is usually degraded and conservation values are often compromised.

While these conditions present a potential ecological threat to regions with harvest-age timber, they also present an opportunity for implementation of new, market-based forest management strategies. Products derived from timber that is sustainably harvested can take advantage of increasing demand in a growing number of niche markets.

A New Solution

The Forest Bank is an idea developed for private, nonindustrial landowners. By making a deposit or a transfer to the Forest Bank of the right to grow, manage, and harvest trees while retaining fee simple ownership of underlying land, participating landowners would receive the following services and guarantees:

1. An ironclad promise that the deposited forest will remain forest forever and will, henceforth, be managed sustainably to contribute functionally to the ecosystem of which it is a part.
2. A modest, regular financial return, or a dividend payment, calculated on the basis of the deposited timber's appraised value.
3. The option, when facing financial need, of withdrawing the deposit by obtaining cash value of the timber without having the trees cleared off their land. The right to withdraw will be made available with certain restrictions, similar to those accompanying familiar commercial bank certificates of deposit, such as a substantial penalty for early withdrawal.

In contrast to virtually every other effort to promote sustainable forestry on private lands, the Forest Bank strategy guarantees permanent protection and permanent control of forest management decisions through the irrevocable acquisition of timber rights. Although certification does not guarantee perpetual protection, it does

present an important, complimentary strategy that, used in combination with the Forest Bank, would provide a compelling, market-based incentive structure for promoting sustainable forest practices. The two are mutually reinforcing.

Target Participants

The Forest Bank is designed for private landowners with a desire to maintain and preserve their forests on the one hand, and a need for access to its financial value on the other hand. The following are just a few indicators underscoring the appeal that the Forest Bank is likely to have:

- \$ In an effort to understand the motivation behind forest ownership, the U.S. Forest Service recently conducted a survey of nonindustrial private landowners. It found more than a quarter of the respondents owned forest land because it is part of a residence; those listing recreation or aesthetic enjoyment as a primary objective accounted for another 20 percent. Only 9 percent own the asset as a land investment, and a mere 3 percent list timber management as the primary purpose.
- \$ In the course of completing Forest Bank feasibility analyses, one-on-one interviews were conducted with private landowners in the Clinch Valley who fit the profile of the target market. In aggregate, these landowners controlled about 4,500 acres—a mere fraction of the watershed but nonetheless a representative sample of the Clinch Valley region. About 70 % expressed a direct personal interest in the Forest Bank. Furthermore, nearly all believed the idea would appeal to other landowners in the region.

The Importance of Conserving Private Forest Land

Of all forest land in the United States, only 17 percent is under National Forest jurisdiction, with another 10 percent under other public control. The remaining 73 percent is in private hands. Furthermore, of all privately owned forest land in the United States (393 million acres), about 60 percent is held by nonindustrial interests; the remaining is split between corporate control (27 percent) and partnerships, clubs, associations, and Indian tribes (14 percent).

The nature of harvesting practices on private lands will have significant implications for the health of our nation's forests because nearly half of all timber harvested comes off private, nonindustrial land. Measured in total cubic feet of timber harvested, the breakdown is as follows: national forest 12 percent; other public forests 6 percent; private forest industry 33 percent and other private 49 percent. As more public land is taken out of production, there is increased demand on privately owned forest land. Unlike most industrial land, nonindustrial private forest land is vulnerable to significant external pressure, which typically comes from logging and timber concerns that have no long-term interest or stake in the health of the forest. Moreover, much of this land is ripe for timber harvests. Owners of over 60 percent of private forest land indicate they intend to harvest within the next one to ten years. Owners of another 23 percent will consider harvesting.

Long-term Prospects for Broad Application

The Forest Bank model is intended to be fully and broadly developed as a widespread tool for forest conservation within The Nature Conservancy and beyond. Although the initial handful of pilots will be dealing in tens of thousands of acres, the eventual impact, in terms of replication and results, is expected to be significantly greater.

The Conservancy's track record in land procurement, and the expertise it has accumulated, is leading the institution toward greater decentralization of staff, offices, and operations. The organization already operates through 50 state offices, each increasingly responsible for their own management, fundraising, and operations. In early 1998, The Nature Conservancy Board of Governors endorsed the decision to move the organization toward even greater decentralization. Current plans call for the establishment of hundreds more local Conservancy offices during the coming decade.

A major challenge during this next phase of the Conservancy's development will be to effectively staff and manage

local offices, and to help them become valuable agents for conservation in their communities by supplying them with innovative strategies and tools for conservation and compatible development. The Forest Bank is one of the most promising new concepts for meeting these objectives, and has great replication potential throughout The Nature Conservancy and beyond.

Feasibility Studies Completed in Support of Forest Bank Planning

Over the course of 18 months, a planning team, comprised of CCED as well as other Conservancy staff, worked with outside experts through a series of complex research exercises to determine the feasibility of the forest bank. These exercises focused on the Clinch Valley region, although additional feasibility work is currently being undertaken in other parts of the country. The Clinch Valley assessments that were conducted include:

1. Mater Engineering of Corvallis, Oregon conducted two consecutive studies:
 - A. The first was a major study of the forest industry in the region. It provided a wide-ranging market assessment for wood products from the Clinch Valley, with demand and supply analyses as well as interviews with landowners, primary and secondary wood product manufacturers, and wood product retailers. This study also included interviews with private landowners about initial reactions to the Forest Bank concept.
 - B. The second Mater study produced a financial feasibility analysis for the Forest Bank, using data generated through the complementary studies listed below. This exercise produced detailed financial models for determining the economic viability and the initial capitalization needs of the forest bank.
2. David Tice, President of North American Resource Management, Inc. of Charlottesville, Virginia completed comparative environmental assessments of forest harvesting regimes, and compared these with current certification standards. Tice also assessed these emerging standards in reference to the forests of central Appalachia, and used existing software for simulating various certifiably sustainable harvesting regimes on such forests.
3. Canal Forest Resources of Charlotte, North Carolina conducted a hardwood price analysis chronicling regional product prices and projecting best, worst, and most likely estimates of future prices.
4. The law firm of Winston & Strawn, headquartered in Chicago, Illinois, was commissioned to assess tax and related legal issues that need to be considered and resolved in advance of launching the pilot Forest Bank. This investigation focused not only on the proposed structure of the Forest Bank, but also on implications for transactions with depositors, with the objective of making the Forest Bank transactions simple for depositors.

Forest Bank Core Principles

- \$ Maintain and enhance the health of the entire forest.
- \$ Optimize the return to our depositors and maximize their satisfaction with our management.
- \$ Protect the soil productivity of our forest land and the water quality of our streams and rivers.
- \$ Create economic value from the forest resources by pursuing premium markets for our products.
- \$ Grow the highest quality timber possible of native species on any particular site.
- \$ Emulate the natural dynamic processes and disturbance patterns of the forest and minimize the impacts of our harvests.
- \$ Become a national model for the sustainable management of nonindustrial forests.
- \$ Continually reassess our methods and operations and look for ways to improve the Forest Bank.

¹Kent Gilges is the Director of The Forest Bank, a new business being developed by the Center for Compatible Economic Development at Nature Conservancy. Prior to this assignment, Gilges directed the Northern Lake Huron Bioreserve in Michigan's Upper Peninsula for the Nature Conservancy. He received his Bachelors degree from Cornell University and his Masters degree from Oxford University.