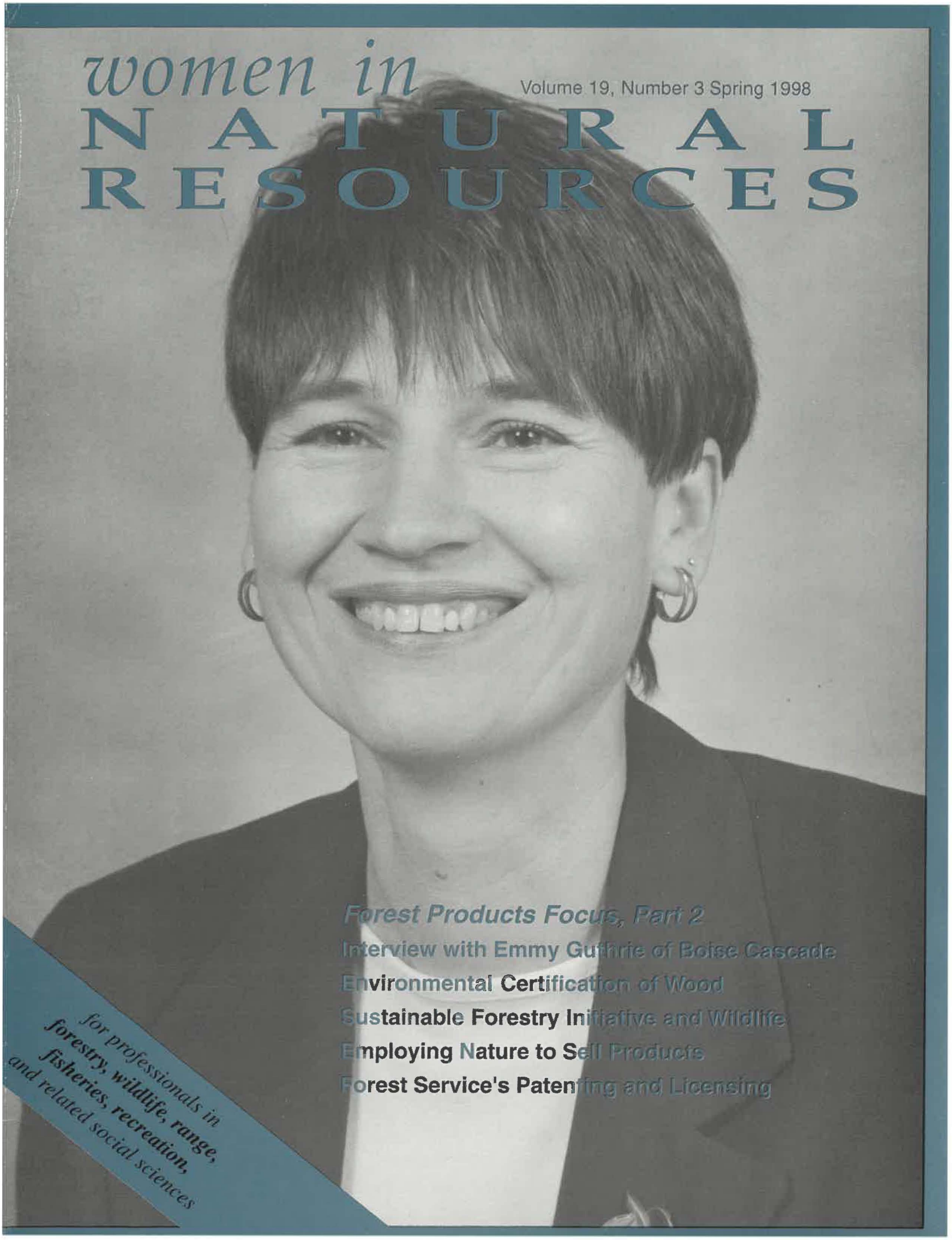
Volume 19, Number 3 Spring 1998

women in NATURAL RESOURCES



Forest Products Focus, Part 2

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Sustainable Forestry Initiative and Wildlife

Employing Nature to Sell Products

Forest Service's Patenting and Licensing

for professionals in ***forestry, wildlife, range, fisheries, recreation,*** *and related social sciences*

Editorial
Jessie Micales

*w*inning the *b*attles—*l*osing the *w*ar?

Last year I celebrated my 40th birthday. This would have been a depressing time but for the kindness of my friends and relatives. It was a time for reflection, especially since it came after two years of doubt and anxiety about my position in the U.S. Forest Service. These were years of downsizing and reorganization, and with a retiring project leader and a "nonemphasized" research program, the people in my research unit were fearful of our jobs. This is a special problem when one's research becomes so highly specialized that there seems no other place to go for employment.

Fortunately I survived the downsizing but was reassigned to a new project, thus creating the mid-life career change that many people of my age seek voluntarily. After 10 years of studying little known biochemical pathways of wood decay fungi, I was transferred into a fungal taxonomy unit. This is quite a change from fungal physiology, but it was the field in which I was originally trained so it didn't seem impossible - just difficult. Fortunately I was able to attend a two-week training class in Montana on "Rocky Mountain Mushroom" identification. Dr. Cathy Cripps, a fellow Virginia Tech graduate and a gifted and talented teacher, taught it.

It was a concise, interesting introduction to fungal identification and was a wonderful review of the mycology classes I had taken in graduate school from her major professor. The course gave me confidence to look through the microscope again! Now I'm developing a new research program, which you will probably hear more about in future issues. I am looking forward to the future. Change can be for the good.

As I look back over the past 20 years, I see definite changes in the biological sciences, many of which have been good for women. As an undergraduate at Delaware Valley College of Science and Agriculture, I was one of two women in the graduating class of Agronomy majors. Only one female science professor was at the college then—Dr. Barbara Muse. She served as my undergraduate senior research advisor and was very enthusiastic about getting me into graduate school as a Plant Pathology major at her alma mater, Virginia Tech.

During the early 1980's, there was only one female professor in the Plant Pathology, Physiology, and Weed Science department at Virginia Tech, and only a handful of women had graduated with Ph.D.'s over the previous five to ten years. There were, however, many female graduate students at this time, and I didn't feel the pressure and intimidation that other women graduate students have reported over the years. The department was very hard on all graduate students, and gender didn't really seem to matter very much. My major professor, Dr. R. Jay Stipes, was absolutely wonderful about taking a woman Ph.D. candidate into his laboratory. We traveled together on overnight trips throughout the state and studied landscape tree diseases together. These trips were the most enjoyable and instructive part of graduate school for me, and I was grateful that he didn't feel uncomfortable in traveling alone with a woman.

The worst part of graduate school was dealing with a certain committee member— the only woman on my committee. The queen bee phenomenon was certainly in effect! I also noticed, as I went to job interviews at some of the major universities in the U.S., that it would always be the female professors who asked the illegal questions about my family status and whether we were planning on having children or not. Women certainly didn't seem to support each other very well back then.

After graduate school, I took on a very interesting postdoctoral position in Frederick, Maryland with the USDA-ARS Foreign Disease and Weed Science Unit at Fort Detrick. This was a unique experience for a plant pathologist because we were working under containment conditions in greenhouses that had been used for biological warfare research by the army up until the 1960's. After that program closed down, the USDA took over the facility in order to study plant diseases that had not yet been introduced to the United States. This gave me an excellent opportunity to become acquainted with some of the rusts, smuts, and mildews that occur in the tropics. There were two women scientists in this work unit, one of whom was Frances Latterell, a pioneer woman in the field of plant pathology. It was a real honor to get to know her and to enjoy her company before her retirement. As in graduate school, I felt quite accepted by the scientists and administration in Frederick and didn't see gender bias as an obstacle.

(*continued on page 3*)

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WOMEN IN NATURAL RESOURCES

Spring 1998 **Volume 19, Number 3**

FEATURES

DEPARTMENTS

The cover photo is of
Emmy Guthrie
Project Manager,
Timberland Resources
Boise Cascade Corporation.

FEATURES

President, World Forestry Center

Position Description: WFCs President is the Chief Executive Officer, in charge of all programs, facilities and operations. WFC has about 20 employees, including five department heads reporting directly to the president. In addition to supervision, the president is responsible for strategic planning, outreach to forestry, environmental and forest products communities and the general public, coordination among domestic and international directors, and fund-raising.

Challenges: Preliminary museum modifications have been completed for a renovation that will feature forests of the world and their relationship to people over time. Fund-raising efforts are continuing to secure the remainder of $10 million needed for completion. Major financial commitments have been made to the international activities of the World Forest Institute, with efforts continuing to develop long-term commitments to expand outreach to countries throughout the forested regions of the world.

Qualifications: Must be innovative, high-energy person with substantial experience in executive management and development, working knowledge about forests, forestry and forest utilization, cross-cultural international experience and sensitivity, and a strong belief in the role of public education about forest management as a means to ensure productive, sustainable, healthy forests. Salary commensurate with qualifications and experience.

Nominations and Applications: Send to: Search Committee, World Forestry Center, 4033 SW Canyon Rd., Portland, OR 97221. Applications should include a complete resume and references. For more information, call Lynn Bergstedt at 503- 228-1367. ***Closing date for applications: August 30, 1998.***

Soil & Water Quality

University of Maine

An academic year, Assistant Professor, tenure track faculty position is available in the Department of Applied Ecology & Environmental Sciences. The position is 60% research and 40% teaching. The successful candidate will be expected to develop a vigorous research program in soil and water quality that emphasizes soil quality, nutrient management, erosion, wetlands/hydric soils, water quality and/or GIS. The faculty member will be expected to teach: soil and water quality (annually); soil taxonomy and mapping (alternate year); and a graduate course in their area of specialization (alternate year). Participation through advising in both undergraduate and graduate education is expected.

An earned Ph.D. in Soil Science or closely related discipline is required. The ability to address information needs of environmental, agricultural or forest resource importance to the State of Maine is expected. Demonstrated excellence in teaching, and experience in grant development and management is highly desirable.

Applicants must submit a cover letter with statement of research interests, vita, official transcripts, and arrange for three letters of reference to be sent to Dr. Tsutomu Ohno, Dept. of Applied Ecology & Environmental Sciences, 5722 Deering Hall, Orono, ME 04469-5722: e-mail: ohno@maine.edu. **Applicant review begins August 1, 1998.** *The University of Maine is EOE*

Regional Wildlife Extension Specialist—Purdue University

Located at Northeast Purdue Agricultural Center, Columbia City, Indiana.

Description: Twelve Month administrative-professional position, functionally divided .70 extension and .30 research.

Extension responsibilities: Conduct proactive, problem-solving wildlife extension program for natural resource professionals, county educators, and landowners as well as for the general public, emphasizing wildlife habitat management. The occupant of the position will also serve as author and coordinator of six issues of *Hoosier Farmland Wildlife Notes*, which is a multi-agency "fact sheet" reaching 150,000 Indiana landowners.

Research responsibilities: Organize and conduct applied research program in wildlife habitat management.

Qualifications: The successful candidate must have an M.S. Degree in wildlife management or a closely related field. Salary: Commensurate with qualifications/experience.

To apply: Applications will be accepted through August 31, 1998, or until a suitable candidate is found. Applications should include a resume, transcripts, copies of leading publications, and a statement of philosophy on outreach educational programs. In addition, applicants should arrange to have at least three letters of reference sent. Inquiries, applications, and letters of reference should be addressed to:

Chair, Regional Wildlife Extension Specialist Search Committee, Dept. of Forestry and Natural Resources, Purdue University, West Lafayette, IN 47907-1159 *An EO/AAE*

Southern Research Station USDA Forest Service
EARLY ALERT for THREE RESEARCH FORESTERS

The Southern Research Station in Asheville, North Carolina seeks one position with the Southern Forest Health Monitoring Program located in Asheville.

The other two positions are with the Forest Inventory and Analysis project with one position to be located in Starkville, Mississippi, and the other position to be located in Asheville.

Salary ranges start at GS-11 at $38,593 and includes GS-12, starting at $46,354.

Minimum of a Master's with expertise in survey sampling, forest inventory, and mensuration.

Specific duties involve the analysis and reporting of forest inventory and forest health information to a variety of audiences. The successful candidate must possess a willingness to accept an assignment involving team efforts within and between Forest Inventory and Analysis and Forest Health Monitoring both locally and nationally.

Submit a one-page resume to Bill Burkman (828-259-0522) or Ray Sheffield (828-257-4358), USDA Forest Service, PO Box 2680 Weaver Blvd., Asheville NC 28802. Inquiries welcomed by phone or fax 828-257-4894. *USDA is an EOE*

EDITORIAL

continued from inside front cover

In 1985 I took on a permanent Research Plant Pathologist position at the Forest Products Laboratory (FPL) in Madison, Wisconsin. This was really the first time in my career that I felt uncomfortable as a woman. It seemed that for a while I was being tested as a "woman scientist" instead of just as a scientist. The male technicians would stop talking when I walked into a room. It was sometimes awkward talking to other scientists or getting people to listen to me. Even though Madison is a very progressive town, which in itself was a shock after having been in the conservative south for seven years, the scientific staff was largely white males in their 50's. As a female in my late 20's, it took some time to feel comfortable in this position, but it eventually happened even with a minimum of mentoring. At the time, there were eight women scientists* at the lab out of a total of 92 scientist positions. ("Scientist," I should mention, is a government term that describes a specific job category, not just anyone doing science. Scientists are reviewed and promoted by a panel of their peers rather than by normal personnel practices. Many other women at the lab did science in the role of research support staff and as research technicians.)

It is interesting to see what has happened to these women scientists over the past 12 years. Two of them, Sue LeVan and Marcia Patton-Mallory, have gone on to higher-level administrative positions in the U.S. Forest Service. Three of them have retired or passed away, and one left government service for private employment. Only two of us are still here doing bench level research. This is rather surprising when one thinks that the normal "lifespan" of a researcher is at least 30 years. Even more surprising is that in 1995, we had nine women scientists but this was out of only 63 total scientist positions. Many of our "new" women researchers have actually been at FPL for many years and have been promoted from the research support staff, often after completing a Ph.D. program. The number of brand new hires has been minimal.

Perhaps a better gauge of women in science is what one sees at professional meetings. When I was in graduate school, many of the plant pathologists in the United States knew who I was because I was one of the few women at any conference. Current meetings of the American Phytopathological Society have almost equal numbers of men and women in attendance and on the podium. In September, I went to a meeting of western forest pathologists in Canada, and a full third of that conference consisted of women. Forest pathology had always been a very male profession dominated by a heavy drinking crowd. Things have changed considerably! Even more important than numbers in attendance is the attitude of the male scientists towards the women. This has greatly improved. Women who have worked hard and done well in their careers are treated as equals and are listened to with respect. There was no patronizing or sniping at this meeting. Kathy Lewis, one of the organizers who is another Virginia Tech alumna, was recently voted British Columbia's "Forester of the Year"—quite an accomplishment and something that never would have happened 15 years ago.

I think women are making definite progress in plant pathology and forest products research. The question is, is it too late? The budget cuts in the U.S. Forest Service have taken their toll. The attrition at FPL is not unique—we see the same thing in other government laboratories and universities throughout the U.S. Today there are only three U.S. Forest Service research plant pathologists in the entire Pacific Northwest and Southwest regions—down from nine in the 1970's.

I fear for the future of natural resources-related science in this country. As people retire, their positions are not being filled and attrition is taking its toll on the research community. We are losing expertise at an alarming rate. We need fresh people with new ideas and the energy to institute them. Technology is changing very fast, and it is hard to keep up with new techniques when a pile of paperwork accumulates on one's desk every day. Competition for funding is fierce as available dollars shrink and the number of people competing for them increases. I sometimes hesitate to advise young women about going into a scientific career. Science can be a lot of fun, but it can also be very competitive and demand long hours. It is harder and harder to find permanent positions in either government or academia.

I visited the Little Bighorn battlefield when I was in Montana last summer. Historians have determined that the Indians didn't initially attack Custer's men in a single concentrated onslaught. The warriors took their time and surrounded the soldiers, carefully firing their highly accurate rifles at individual troopers until the calvarymen were reduced in numbers so badly that they could no longer defend their positions. It was only then that the warriors rushed in for their final victory. I fear that the U.S. research community may be in the early stages of a similar battle. I hope that we are smart enough and resolute enough to win this war and that attrition doesn't thin our ranks to the point where we cannot recover.

Jessie A. Micales is Research Plant Pathologist at the USDA Forest Products Laboratory in Madison, Wisconsin. She is a longtime Women in Natural Resources *editor.*

*Thanks to Virginia White, Karen Nakasone, Linda Lorenz, and Kim Stanfill-McMillan for providing information on the numbers of women scientists at the FPL over the years.

A study was conducted in the spring of 1995 to compare attitudes of male and female U.S. consumers with regard to environmental certification of wood products and a willingness to pay a price premium for certified products. Results indicate that there are gender differences.

Environmental Certification of Wood Products

Lucie K. Ozanne
Richard P. Vlosky

Introduction

Environmental certification of forest products and forestry practices, part of the more encompassing green movement, is proliferating globally. In response to environmental concerns, some environmental organizations, retailers and wood products companies are developing standards to encourage consumers to purchase wood originating from certified sustainable forests. These efforts are intended to counter the common perception by the general public that most forest practices involving the harvesting of wood do irreversible damage to the environment (Peterson, 1994).

The basis for this action is a perceived need for consumers to be assured by neutral third-party organizations that forest products companies are employing sound practices that will ensure a sustainable forest. In addition to countering negative perceptions by consumers and the general public, it is believed that companies that prove themselves to be environmentally responsible will benefit from certification by differentiating their products in the marketplace and thus acquiring a larger share of the market. "The assumption behind these initiatives is that consumer interest in the forest dilemma is strong," and this interest may cause discrimination in favor of timber from sustainably managed forests, and a willingness to pay any associated extra cost (Upton and Bass 1996).

While only a small number of wood products manufacturers are currently involved in manufacturing or purchasing certified wood products, and only about .5 percent of internationally traded wood products have actually been certified (Baharuddin and Simula 1994), the potential exists for increased industry participation (Lyke 1996). However, critics of the environmental certification of wood products question whether there is sufficient consumer demand for certified wood products, and whether consumers will be willing to pay a 'green' premium to acquire such products (Waffle 1994; Baharuddin and Simula 1994; Bourke 1995). Without the ability to charge such a premium, manufacturers are concerned that they will have to incur the additional costs associated with certification, or their products will be at a cost disadvantage to uncertified wood products or other substitute materials (Upton and Bass 1996).

Very little empirical data have been collected on the markets for certified wood products. From a review of the literature, only three studies were found. These three separate studies found that consumers say they would be willing to pay a premium, with estimates generally falling in the 5 to 15% range (Read 1991; Winterhalter and Cassens 1993; Centre for European Economic Research 1995). However, some suggest that these findings obscure how a willingness to buy green products actually varies between consumer segments (Lober and Eisen 1995). This suggestion serves as a rationale for pursuing a study that compares different segments of consumers, in this case male and female consumers.

Thus, to better understand wood products environmental certification and its implications for wood product manufacturers, this research study had the following objectives:

1)To compare and contrast the attitudes of male and female consumers toward environmental certification programs.

2)To assess male and female respondents' willingness to pay a premium for environmentally certified wood products over a range of consumer products.

Wood Products Environmental Certification

Wood products certification has been identified by an American Forest & Paper Association (AFPA) task force as an important issue facing the industry (Anonymous 1995). Currently, there are two independent organizations that maintain wood products certification programs in the U.S.: the Smart Wood Program of the Rainforest Alliance and the Green Cross Program of Scientific Certification Systems. These two programs are the only ones in the U.S. that have been accredited by the Forest Stewardship Council (FSC), a diverse coalition that sets international standards for forest management and accredits certifiers. "FSC's mission is to accredit certifiers on a voluntary basis and to foster the development of national certification standards (Cabarle and Freitas 1995)." To facilitate widespread application of forestry certification, The Rainforest Alliance developed the Smart Wood Network in 1994. The Network currently involves regional organizations, as either members or collaborators, in seven regions of the United States and Canada, plus Brazil, Costa Rica and Mexico (Ozanne and Vlosky 1996; Lyke 1996).

Upton and Bass (1996) explain that forest or wood products certification has four main assumptions: 1) certification

has the twin objectives of (a) working as a market incentive to improve forest management and (b) improving market access and share for the products of such management; 2) certification is conceived as an economic, market-based instrument and, as such, participation in certification programs should be voluntary; 3) certification takes place by assessing the effect of forest activities against standards previously agreed as significant and acceptable to stakeholders; and 4) certification is undertaken by third party organizations that have no self interest in a specific forest activity; that are not stakeholders in the forest being certified; and that can assure the public of independent and professional judgment. "Sustainable forest management is an inherent aim of certification (Upton and Bass 1996)."

Many companies in the wood products industry have questioned the future of environmental wood products certification. However, some have suggested that this is an issue that will continue to impact the industry (Anonymous 1995; Mater 1995; Bourke 1996). A Society of American Foresters study group concluded, for example, "the discussion of forest management and forest products certification programs is increasing and will continue." (Anonymous 1995). Jean Mater (1995) recently wrote, "Perhaps a move toward certification will come from forest managers themselves, in the clarity with which they define sustainable forests and the sincerity they display about managing for sustainability."

Consumer Perceptions Regarding Environmental Certification

Similar to market studies on certification, few studies have been done regarding consumer perceptions about environmentally certified wood products or their willingness to pay a premium for such products. From a review of the literature, three studies that consider willingness to pay and one study that discusses general consumer perceptions of certification, were found. A study by the World Wide Fund for Nature (WWF) found that 66% of consumers would be willing to pay higher prices, up to 13.6% more for wood originating from sustainable sources (Read 1991). Another study involving interviews of affluent consumers, defined as households with incomes of $50,000 or more, found that 56% would pay 1 to 10% more for sustainable wood products, 19% would pay 11 to 20% more, and 3% would pay a premium exceeding 20%. Some 19% said they would not be willing to pay a premium for assurances of sustainability (Winterhalter 1993). Finally, a German study found consumers in Germany would be prepared to pay an additional 5% for certified wood products (Centre for European Economic Research 1995). However, it should also be noted that there is a distinction between actual purchase behavior and professed purchase behavior or stated attitudes, particularly with respect to environmentally sensitive topics (Eastin 1996; Wicker 1969; Eagly 1992).

In another study, Ozanne and Smith (in review) develop and profile consumer segments in terms of their attitudes toward environmentally certified wood products. They found that 18% of their consumer respondents believe that environmental certification of forestry practices is important; this segment is also the most likely group to seek out and buy these products at a premium. They describe this segment of consumers as politically liberal, democratic, female, a member of an environmental organization, and fairly well educated.

This study provides direct empirical evidence to support the hypothesis that there may be a gender difference in attitudes toward environmental certification programs while indirect evidence also points in that direction. For example, many studies of self-reported pro-environmental behavior find women reporting greater concern about the environment than men (Maloney et al. 1975; Smythe and Brook 1980; Ostman and Parker 1987; Baldassare and Katz 1992).

The Study

Research methodology and instrument

Survey development and implementation for this study was based on methods recommended by Dillman and described as the Total Design Method (TDM) (Dillman 1978).

Some of the survey questions assessing consumer perceptions of certification were adapted from the work of Ozanne and Smith (in review) while others were wholly developed as part of this study. Respondents were asked to rate their level of agreement using 5-point Likert-type scales that ranged from 1 = disagree to 3 = neither disagree nor agree to 5 = agree. Because of the limited number of certified products actually in the marketplace, the researchers felt it necessary to define environmental certification for respondents. The definition used was: environmental certification means that the forests from which the wood comes from are managed in a sustainable manner and that the trees are harvested in an environmentally sound manner. These management practices are certified by objective third parties.

In addition to documenting these attitudes, a series of questions were developed to assess "willingness to pay" for environmentally certified wood products by these consumers over a range of consumer products. For example, respondents were presented with the option of a dining room set, told the non-certified price was $1,000, and asked to "tick" the box that indicates their willingness to pay a premium for the environmentally certified version of this product. The options available to them were: would not pay more than $1,000, $1,100 or ten percent more, $1,250 or 25% more, $1,500 or 50% more, and would pay more than $1,500. This research instrument was thoroughly pretested to check for biased, misleading, or confusing questions and to verify the quality and comprehensiveness of information received.

Sample design

The sample used in this study was drawn in early 1995. Based on those consumers who would be in the market for a range of environmentally certified wood products, only residential consumers (homeowners) over 18 years old with incomes over $30,000 were selected. In addition, an equal number of males and females were selected for the sample population. Best Mailing Lists, Inc., a national sampling service provider, provided 2,500 homeowner names and addresses on a random, nth name basis with every single-family, owner-occupied U.S. household having an equal

Table 1. Differences Between Women and Men on Environmental Attitudes

(Scale: 1= strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree)	Mean Responses: Females (n=364)	Males (n=404)	P Value	Significance at a=
General Environmental Attitudes				
Whenever possible, I buy products which I consider environmentally safe.	4.10	3.86	0.0025	0.01
I would pay more for environmentally friendly products.	3.49	3.23	0.0017	0.01
I believe that having environmental information on packaging is important.	4.19	3.94	0.0028	0.01
I generally believe environmental information on packaging.	3.72	3.47	0.0007	0.01
I believe there is much that individuals can do to improve the environment.	4.47	4.20	0.0015	0.01
Attitudes Toward Environmental Certification				
I believe there is a need for environmental certification of U.S. forests.	4.12	3.78	0.0001	0.01
I believe there is a need for environmental certification of tropical forests.	4.44	4.18	0.0013	0.01
I believe environmental certification can help sustain the health of U.S. forests.	4.12	3.88	0.0021	0.01
I believe environmental certification can reduce tropical deforestation.	4.07	3.78	0.0005	0.01
I understand the concept of environmental certification.	3.76	3.81	0.5739	NS at a=0.05
I have purchased environmentally certified wood products in the past year.	2.86	2.83	0.7096	NS at a=0.05
If available, I would seek out environmentally certified wood products.	3.82	3.43	0.0000	0.01
I would pay more for environmentally certified wood products.	3.54	3.19	0.0000	0.01

and known chance of being selected (Mendenhall and Shaeffer 1986). Survey pre-testing was conducted on a convenience sample of acquaintances of the authors that fit the respondent profile. An iterative process resulted in the final survey instrument.

Of the 2,500 questionnaires mailed, 803 were included in the analysis. Sixty-seven questionnaires were returned as either undeliverable, the respondent was deceased, or the questionnaire was incomplete or otherwise unusable. This resulted in an adjusted response rate of 33 percent.

Non-response bias

Non-response bias is often a common concern in survey research. Using two tests, non-response bias was found to be statistically insignificant (at a = .001) by first comparing responses to first and second mailings and second by comparing geographic distributions by state for respondents to the geographic distribution of non-respondents.

Data analysis

Simple frequencies mean responses and one-way analysis of variance (ANOVA) techniques were used to examine and test for differences between male and female respondents on attitudinal questions and their willingness to pay a premium for selected environmentally certified wood products.

Results

Respondent profile

Men (52.5%) slightly outnumbered women (47.5%) respondents. The median age was 49 years. Slightly over a third (34.3%) of respondents had some college education, 32% reported receiving a college degree, and a large number (19.3%) reported completing a graduate degree. Another 15% of respondents received only a high school education or less. Most respondents were married (70.4%). The majority of respondents were in three income categories, $20,000 to $39,999 (18.6%), $40,000 to $59,999 (28.3%), and $60,000 to $79,999 (21.3%). However, 24.4% of respondents reported total household incomes of more than $80,000. A larger number (44%) of respondents were members of the Republican Party than were members of the Democratic Party (32%). However, 24.3% reported association or membership in neither of the two major political parties. The vast majority of sample respondents (94%) were Caucasian. Finally, 12.3% of respondents reported they were members of an organization whose primary mission is to protect the environment.

It is important to remember that inferences in this study are made about the sample population and not about the U.S. population as a whole. Thus our study inferences are made to the (approximately) 41 million persons in the U.S. 18 years old and over with an income of $30,000 or more living in owner-occupied housing units (Current Population Survey 1996).

Attitudinal questions

Common questions asked of both male and female respondents were classified into two groups: general environmental attitudes and attitudes toward environmental certification. Table 1 presents the results of one way ANOVA tests conducted on each of the attitudinal questions posed to male and female respondents.

Table 2. Levels of Trust in Potential Certifying Organizations

Potential Certifying Organization (Scale: 1 = trust the most to 4 = trust the least)	Mean Responses: Females (n=364)	Males (n=404)	P Value	Significance at a=
Wood Products Industry	3.05	2.92	0.1046	NS at a=0.05
Federal Government	2.85	2.84	0.9646	NS at a=0.05
Private Certification Company	2.38	2.22	0.0448	0.05
Non-Governmental Environ. Org.	1.73	2.17	0.0000	0.01

From the first grouping of questions, female consumers indicate a significantly higher (at a = 0.01) level of agreement with these general environmental attitude questions than men. Women are more likely to indicate that they: buy products which they consider environmentally safe; are willing to pay more for environmentally friendly products; believe environmental information is important and believable; and believe there is much individuals can do to improve the environment.

A range of questions was posed to determine male and female respondents' attitudes towards environmental certification programs. On the majority of these questions, women were statistically more likely to respond positively than men. For instance, female respondents were more likely to believe there is a need to incorporate environmental certification into both domestic and tropical forest management practices although both respondent groups strongly agreed that certification is necessary in the tropical forest setting. Women also were more likely to believe that certification can have a positive effect on the health of domestic forests and the sustainability of tropical forests. It is important to note that no significant difference was found in male and female respondents' understanding of the concept of environmental certification. Thus, a lack of self perceived understanding is not responsible for the difference in attitudes toward certification programs. Women were also more likely to indicate that they would both seek out and pay more for environmentally certified wood products. However, given the lack of certified products in the marketplace, it is not surprising to find that neither group was very likely to report that they have actually purchased environmentally certified wood products.

Trust in certification organizations

A question was posed to determine respondents' level of trust in potential certifying organizations. As seen in Table 2, on a scale of 1 = trust the most to 4 = trust the least, the wood products industry is the least trusted entity by both groups, followed by the federal government, a private certification company, and an environmental organization. Men are more trusting of a private certification company than women and women are more trusting of an environmental organization. However, both respondent groups are most trusting of an environmental organization to provide certification associated activities, such as forest management and harvesting and chain of custody monitoring.

Willingness to pay for environmentally certified wood products

Men and women were asked to indicate their willingness to pay a price premium for environmental certification across a range of wood products. For most products, respondents were given a base price to consider and then asked to indicate whether they would not pay a premium, or whether they would pay 10%, 25%, 50% or more than 50%. Given the huge expenditure incurred for a new home, respondents were asked to assess smaller premiums (2%, 5%, 10%, and more than 10%). For all of the products evaluated, female respondents were statistically more likely to pay more than men.

However, on average across all products examined, 33% of women and 40% of men indicate they would not pay any premium to purchase environmentally certified wood products.

Table 3. **Differences in Willingness to Pay for Environmentally Certified Wood Products. Mean Responses**

Wood Product (specified base price) (Scale: 1= not willing to pay any premium; 5 = willing to pay the highest premium option)	Females (n =364)	Males (n=404)	Significance P Value	Significance at a=
2x4-8' Studgrade stud ($1.00)	2.56	2.22	0.0001	0.01
Ready-to-Assemble Chair ($100)	2.28	1.93	0.0000	0.01
Dining Room Set ($1,000)	2.23	1.96	0.0013	0.01
Kitchen Remodeling Job ($5,000)	2.02	1.76	0.0006	0.01
New Home ($100,000)	2.65	2.43	0.0434	0.05

Summary

Are there gender differences in environmental inclinations, purchase intentions and willingness to pay for environmentally certified wood products? In our examination of men's and women's attitudes towards environmental certification programs, the answer is "yes." Given results that indicate that women are more likely than men to think environmental information on packaging is important and believable, it is not surprising that women are more likely to believe such information is necessary in the form of environmental certification claims on forest products. Women are also more likely than men to indicate they will buy and pay more for environmentally safe products, and this purchase intention is extended to the desire to seek out and pay more for environmentally certified wood products. These positive purchase intentions, on the part of women, may be partially explained by their belief that there is much that individuals can do to improve the natural environment.

Both men and women indicated they were most trusting of an environmental organization to provide certification; however, women were statistically more trusting of this type of entity than men. Thus, if a wood products organization were interested in pursuing this strategy, an environmental organization would be the most credible organization to provide certification processes and monitoring in the eyes of the consumers group studied. However, given the results that women are more likely than men to incur a price premium for certified wood products across all wood products considered, an organization pursuing environmental certification as a marketing strategy would target women as the most profitable market segment.

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Winterhalter, Dawn and Daniel Cassens. 1993. Telling the Sustainable Forest From the Trees. Furniture Design and Manufacturing. (August):101-106.

Lucie Ozanne, pictured below left, recently left the U.S. to move to New Zealand to take a Lecturer position at Lincoln University where she continues her research and teaching in the area of forest products marketing. Her research examines the impact of environmental concerns on consumption behavior and subsequent impact on the forest products industry. She received her B.S. in marketing at Florida State University and her M.S. from the Pennsylvania State University in marketing. Her Ph.D. is also from Penn State in the area of forest products marketing.

Richard P. Vlosky is an Assistant Professor of Forest Products Marketing at the Louisiana Forest Products Laboratory, part of the Louisiana State University Agricultural Center in Baton Rouge. He received a Ph.D. in Wood Products Marketing at Penn State University, a Masters Degree in International Forest Products Trade from the University of Washington and a Bachelors Degree in Natural Resources and Forest Management from Colorado State University. His research at LSU includes domestic and international wood products marketing; technology applications to improve wood products business competitiveness; marketing applications to economic development; environmental marketing; and value-added product opportunities.

Elements of a Successful Undergraduate Recruiting Program

The long-term health of undergraduate programs in wood science and forest products curricula world-wide, will depend on sustaining a high level of recruitment

Audrey G. Zink

INTRODUCTION

The recruiting program in the Department of Wood Science and Forest Products at Virginia Tech was initiated in 1991 as a response to declining enrollments in undergraduate wood science programs here and across North America. The last 12 years have seen a substantial decline in undergraduate enrollment in wood science and related disciplines and many programs have not been sustained as a result. The recruiting efforts at Virginia Tech however, changed the trend. The undergraduate population grew from only a handful of students at the beginning of the recruiting program in 1991 to over 100 in only a few years. This is quite a success in view of the grim national statistics just a few years ago (Bowyer 1992, SWST 1992, and Lyon et al. 1995).

The breakdown by class at Virginia Tech is almost equal across the four classifications, with freshmen at 23.5%, sophomores 30%, juniors 27.5%, and seniors 19%. Two undergraduate options are offered at Virginia Tech. Students in the option called Wood Products are 51% of the total and those in the Forest Products Marketing and Management option are 49%. In the beginning of the recruiting program, most of the students were enrolled in the marketing and management option, but in the past few years there has been an equal distribution between the two options.

KEY ELEMENTS

After a few years of experimentation, we have identified four elements that are key to the recruiting efforts at Virginia Tech. The first is to have the support of all levels of administration: departmental, college, and university. It is not enough to simply infuse money into the program; it is crucial to have the philosophical support of the decision-makers and career counselors. While at first reading, this may seem trivial, it is not at all. With declining enrollments prevailing around the world, it has been difficult to convince administrators to support efforts to bolster a "sinking ship". But with a little effort and preliminary data, it is possible to demonstrate positive results and garner the support of those who decide the future of programs.

The second key element has been to cultivate and maintain a positive relationship with career and academic counselors within our College and around the university. Those students who have declared an academic major in Forestry and Wildlife Resources are assigned a faculty member in their discipline as an academic counselor. For those students who have not chosen a major, it is possible to enroll in a general program called University Studies. Students are not allowed to graduate from this program but are required to declare a major by the time they achieve junior standing. While enrolled in University Studies, these students have an academic advisor assigned to them who is charged with preparing the students for their eventual major and career.

Interested faculty and students regularly meet with the Counselors in the University Studies office and inform them about our program and any changes that have taken place since the last meeting. At these meetings, we discuss the courses needed to transfer into our department, the courses the students are required to take for graduation, and most importantly, the career opportunities upon graduation. After learning about our program and the attractive career options, the Academic Counselors are very enthusiastic in encouraging students to transfer into our program. We also guest lecture in the course on choosing a college major and give interested students a tour of our research facilities. Establishing and maintaining the positive relationship with University Studies has been very fruitful for obtaining transfer students.

We have also cultivated a positive relationship with the Academic Counselors within our own College. Their office has taken an active role in guiding prospective students our way, in providing literature and information, and including our department in recruiting and informational sessions. Having people in the Counselors' Office that are supportive of our program has made a significant difference in the number of prospective students we meet with and the number that eventually transfer into program. On average we get 6 - 7 students per year through referrals from the Academic Counselor in our College. This number is increasing each semester. As the word about career opportunities is spread across campus, many more students who are interested in transferring into our program come to our offices.

The third key element is an effort called "Students Recruiting Students." Ifju (1996) has briefly described this effort in his recent editorial in Wood and Fiber Science. In this program, a graduate student is responsible for coordinating mailings, organizing tours and private meetings, staffing the recruiting office, attending recruiting and informational sessions, and coordinating with the Academic Counselor and faculty within the College. The graduate student is given the title "Recruiting Coordinator" and receives a modest financial award ($1000 per semester in addition to any regular stipend received). The coordinator has access to departmental resources including photocopying, telephone and mail services and the use of the computer facilities in the recruiting office. A visible office near the main departmental office was created specifically for the recruiting efforts and is staffed by the graduate student recruiter. The recruiting coordinator also has the ability to hire undergraduate students to assist with staffing the office, mass mailings, and personal phone calls to interested students.

There are two mass mailings per year. The first is a full size folder sent early in the fall semester to high school guidance counselors in Virginia and Maryland. Maryland high schools are included because we have a common market agreement that allows Maryland residents to pay in-state tuition if they are enrolled in one of our programs. Included in these packets is a full size folder that contains specific information about the faculty, facilities, degrees, departmental programs, the university and environs, course requirements, student activities, employment opportunities, recreational activities, interesting facts about wood, information about

each undergraduate option, and how to apply to our program. Also included in the packet is a number of response cards for the Guidance Counselors to give to their students to use for requesting more information about our program. When these cards are received back in the recruiting office, the interested student receives a letter and the full packet of information; and in about two weeks, the prospective student receives a phone call from either the recruiting coordinator, an undergraduate student, and/or a faculty member. It has taken several years to see results from these mass mailings. The mass mailings to high school guidance counselors started summer 1992, and by fall 1996 semester we had the largest freshman class in the last decade. While the folders in the mass mailings are very expensive to print, to prepare, and to ship and the personal phone calls and second mailings are very time consuming, the results are starting to be very profound in the number of freshmen enrolled in our program.

The second mass mailing is to students who are already enrolled in Virginia Tech but who have yet to declare an academic major —those in the University Studies program. This mailing consists of an informational letter, brochures describing each of the two options we offer, and an invitation to meet with us and tour our facilities. This mailing takes place in the spring semester. A second mailing is sent to these undecided students later in the spring semester which consists of the full packet described above that is sent to Guidance Counselors and another letter. About two weeks after the second mailing, a personal phone call is made to each student. In the past, this was our most successful recruiting effort and remains very productive. We typically get about 5 students each year from University Studies, primarily through the mailings and the advice from the Academic Counselors.

The graduate student recruiting coordinator is also responsible for attending local high school career fairs and University recruiting sessions around the state. Attending high school career fairs just started this year. Recently, a faculty member, the recruiting coordinator, several undergraduate students and an industry manager attended a career day at one of the local high schools. At a typical recruiting session, the faculty and student recruiters are usually asked to make a brief (20 minute) presentation about the program and then staff the information booth for several hours. Since we just started attending high school career fairs, the results are uncertain but, in general, we believe this effort will produce positive results in a 2 - 3 year period. The current undergraduate students in the department are very enthusiastic about their college major and are interested in attending the recruiting sessions. Their enthusiasm and commitment is sensed by the high school students and should prove beneficial to our enrollment numbers.

The fourth key element in our recruiting program is the involvement and solid commitment of the faculty and the administration. The recruiting efforts of individual faculty are as diverse as the faculty members themselves. They include teaching classes or describing our program and career opportunities at local schools, church and youth groups, 4-H meetings, community organizations and clubs. On-campus efforts include meeting with prospective students, guest lecturing, and attending information sessions sponsored by our College or the University. On average 4 - 5 meetings are held each semester with prospective students and 3 - 4 guest lectures are given in natural resource or related classes.

Much of the recruiting effort of the faculty is highly personal attention given to a prospective student, including one-on-one encounters at meetings, after classes, or in office visits and tours of our research laboratories. These personal visits and tours are very time-consuming but perhaps the most productive and rewarding of all the recruiting efforts listed. At the meetings with individual students, we generally discuss the course requirements, try to interest the prospective student with the attractive career market, the productive, interesting nature of the curriculum, and the diversity of options and concentrations available to them in the curriculum. Even though the program has quickly approached over 100 undergraduate students, we still maintain a high faculty-to-student ratio and a personal interaction level not afforded by other programs at a large University such as Virginia Tech. When the students are asked what caused them to transfer into our department, they often reply first with "the personal attention, the size of the classes, it sounds interesting" and then later respond "the strong possibility of a rewarding career upon graduation." Even after describing our program and the career options at great length, the most often-asked question at these meetings is "What kind of job can I get?"

Another very productive effort by the faculty has been to coordinate the introduction to renewable natural resources class (F100 intro-type class) by a member of our department. This faculty member gives a majority of the lectures in the class and then has several guest lectures from our department throughout the semester. This class is required for all first-year and transfer students in our college, and is also very popular throughout the campus. Approximately 150 - 200 students take this class in the fall and 125-150 in the spring. The majority of the students in the spring semester class are from outside our college, simply interested in the subject matter, and often interested enough to transfer into one of our college programs as a result. In the past, 1 - 2 students transferred into our program each semester as a result of this introductory class. The numbers are now increasing.

RECRUITING AND RETAINING WOMEN AND MINORITY STUDENTS

The percentage of women enrolled in our program has risen slightly as the enrollment has increased, however the percentage of minority enrollment has not significantly changed. When the recruiting efforts were started, there were 2 women students in about 30. Today there are 15 in 102 (15%) and only 1 minority student. Recently, a woman faculty member and a minority faculty member have joined the department.

Programs that have been effective in recruiting and retaining women and minority employees in industry include the following:

•well-developed initiatives and rewards for those doing the recruiting

•career development programs for women and minority individuals

•formal and informal mentoring programs

•high potential individuals in leadership and mentoring roles

•awareness that people all respond in unique ways to performance requirements, supervision, testing, classroom environments, and social events. Each person has unique needs, i.e., one size *does not* fit all

•a workplace "comfort zone" in which all individuals are accepted as equals; they are not completely isolated and alone; they will not be harassed, made fun of, or scared; they will receive help if they need it; and they are made to feel welcome and comfortable.

In general, these methods have been used in businesses and industry, but all of them can be molded and used successfully in the educational arena if the faculty, staff, and students are committed to increasing the enrollment of women and minorities in wood science curricula. All large universities and some of the smaller colleges have offices specifically devoted to diversity, equal opportunity, and student life issues. These offices provide a wealth of information on recruiting and retaining women and minority students. In addition, there are several very good publications that regularly provide information related to women and minority work/learning place issues (see box).

Magazines and journals which address the needs of women and minorities in the workplace are:

AWIS Magazine, Association for Women in Science, 1200 New York Ave., NW, 6th Floor, Washington, DC 20005, 800/886-1947

On Campus with Women, Association of American Colleges and Universities, 1818 R Street, NW, Washington, DC 20009, 202/387-3760

Women in Natural Resources, Bowers Lab, University of Idaho, Moscow, ID 83844-1114, 208/885-6754

Workforce Diversity, Equal Opportunity Publications, Inc. 150 Motor Parkway, Suite 420, Hauppauge, NY 11788-5145; 516/273-0066

Equal Opportunity Publications: Minority Engineer, Woman Engineer, Careers & the Disabled, Independent Living Provider magazines.

OTHER POSSIBILITIES

It is possible for industrial partners and employers to contribute to the recruiting efforts through summer jobs, co-op employment, and internships as well as sponsoring scholarships for students. It doesn't take a large scholarship to help students, as little as $500 can make a marked difference to a struggling student. In fact it can be the difference between continued enrollment, transferring to another program, or dropping out altogether. Industrial trade associations can contribute to recruiting and program health through collaboration with the universities and through their members. They can generate demand projections that are often required to secure administrative and political backing.

Currently there are several other successful recruiting efforts being undertaken, such as Mississippi State University's Wood Magic Science Fair (Conners and Seale 1996) and the University of British Columbia's Strategy for Renewal and Growth (Barrett and Cohen 1996).

The current enrollment statistics and the recruiting efforts of universities in the United States that offer wood science and pulp and paper science programs is summarized in the publication "Evaluating Careers and Functions in Wood Technology" (Anonymous 1996). The paper cites enrollment statistics in the Fall of 1993: approximately 485 students were enrolled in wood science and technology programs; 1410 in pulp and paper science programs. Females comprised slightly more than 13% of the wood science students and approximately 24% of the pulp and paper science students.

Additional recruiting ideas as well as ways industry can contribute are presented in this paper, e.g., include more involvement in recruiting by alumni, systematic and aggressive visitation schedules to high schools and junior colleges by faculty-student-industry teams, and regular participation at career fairs with ample literature to describe the advantages of wood science careers.

Placement rates of students in forest products careers nationwide are reported to be 80% and it is felt that this could be even better if more wood science graduates were promoting the programs with the industry. Along the Eastern seaboard where 75% of graduates emerge, there is a potential demand of six positions for each graduate.

It is clear from the success of the various recruiting programs that with positive and committed support from all levels of administration, referrals from Career Advisors, individual and collective faculty efforts, and a program such as Virginia Tech's "Students-Recruiting-Students," that it will be possible to reverse the declining enrollment trend and recover from the crisis in wood science and technology education.

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Audrey G. Zink is an Assistant Professor of Wood Mechanics and Anatomy in the Department of Wood Science and Forest Products at Virginia Tech, Blacksburg Virginia. Prior to this she worked in industry and for the Colorado State Forest Service. Her research program, funded for three years for $603,262, on the anatomy of wood and certain mechanical and physical behaviors is funded by the U.S. Department of Energy and co-sponsored by two industrial colleagues.

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Jessie A. Micales

Research In Progress

Focus on: *Wood Products*

Wood Science Graduate Program

University of British Columbia, Vancouver, British Columbia, Canada

Overview of the Graduate Program, by Dr. Colette Breuil (breuil@unixg.ubc.ca), Associate Professor

The goal of the graduate program in Wood Science is "to provide highly specialized education to ensure that leading edge human resources are available to the wood sector." The University has encouraged a more even gender balance in student enrollment. IN 1992, only five students out of 36 were female; by 1997 this number had increased to fifteen out of 64. Five female students graduated at the beginning of 1997, and ten are currently pursuing degrees. Departmental research activities are represented by at least nine general areas, including Marketing, Wood Biology/Quality, Wood Protection/Biodeterioration, Chemical Processing/Pulp, Wood Products processing, Wood Physics/Drying, Wood Mechanics/Engineering, Wood Composites, and Forest Products Biotechnology. Each student has briefly described her research activity.

Wood Protection and Wood Drying

Radio Frequency Heating of Wood

Fang Fang (ffang@unixg.ubc.ca)
M.S. Student

I am a new graduate student at UBC. My research project will combine radio frequency heating of wood (RF) with chemical treatment. There has been renewed interest in RF of lumber and also in the use of techniques to accelerate the fixation of the wood preservative chromated copper arsenate (CCA). There is now much interest in combing the RFVD technique with the fixation aspect for CCA-treated poles. This would take advantage of the fact that RFVD is independent of pole diameter. It would also mean that instead of storing poles for six months or more to dry, the poles could be conditioned and treated in less than three weeks. A demonstration of RFV drying, CCA treatment and RFV post-treatment for fixation and sterilization will be done at the laboratory. X-ray photoelectron spectroscopy and electron spin resonance spectroscopy, and other methods will be used to confirm that the performance of the CCA preservatives is not affected.

Effect of Drying on Preservative Permeability

Yuxian An (yuxian@unixg.ubc.ca)
M.S. student

I am starting my second year at UBC. In my research project, I will attempt to determine the influence of drying for improving heartwood permeability to preservation treatment.

The majority of Canadian wood species have relatively impermeable and non-durable heartwood. Currently waterborne preservatives such as chromated copper arsenate (CCA) are used to improve wood durability. Most Canadian wood species have a low permeability to CCA. Certain high-temperature pre-steaming schedules can significantly improve the permeability in now cloned Pinus radiata pine heartwood to waterborne preservatives. In other studies, high temperature kiln drying has been shown to reduce the treatability of wood. Consequently, the main objective of my research project is to identify the best drying regime for improving the permeability of Canadian softwoods to chemical treatments.

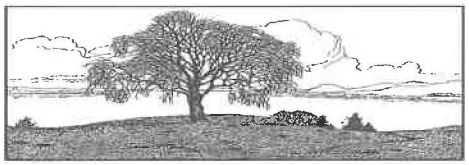
It is anticipated that additional spin-offs will include a better understanding of the effect of drying processes on wood properties, and of the pathways through which waterborne chemicals penetrate wood. Five Canadian softwood species will be dried with seven different drying regimes and then treated with two preservatives. The measurement of the preservative penetration and retention will be done with standard test methods. Scanning electron microscopy - EDX analysis will be used to evaluate the distribution of CCA components in the wood cell wall. The chemical components of CCA that penetrated into the cell wall will be observed by microscopy.

Fixation Chemistry of Alternative Preservatives

Jiang Xiao (jiangx@unixg.ubc.ca)
Ph.D. Candidate

I am just starting my research project that will deal with the fixation of alternative waterborne preservatives based on copper. The value of the treated wood products in 1992 was over half a billion dollars. More than half of this was consumer lumber treated with chromated copper arsenate (CCA), the most widely used preservative in North America. CCA now also accounts for almost half of the treated poles produced in Canada.

During the past decade, there has been growing resistance by the general public and governments agencies in Europe, North America, and Japan over the use of preservatives that contain chromium and arsenic. The response of the industry was to develop alternative copper-based waterborne preservatives that do not contain chromium or arsenic. Relatively little is known about the fixation of these alternative preservatives in wood. In order to maximize the commercial opportunities for these alternative preservatives, my project will focus on the fixation-chemistry of these alternative preservative systems.



Wood Mechanics/Engineering

Converting Timber into High Value Products

Maria Stefanescu (mariast@unixg.ubc.ca)
M.S. Student

I joined UBC in September of 1997. Some key elements in my research will relate to converting timber into high quality products. Furniture will be largely determined by selection of optimum dimensions and by those features or mechanical devices that combine to make the end product function as well as possible. The appearance of a piece of furniture is as important as its function, and for this we may incorporate moldings, carvings, or shaped components to increase its visual appeal. In principal, the project will look at the factors relating to form, comfort, style, and function.

Design of Structural Composite Lumber

Peggy Clouston (pclousto@unixg.ubc.ca)
Ph.D. Candidate

My research topic deals with the development and verification of a computer model to analyze the structural behavior of engineered wood that is known as structural composite lumber. This engineered wood is a common commercial building material made through sophisticated manufacturing techniques in which thin wood veneers or strands are arranged and bonded together with resin under heat and pressure.

The computer model will use the properties and characteristics of the wood strands as input giving consideration to strand orientation and dimensions and the presence of voids. The work will involve a comprehensive experimental test program for the basic engineering material properties of the strands. These strand properties will then be incorporated in numerical analyses to predict the structural behavior of the composite. The model will be verified through full scale testing.

This research will be invaluable in the development of new structural wood composites. Presently development or modification of wood composites are experimentally based and require expensive testing programs to optimize new product strength. A theoretical model to predict strength, given a set of specific material variables, will alleviate a large portion of this costly testing. In summary, my research is concerned with the understanding and prediction of structural wood composite behavior.

Forest Products Biotechnology

Detection of Wood Preservatives with Antibodies

Jennifer Bull (jbull@unixg.ubc.ca)
M.S. Student

I have a background in environmental biology that included work in chemistry, biology, microbiology, and toxicology. I am finishing my Masters' degree, and my research project was to develop new detection methods for fungicide wood preservatives used in the Canadian forest products industry. The fungicides are quaternary ammonium compounds (QACs) which are also used ubiquitously as disinfectants.

These compounds are toxic to aquatic life and may enter waterways via runoff from sawmill sites. Detection and monitoring of these compounds are required by law. Conventional detection methods exist, but they are expensive, require sample preparation and technical expertise, and have low sample throughput capabilities. Immunoassays are a relatively new technology that have been used to detect pesticides and many toxic substances. Immunoassays are easy to use, cost effective, sensitive, have high sample throughput, and can be developed into a portable field kit. This technology exploits the immune response in mammals in that antibodies can be raised against foreign substances, termed "immunogens."

Small chemicals, such as QACs, can be made immunogenic by conjugation to a large carrier protein. The immunoassay then relies on the specific interaction between the antibodies and the "analyte" (i.e. the compound that is being analyzed), of interest. The specificity, and a high sensitivity, is ideal for analyte detection in a wide variety of environmental matrices, such as soil and water, without sample extraction or purification. We have developed immunoassays for two QACs. Currently we are testing the viability of the assay to detect analyte concentrations accurately in several different matrices.

Using Fungal Enzymes to Modify Paper Pulp

Gyöngyvèr Csom (csom@unixg.ubc.ca),
M.S. Student

I am starting the second year of my Masters' degree. My research project is on the use of enzymes to modify dissolved pulp. Enzymes are biomolecules with the ability to catalyze specific reactions. For example, cellulases break down cellulose into glucose, a simple sugar. Pulps are largely made from wood chips by either mechanical or chemical processes. After chemical pulping and bleaching, most of the lignin is removed from the pulps. For special end products, such as viscose rayon, cigarette filters, diapers, etc., the pulps have to be treated further to remove chemicals other than cellulose.

Usually highly treated "dissolving"pulps are composed of 95 – 98% cellulose, 2 – 4% hemicellulose, with traces of lignin. The small proportion of hemicellulose is undesirable for viscose rayon preparation as it causes filtration problems and precipitation on the equipment. A further chemical treatment to improve the cleanness of the pulp is difficult to achieve. Consequently, I will be using selective hemicellulose to remove the remaining hemicellulose from the dissolving pulp. The treatment should result in a better substrate for viscose rayon manufacture.

Enzyme Pretreatment of Wood Pulp

Minna Lumme (lumme@unixcg.ubc.ca)
M.S. Student

I am starting the second year of my Masters' degree. The objective of my project is to evaluate the potential of various fungal enzymes, mainly cellulases and xylanases, for the treatment of spruce/pine/fir kraft pulps. The enzymes are used to modify the pulp fibers in order to improve their papermaking properties.

As these enzymes are of fungal origin, their role in nature is to degrade cellulose and xylan during wood decay. For fiber modification, the goal is to apply the selective enzymes onto the surface of the pulp fibers in order to produce beneficial changes in fiber characteristics (reduced coarseness) which, in turn, are expected to translate into improved paper properties such as paper strength. Our initial results seem promising.

Ethanol Production from Wood Waste

Triona Mooney (tmooney@unixg.ubc.ca)
M.S. Student

In the second year of a Masters' program, I am studying the use of fungal enzymes to convert wood waste into ethanol for use as fuel. This area has been of interest since the fossil fuel crisis of the 1970's when it became obvious that alternative fuel sources were going to be needed. Cellulose is the most abundant polymer in the world and can be converted to glucose using cellulase enzymes. This glucose can convert to ethanol using technology already in place in the brewing industry. For this reason, enzymatic hydrolysis of cellulose to glucose is of economic interest. My project involves studying the mechanism of action of these

enzymes on softwoods and determines how the glucose yields can be increased.

There are many factors involved in determining the rate of hydrolysis of a substrate. Many of these factors are related to the substrate structure. These include lignin content, fiber size, and surface area available to the enzymes. The first step in the hydrolysis reaction is the adsorption of the enzymes to the substrate. For this reason, the surface area is one of the most important factors.

Lignin often interferes with the adsorption process, so it too is an important factor in the hydrolysis reaction. My goal is to study the effect of surface area and lignin content on the hydrolysis of softwood substrates native to British Columbia.

Melanin Production and Genetic Control in Sapstain Fungi

Rebecca Eagen
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Ph.D. Candidate

I am in the last year of my Ph.D. degree. My research project is on the isolation of melanin genes from the sapstaining fungus Ophiostoma piceae. Canada is the world's prime exporter of softwood lumber. During shipment and storage, lumber is susceptible to sapstain, a wood discoloration caused by fungi.

Currently kiln drying and chemical applications are used to control sapstain. The chemicals treatments used for sapwood control are either under temporary registration or are under scrutiny by regulatory agencies or the public. Consequently there is a need for new antifungal agents that are highly specific and have very low environmental impact. The overall objective of my research is to compile fundamental information about the chemical nature and biosynthesis of the pigment produced by many sapstaining fungi.

We isolated the pigment and showed that it was melanin. Using inhibitors, I determined that the O. piceae melanin was produced through the dihydroxynaphthlene (DHN) pathway. Using polymerase chain reaction (PCR), I identified two of the genes involved in the melanin pathway. One of the genes has been characterized. Presently I am constructing melanin-deficient mutants to prove further the functionality of this gene. The fundamental information generated by this project will help the wood industry to design more specific and environmentally benign antifungal products.

Photos: From left to right
Top row: **Peggi Clouston, Triona Mooney, Xiao (Alice) Jiang**
Middle row: **Jennifer Bull, Yuxian An, Minna Lumme**
Bottom row: **Fang Fang, Maria Stefanescu, Rebecca Eagan**

USDA- Forest Service
Forest Products Laboratory, Madison, Wisconson
Introduction by Dr. Jessie A. Micales, Research Plant Pathologist

Many of the women researchers of the Forest Products Laboratory have been profiled in *Women in Natural Resources* over the past seven years. These articles have described studies in wood adhesives [12(1):24], timber bridge design [15(4):36], using antibodies for the detection of wood decay fungi [17(1):16], the biological control of wood decay and sapstain fungi [18(2):11], ethanol production from wood by fermentation of yeast [14(2):6], composting [15(4):37], tropical mycology [14(3):13], wood anatomy [12(1):24], forestry economics [12(1):25], and paper recycling [17(1):38]. The work of three additional women researchers are presented here.

Improved Paper Recycling Technology

Marguerite Sykes (Marguerite.Sykes/fpl@fs.fed.us)
Research Forest Products Technologist
Fiber Processes and Products

What do the new pressure sensitive postal stamps, address labels, self-sealing envelopes or post-it notes have to do with forest products? Plenty. Perhaps the biggest problem facing paper mills using recycled fiber is the presence of "stickies," adhesive particles remaining on recycled paper fibers. While the widespread use of self-adhesive postage stamps alone contributes in excess of 30 tons of adhesive to the post-consumer paper stream annually, it is actually a very small percentage of the 34 million tons of fiber recovered in the US every year.

You may not think of recycled paper as a "forest product," but recycled fiber is an important factor in the worldwide fiber supply. European countries recycle as much as 60% of all their paper products; the US may meet its 50% target by the year 2000. Unfortunately, increased use of adhesives in our homes and offices is making that goal more difficult. As a substitute for virgin fiber, recycled fiber must meet the same cleanliness specifications. Because stickie contaminants are such a large and costly problem, simultaneous efforts are being directed to developing recyclable adhesives and designing more efficient recycling equipment and processes to increase contaminant removal.

Recycling printing and writing papers has been the focus of much of my recent research. In an effort to improve the paper recycling process as well as making it more environmentally sound, we are replacing conventionally used deinking and bleaching chemicals with enzymes, naturally occurring biological products. Cellulases are effective for removing toner inks used in laser printers and xerographic copy machines. Xylanases improve the "brightness" of recycled paper, thereby reducing the amount of bleach chemicals required. Lipases target both the naturally occurring wood resins and some adhesive residues. When combinations of these enzymes are used during recycling, they interact synergistically to produce a brighter pulp furnish free of ink and stickie contaminants. This biological method decreases chemical use and has a positive impact on the quality of mill process water.

Preliminary experiments have demonstrated that a combination of commercially available enzyme preparations used with new recycling equipment can remove up to 60% more stickie contaminants than the conventional alkaline repulping process. Current technology in the recycle mill uses medium consistency repulping to fiberize waste paper, pressure screening to exclude contaminant particles by size, cleaning sequences which separate contaminants by density, and flotation which separates hydrophobic contaminants by adsorption on soap-like bubbles. Paired with producing cleaner recycled fiber, enzyme enhanced recycling also has the advantage of being carried out at the ambient pH of the paper furnish--essentially a neutral (pH 7- 8.5) range. Operating at neutral pH at moderate temperature has a positive impact on process water. Fewer stickie contaminants are solubilized under these conditions which also prevents redeposition in other parts of the paper mill, a costly problem now prevalent in mills using recycled paper furnish. On this scale, enzyme technology appears to be the answer to many of the problems facing recyclers.

So what's next? Ideally, transferring this technology to mill use. Some mills in Europe and South America are already using enzyme technology for bleaching pulp because of the benefit of improved effluent quality. In the US some recycling mills currently are cautiously evaluating enzymes for improving the quality of their product. However, change comes slowly when an emerging technology is involved. Additional research and extended mill trials to confirm the advantages of enzyme substitution are still needed before this technology becomes "conventional."

Putting Synchrotrons to Work on Forests

Barbara Illman (Barbara.Illman/fpl@fs.fed.us)
Research Plant Pathologist
Biodeterioration of Wood

Forest ecology, forest health, biodegradation of wood waste and biodeterioration of wood have fundamental similarities - the dynamic interaction of organisms, and the chemical mechanisms responsible for the interactions. We are using a new class of nondestructive, noninvasive technologies to study problems in these areas of research. The technologies are based on the use of synchrotrons to probe the mechanisms of interactions at the molecular level. A synchrotron is a particle accelerator that produces electromagnetic radiation, including high energy X-rays and ultraviolet rays. This radiation can be used to detect the presence of most elements in the periodic table in multiple valence states. Synchrotrons are proving to be valuable tools in forestry and forest products research. The synchrotron research is conducted at the National Synchrotron Light Source (NSLS), Brookhaven National Laboratory and the Advanced Photon Source (APS), Argonne National Laboratory. My collaborators are Betsy Dowd, National Synchotron Light Source and Sasa Bajt, Lawrence Livermore Laboratory.

We are using synchrotron-based technologies for in situ detection of wood degrading fungi and root-rot pathogens. Chemical analysis of the specimen can be determined by several synchrotron-based techniques. Additionally suited for forestry research is the newly developed synchrotron-based microtomography. Computer tomography is more commonly used in the medical field. The result images are known as CAT scans. The tomography images show relationships between organisms at the cellular level.

In the future, we will expand the use of the synchrotron to research in forest ecology to study important questions about one of the most damaging insects affecting North American forests. Spruce ecosystems of Alaska are currently affected by outbreaks of the spruce bark beetle, Dendroctonus rufipennis (Kirby) and its symbiont fungi. Forests of white and Lutz spruce are subject to mortality from the bark beetle, where infestations have expanded throughout south central Alaska since 1974 and have killed trees on over a million acres of forest. These large-scale outbreaks can affect forest community structure and successional pathways. The beetles' ability to exploit the forest resource is augmented by their pheromonally mediated cooperative behavior, and their associations with microbial symbionts. Spruce - bark beetle - fungal systems offer an opportunity to evaluate the effects of ecological interac-

tions across multiple spatial and temporal scales, across multiple trophic levels, and among diverse taxa. Understanding these relationships could greatly improve our ability to evaluate and devise appropriate forest management practices, and anticipate the impacts of multiple abiotic, biotic, and anthropocentric stresses.

Lignocellulosic – Plastic Composites

Nicole M. Stark (Nicole.Stark/fpl@fs.fed.us)
Chemical Engineer
Performance-Designed Composites

The plastics industry has used inorganic materials such as talc, calcium carbonate, and glass fiber as reinforcement for many years. An emerging area of interest is using lignocellulosics combined with thermoplastics. Although wood flour has been used with plastics in the automotive industry, the interest of the plastics industry has generally been limited. When compared to inorganic materials, lignocellulosics in the thermoplastics are less expensive, less abrasive to processing equipment, lighter weight, and derived from a renewable resource.

The production of wood fiber-thermoplastic composites is a two-step process: compounding and forming. Compounding is mixing the lignocellulosic with a molten thermoplastic to produce a homogeneous composite blend. The resulting blend is in a form that can be used as a feedstock for forming. Forming involves heating the composite material and forming it into the desired shape.

An outreach effort conducted by the Forest Products Laboratory (FPL), in combination with a study that compares the effectiveness of wood flour and wood fiber fillers to several inorganic fillers, has broadened the interest of the plastics industry in using lignocellulosics with plastics. This interest has paved the way for FPL to become a leader in the area.

My particular area of interest has focused on the effect of different sizes of wood flour on the mechanical properties of wood flour-filled thermoplastic. I have found that flexural and tensile strength and modulus reach a maximum at a particle size of around 0.25 mm. For increasing particle size, the impact strength increases or decreases depending on the orientation of the sample. The next phase of this project is to improve the bonding of the wood flour with the thermoplastic using a coupling agent. This should result in better mechanical properties.

Besides using additives, performance of these composites can be improved by using wood fiber rather than wood flour. As the aspect ratio (length to diameter ratio) of the wood fiber increases, it becomes more of a reinforcement for the thermoplastic rather than a filler. I am currently examining the effectiveness of reinforcing thermoplastic with wood fiber derived from scrap pellets. In the future, fiber for reinforcing thermoplastics may include wood fiber derived from sources such as pallets, demolition waste, and forest residues. Other natural fibers, like hemp, kenaf, and jute fibers may also be used.

Highlights of Forest Certification

Timber owners are voluntarily submitting to third-party verification of their management practices. In return for following certification guidelines and conserving the forest ecosystem, property owners' "green certified" logs and other products may bring higher prices in the developing niche markets for certified wood.

History of Certification

The forest certification movement began in the 1980s in response to concern over depletion of tropical hardwoods and overcutting in the rainforests. Consumers, particularly from northern Europe, sought "certified" products, from certifiably "well managed" or "sustainably managed" forests. In 1993, the Forest Stewardship Council (FSC) was created as an international organization to accredit and monitor certifiers. In the U.S., most "third party" certification has been through SmartWood of Richmond, Vermont, or Scientific Certification Systems (SCS) of Oakland, California. SmartWood works with local nonprofit organizations (such as the National Wildlife Foundation in the Northeast and the Rogue Institute in the Northwest) to certify well-managed forest ownerships that are conserving the forest resource through careful stewardship. The long-range objective is to become certified as sustainably managed as the management program matures and our understanding of sustainable practices evolves.

The Process

Currently over three million acres in the U.S. have been certified as well-managed, and in the past year, the trend has accelerated. Minnesota and Pennsylvania are now seeking certificaiton on almost two million acres of public forests. Certified mid-size industrial landowners include Collins Pine Company (92,000 acres in north-eastern California), Keweenaw Land Association (155,000 acres in Michigan) and Seven Islands Land Company (975,000 acres in Maine).

The Certification Process

An application form describing the property and management strategy is submitted. If interest is strong, the landowner completes an application that describes the property and management strategy. If appropriate, an indepth interview and/or field visit is conducted to ensure no obvious impediments to certification exist. This is followed by the formal assessment. The assessment team consists of a team leader from the certifying organization and one to three others, usually professionals with expertise in forestry and other relevant disciplines. After the team evaluates and scores the operation, a draft report of the findings is prepared. Both the landowner and independent, knowledgeable outside parties review the document for consistency, logic, and feasibility. Details of the conditions and/or preconditions to certification may be discussed and improved. The final document is submitted to the certifier for a decision. Following certification, the certifier visits the property each year to ensure that no major, unjustified management changes have occurred that would threaten the certified status of the operation.

Cost

A landowner's primary expense comes at the time of the assessment process and can cost from $1,000 to $10,000 depending on the size of the property. A written management plan and forestry inventory may be additional expenses (if not already in place). Annual monitoring visits are billed to the landowner. Even though certification is a voluntary program that can be dropped at any time, a significant commitment in dollars and time is required to participate. Motivation is required beyond a desire for potentially higher returns at the marketplace. Through the Certified Forest Resource Manager Program, costs can be spread among a pool of woodland properties, making it more affordable to the small woodland owner.

The Market: Two Examples

Although a mass market is unlikely anytime soon, niche markets for certified wood have developed. For example, in the northwest, certification is likely to have the earliest impact on marketing of specialty woods such as alder, bigleaf maple, cedar, madrone, and oak. The Harwood Forest products mill in Branscomb, California is successfully marketing certified dimensional redwood and fir lumber. They are currently seeking additional sources of certified logs and have been paying landowners a five percent premium for them.

Scott Ferguson, *Forest Stewardship Notes*, Spring 1998

BOOK REVIEWS
by Jonne Hower

Where Wizards Stay Up Late: The Origins of the Internet

Katie Hafner and Matthew Lyon
Simon and Schuster, New York. 1996.

"I'll send you an e-mail. What's your address?"

Are you to the point where you can't live without e-mail? Although computer-challenged, I confess I like it. I find e-mail much more convenient than faxes. I like it better than voice-mail. And, within the agency, I can track it: Has my message been received, opened, or deleted?

But where did that address style come from? Who figured out how to have computers talk to each other, anyway? Can you remember when a computer *just* was a computer? When it wasn't connected to anything else like the world wide web on the Internet?

Where Wizards Stay Up Late describes the birth of the Internet beginning with the Advanced Research Projects Agency (ARPA). This office, a civilian-led, research and development arm of the Pentagon, was organized by President Dwight Eisenhower—Yes, I mean really! President Eisenhower of the 1950s created ARPA. And, yes, national security and the Pentagon was involved.

There even existed an agency within the Pentagon capable of supporting what some might consider esoteric academic research and was a tribute to the wisdom of ARPA's earliest founders. They had been formed by President Eisenhower in the period of national crisis following the Soviet launch of the first Sputnik satellite. *Wizards*, the book, grew out of a reunion of the individuals who began working on proposals, ideas, and problems identified by ARPA.

There are some problems with the book. In following the history of the Internet, there is a huge—for a short book—cast of characters. Who was doing what, when, and in which location was confusing. Sometimes the book is excruciating in boring detail. Sometimes the book has all the geekiness of the computer nerd stereotype. (Don't get me wrong, I'm married to a GIS [geographic information systems] guy. He loves databases. To me, they are just rows of numbers; I don't see any relationship at all.) But there are great stories like the following which add an element of human-ness to the concept of computers "talking" to each other.

[Tomlinson] *needed a way to separate, in the e-mail address, the name of the user from the machine the user was on. How should that be denoted? ... He looked down at the keyboard he was using....'I got there first, so I got to choose any punctuation I wanted.... I chose the @ sign.' He had no idea he was creating an icon for the wired world.*

Wizards is not a compelling read. It doesn't have very much of a plot line. It isn't for everyone. But, if you've ever wondered about how science actually contributes to your day-to-day world, *Wizards* provides an answer.

Endangered Species

An Anna Pigeon Mystery
Nevada Barr
Avon Books, New York: 1997

National Park Service law enforcement ranger Anna Pigeon is on the wagon and assigned to a 21-day firewatch on Cumberland Island, off the coast of Georgia. Although the endangered species referred to in the book's title is the endangered loggerhead turtle, turtles aren't central to this story.

Rather, a pot-growing, woman-stalking pilot turns up dead in a mysterious plane crash, along with the island's chief ranger. It turns out the widow was the object of the stalker, and no, she didn't do it. In addition there are two 70-year old VIPS (volunteers in the park) who play central roles, a human-gentled fawn named Bambi, plus the entire fire crew. A sub-plot has Anna's FBI boyfriend fall in love with her sister in New York City.

I've reported earlier on these Nevada Barr books, and like them, *Endangered Species* is an entertaining summer read.

Jonne Hower works for the Bureau of Land Management in eastern Oregon. She is a Women in Natural Resources *editor.*

PUBLICATIONS

If you are looking for a college in which to pursue a graduate degree in natural resources, the Student Conservation Association's book titled *SCA's Career Resources* will be helpful. It profiles 160 graduate programs. It costs $16.95 plus $5.25 for shipping and handling. Send to SCA, Dept GSB, PO Box 550, Charlestown NH 03603.

The environmental impact of the paper and wood industries, from production through consumption and recycling, is the topic of a recently released special issue of the new *Journal of Industrial Ecology*. The peer-reviewed international journal is published quarterly by MIT Press for Yale University with headquarters at the Yale School of Forestry and Environmental Studies. For information about the special issue visit the journal's web site at http://mitpress.mit.edu/JIE or call 203-432-6949.

Emily Dickenson was a mystery in her own lifetime, and her poems continue to challenge their readers. This book, *An Emily Dickinson Encyclopedia*, edited by Jane Donahue Eberwein from Oakland University, examines the poet herself, the environment that sustained and challenged her, her artistic choices and the implications of her poems. Published by Greenwood Publishing Group, Inc., it costs $85 and can be ordered by credit card from 800-225-5800. Another book at the same publishing house is Poverty, Female-Headed Households, and Sustainable Economic Development by Nerina Vecchio and Kartik C. Roy which looks at female-headed households in the world economy, and especially in India. Check out ordering information at http://www.greenwood.com

Women in Science, A Book Series, is edited by Marilyn Bailey Ogilvie at the University of Oklahoma. Throughout history there has been a scarcity of women scientists, and this series explores the special circumstances which enabled those few women scientists to succeed despite the hostility and rejection. Manuscripts and proposals to be considered for the series should be submitted to Ogilvie. To inquire, email her at Mogilvie@OU.edu or Associate Editor Janell E. Robisch at Janell.Robisch@gbhap.com.

Most loggers today believe that the environmental movement has had a *positive* influence on them—moving them to low impact harvest systems and *better* utilization of the log.

Moving *Toward* the Middle Ground

Ruth Carapella

"Nobody wants to see massive clearcuts." ***Bob Danielson***

"We need to take care of the land for future generations." ***Bob Zacharias***

"Everybody has the same common goal, to protect the watershed." ***Kelly Scott***

Danielson, Zacharias, and Scott have one thing in common. It might not be what you think.

After two decades of lawsuits and injunctions, most of us expect litigation on natural resource projects, especially those that include timber harvest or those affecting wildlife populations. Litigation against the federal government and timber industry has changed the way we manage resources. And, in the last two decades, the timber industry has made tremendous changes. Just ask a logger.

I did. That's when I heard what Danielson, Zacharias, and Scott had to say about timber management. All three manage logging companies.

Over the last three years, I have interviewed 20 loggers for *Timber/West*, a journal for loggers and mill owners in the Pacific Northwest. Out of more than 90 hours of taped interviews a surprising theme has emerged. Most loggers believe that the environmental movement has had a positive influence on the way private and public timberlands are managed.

Don't get me wrong. Every logger I interviewed believes in forest management. All believe that good management practices include timber harvest. There's still a gap between the values of those who support the environmental movement and those who harvest timber for a living.

But that gap may not be a chasm. Without exception, the loggers I spoke to agreed that the way they log today is better than the way they logged in the past. They credited part of that change to the influence of environmentalists.

Doug Aubertin of ABN Logging in Inchelium, Washington, said, "Logging has dramatically improved in the last 15 years. It's like any other business. It changes and grows as the market changes. Economics plays a part, but you have to give the environmentalists credit where credit is due. There's nothing wrong to being woke up to the fact that something you were doing was hurtful to the forest."

Jeff Ramshaw of Ramshaw Peone Logging in Colville, Washington, expressed a similar sentiment when he said, "It's a check and balance. The environmental movement has encouraged industry to move along a little faster. It's good."

Ramshaw was referring specifically to the fact that he now hauls wood to the mill that he once would have left on the ground. Also, today's low impact harvest systems run over branches and limbs and weave between standing trees. That reduces soil disturbance and leaves healthy, undamaged standing trees. Processing trees into logs in the woods leaves nutrient-rich foliage on the ground and eliminates unsightly piles of slash at log landings.

Eight other loggers articulated ideas almost identical to those expressed by Aubertin and Ramshaw. Seven of the loggers I spoke to said that they regularly attend classes to learn about new issues in resource management. One logger, Mick McLaughlin of Orofino, Idaho, serves on the state board charged with the responsibility of writing water quality rules and regulations. He works with hydrologists, foresters, citizens, and water quality experts.

It's clear that the way these loggers look at their work has changed. But what does that mean? Do the public and the environmental community view the on-the-ground changes in logging practices in a positive light?

Sometimes, yes. Three of the loggers I interviewed worked on projects in highly visible areas. All three said that the public response to their workhas been favorable.

Danielson thinned an area next to a city golf course to generate revenue for course improvements. He said, "A lot of people come past here on their way to the restaurant for lunch. There hasn't been one negative comment and we haven't even cleaned up yet."

Zacharias removed trees from areas that bordered Highway 3 in Oregon. For the most part, his work was invisible. His super-narrow logging equipment threaded it's way between standing trees so deftly that was difficult tell where he

had been without a stump to prove it. A harvest prescription designed to improve resistance to insects and fire guided his work. He said he didn't get many comments, but that's because he didn't think many people saw it. That's surprising, given the project location.

Chet Barnett harvested timber beside a campground east of Moscow, Idaho. He finished thinning the stand before camping season, but even so, he said he had a lot of visitors. People were interested in what he was doing. Under the harvest prescription he followed, he left tree crowns touching to reduce the chances of trees blowing over in storms. Within a month after harvest the first big storm blew through. Not a tree went down. Besides being safer for nearby campers, the adjacent stand of park-like timber invites exploration.

Perhaps the lack of negative comments about logging in these highly visible spots suggests a more widespread acceptance of new logging practices. Even so, it does not signal the end of conflict over resource decisions. Lawsuits and injunctions don't face extinction just yet. But after two decades of fighting, at least some representatives on both sides of the issue agree that things are better today. I call that progress--progress in spite of ourselves.

In a presentation to a group of resource managers, Dr. Steven Daniels from Oregon State University said managers "operate in an inherently controversial environment, and that expecting the conflicting values to be resolved is probably unrealistic, if 'resolved' means settled for all time." Instead, Daniels proposed that those who are charged with the task of resolving resource conflicts "agree to make progress in the face of disagreement."

With two decades of change under our belts, all of us--resource managers, environmentalists, and industry proponents--need to take a hard look at where we've been and where we are going. We may never agree, but we have made progress.

Ruth Carapella is President of PenCraft Writing & Design. Prior to that she worked for the USDA Forest Service as a Planning and Ecosystem Management Team Leader and as a TMA/Silviculturist preparing sites for timber sales, reforestation, and stand improvement. Earlier, she worked as a Forester for the Forest Service in Montana.

INTERVIEW

EMMY GUTHRIE

AN INTERVIEW BY DIXIE L. EHRENREICH

WiNR: Describe your current position and the kind of work you do at Boise Cascade Corporation.

Guthrie: I joined the company in August 1997 as Project Manager in Timberland Resources, which is a corporate staff headed by the Vice President of Timberland Resources, David New. I've been assigned to several different projects, related to future wood supply. Currently, I'm investigating offshore plantations. I've had limited international experience and with this assignment, I'm gaining a considerable amount of knowledge and experience.

WiNR: Plantations have been around awhile. What interests you the most right now?

Guthrie: The emphasis is very specifically on fast growing species. For example in Latin America, Australia, New Zealand, and other places, increasing acreage is being developed into plantations that will yield fiber in five to 10 years, depending on the species. That has a real attraction for the forest products industry globally because of the speed with which this fiber can be grown. In many cases, plantations are the way to take the pressure off native forests. Plantations are also seen as an alternative to improve quality through genetics, whether it's for pulp or for solid wood products. In addition, plantations are typically viewed as an attractive land use by the government and citizens of many countries—and a source of revenue and jobs. Forest product companies around the world purchase fiber in South America, for example, for shipment to Europe, Japan and other countries. Some invest in the plantations as well as manufacturing facilities, and then ship finished products. My department handles a variety of such projects which come to it from various divisions and departments of Boise Cascade, which is a decentralized company.

WiNR: Explain what you mean by decentralized.

Guthrie: In our case, decentralized means we have several, stand alone businesses. We have three main businesses: the paper and paper products business, building products, and office products. Within each of those businesses there are several mills and operations or regions. The businesses are autonomous as opposed to being managed out of the corporate headquarters in Boise.

WiNR: Each must be profitable?

Guthrie: Right. Each business unit has financial performance as well as non-financial performance criteria that they are accountable for. How divisions run each business is decided at the division level as opposed to the corporate level, regulated only by corporate policies and expectations.

WiNR: What is the background you bring to the company?

Guthrie: I graduated with a Bachelor of Science Degree in Forestry from Michigan State University in 1977 and then started out in a field forestry position with the Mead Corporation. My responsibilities included management of company owned timberland, and purchasing the right to cut timber from private landowners, the federal government, and state government. At that time I worked my way through an MBA. As a result, I went from the field into an analytical role, then moved to management in timberlands administration and accounting. In the early 1990s, I managed wood procurement at a large pulp

and paper mill, and then the one I prize the most, I became General Manager for a hardwood sawmill complex.

WiNR: Describe that a little more fully.

Guthrie: This was Northern Hardwoods, a Mead Company with a hardwood sawmill, dry kiln capacity to dry about half of the lumber that was produced, and a dimension plant that used some of the lumber we made to manufacture dimension parts or components that we sold to the furniture, cabinet, and flooring industries. We managed about a quarter of a million acres of timberland which supported that manufacturing facility. I was General Manager for almost three years—that was my final operating position at Mead.

WiNR: And then?

Guthrie: I went to Mead's corporate finance department—out of forestry—where I was the Director of Decision Resources and I reported to Mead's Vice President, Controller. I had responsibility for a group of eight business analysts who supported the top management of the company with analysis for strategic decisions. For example, we did the financial analysis for potential acquisitions and divestitures that Mead considered. Going into that position, I had manufacturing, forestry, and general management experience. In the eyes of the company, a corporate finance role would be good development to further qualify me, potentially, for general management. When I made the jump I suddenly had to learn about the other 75 percent of Mead's businesses such as the school and office products business in a very short time. It was very challenging and rewarding.

WiNR: If we could backtrack just a bit, what made you pursue an MBA to go with your forestry degree?

Guthrie: Very early in my career I realized that I lacked some important business education. I started taking some basic business courses—just job related improvements—and found I was very interested in the business aspects. Then I saw that I could make these courses work towards a greater benefit for my career by getting the MBA. Over the course of about four years, I took usually one, maybe two classes per term. While working in the field, I accumulated the prerequisites I needed—the basic business courses. Then I spent two years at The Ohio State University in Columbus, Ohio, finishing the MBA in 1985. So, motivated by what I thought were gaps in my education I found that that's what I enjoyed doing and that's what I was good at.

WiNR: Did Mead reward you?

Guthrie: Yes. I was promoted half way through the coursework to a position requiring that degree and advanced to management with increasing responsibilities after that. In any business, regardless of the resource you're working with, there are requirements related to formulating strategy, generating revenues, controlling costs, focusing on quality, and so on. A business education gives you the tools and knowledge that you need. Since I finished mine, I've become familiar with some of the programs at various colleges that have a combined MS in Forestry with an MBA and I think that's another good approach.

WiNR: To return to the subject of your current work, do most forest products companies have some offshore businesses?

Guthrie: Many do, especially the larger corporations. Mead has some paper converting and packaging facilities in other countries. Boise Cascade has a sawmill operation in Mexico, and an OSB panel operation in Canada. But neither company has a very large international presence and neither, at this time, has any international timberland holdings.

WiNR: What are some of the constraints and problems associated with offshore plantations?

Guthrie: Anywhere you go, first and foremost, the decision on what to plant and how to plant it will be dictated by the biological requirements—soils, rainfall, and other species requirements. In our investigations of offshore plantations we sometimes found the wrong species planted for the site. In many cases, a government wants to increase forests, and they view plantation forestry as the direction to take, so they develop an incentive program that encourages landowners and entrepreneurs. But there's not necessarily a well-thought out plan for appropriate species, market requirements, logistics, etc. Sometimes it's the chicken or the egg first scenario. Do you need the tree resource to attract industry or do you need an established industry available for people to invest in the resource? Getting things balanced doesn't happen overnight. As we toured sites in Latin America, we also found sites where the owners haven't managed the planta-

Emmerentia (Emmy) Guthrie is Project Manager Timberland Resources Boise Cascade Corporation

In Entre Rios Province, Argentina, inspecting Eucalyptus grandis plantation, one year old. The site was intensively prepared and trees average 3.5 meters. The plantation is owned by a family business which includes a eucalyptus sawmill, and tangerine growing and packing.

tions very well. Those sites are not attractive to a buyer, particularly if there are options where there's better quality. The more appropriate the decisions are at the front end, the more likely that the outcome will be attractive. There are, however, many very successful, impressive plantations in the countries I have visited.

WiNR: Will these countries eventually have the same sorts of environmental regulations that the U.S. has?

Guthrie: I think so. In Latin America, it was a real education for me to listen to people who have been working their way out from under very different, difficult political and economic environments. These countries are balancing the pressure to do the right thing environmentally with the need to develop their economies. Not surprisingly, environmental concerns are different from country to country. Land ownership rights and environmental regulations are impacted by what they see going on elsewhere in the world.

WiNR: What constraints does Boise Cascade have in planning businesses abroad?

Guthrie: One of the things we are focussing on is how to access the "risk" of doing business in a given country. The economic environment, the political and legal environment, the country's culture, land ownership issues, and many, many other considerations all roll into a risk assessment and a business decision. Several of those variables we weigh differently in the U.S. It's up to us to do the research, to talk to people, visit the country, and get as solid an understanding as possible about these variables. We have a strong belief that some times it is important to have partners in a foreign country. And decisions about partners also takes careful research and consideration.

WiNR: Do you finance the foreign ventures differently?

With a forest plantation owner in Minas Gerais, Brazil. Pinus caribaea is harvested for sawlogs and charcoal. Charcoal ovens are in the background surrounded by bolts. The clay ovens are loaded to the the top with wood, ignited and allowed to burn slowly. The charcoal is then hauled to nearby steel mills.

Guthrie: Possibly, depending on the project, depending on where it is. The objective really is to find the financing vehicle and structure that meets the needs of all the parties concerned. But that's true in the U.S. too. International investment just adds several other variables and risks to be considered.

WiNR: Are you familiar yet enough with Boise Cascade that you can tell us how many employees there are and a general overview?

Guthrie: I can give you some basic statistics from various reports I've seen. At this time we have approximately 20,000 employees and the land ownership is just over two million acres. George J. Harad, Boise Cascade's Chairman of the Board and CEO, wrote recently in the 1997 Annual Report that sales in 1997 were $5.5 billion compared to $5.1 billion in 1996 with the growth due mainly to the office products distribution business. Currently, there is weakness in the paper business and in building products. Turmoil in Asia is blamed for lack of growth especially in the pulp and paper markets.

WiNR: Moving from Boise Cascade specifically to forest products companies generally, how is the business? Do companies feel comfortable where they are?

Guthrie: Comfortable, no; clearly no. The forest products industry, and in particular the pulp and paper component, has not done well over the last 10 years. In fact if you look at the major companies in the United States, most had very poor performance from the investor's perspective in that time. It is a fairly fragmented industry and we have experienced significant business cycle swings. The most recent one in the pulp and paper industry was pronounced with quick and significant escalation of pulp and paper prices in 1995, resulting in record profits. However, that was followed by an equally quick and dramatic drop in prices in 1996 due to unanticipated imbalances in the supply and demand of pulp and paper. The industry has not done well since, hoping for improvement through 1998.

WiNR: Is there relief ahead?

Guthrie: There are many who think this industry needs to be consolidated; we have been described as too fragmented with too much capacity, and others think we are not responding well to customers. Many companies have not really focused well in the past. Boise Cascade is attempting to focus and has had some success in the last couple of years. We're working very hard at becoming more cost effective, adding value to the business from the shareholder's perspective, targeting what we do best. It's up to this industry to change by performing better.

WiNR: Can you see consolidations coming?

Guthrie: Yes, last year James River and Ft. Howard combined into the Fort James Corp.—and there are other examples. Boise Cascade sold it's coated paper mill in Maine to Mead Corporation in late 1996—an example of one company selling a business that was not strategic for them to a company where that business was strategic. Boise's emphasis is on uncoated paper, while coated paper is strategic to Mead, so that was a logical transaction.

WiNR: What else is Boise Cascade working toward?

Guthrie: The ability to sustain performance through the business cycle is important. To that end, there have been some divestitures and some new types of investment very recently such as another new paper machine at our Jackson, Alabama operation in an effort to get us out of the market pulp business. We made pulp—a higher cost and lower value product—to sell on the open market. Now we take that pulp and make paper ourselves, capturing additional profit.

WiNR: Are there major regulatory backwashes that have affected the future of the company?

Guthrie: I think one of the critical issues that will affect the future of the forest products industry generally is where the fiber will come from. Historically,

With Costa Rican President Jose Maria Figueres in January, 1997 during a visit to Stone Container's Costa Rican project, Ston Forestal S.A. The project includes approximately 13,000 hectares of gmelina near Golfito with a target of establishing 24,000 hectares. President Figueres has been a supporter of this project.

Boise Cascade has been one of the largest purchasers of federal timber in the country and the significant decrease in availability of federal timber has had a major impact on us. Federal timber dependence is very different than my experience at the Mead Corporation, whose operations are all east of the Mississippi in Michigan, Maine, Alabama, Georgia, and Ohio. There was a much lower reliance on federal timber—although that varied significantly from mill to mill—but nothing along the lines of the magnitude of Boise Cascade's dependence in the Pacific northwest.

WiNR: What is the company doing to secure U.S. fiber as opposed to offshore?

Guthrie: The sheer size of corporate resources devoted to this is very large. Assessments are going on at all operations and are driven by a need to understand all our options—cost effective, sustainable options—to secure and control fiber. One significant shift is the development of fiber farming at Boise Cascade. In early 1997, for example, we began harvesting six-year-old hybrid cottonwood trees at our first fiber farm near Wallula, Washington, established in 1991. Now roughly 23 percent of the pulp used by our mill's white paper machine comes from cottonwood. When growing or "farming" plantation fiber, the effort is focused on one product only—in this case, chips for pulp.

WiNR: How important are irrigation water and dam-created electricity to drive irrigation equipment to the success of fiber farms, especially in western desert country?

Guthrie: Irrigation is critical to the Wallula fiber farm and it is also one of the significant costs in the project, largely due to power to run the irrigation system. So changes in the system of dams will impact the cost of power and irrigation. At other Boise Cascade locations where we are assessing the feasibility of fiber farming, we are looking at both irrigated and non-irrigated options. If irrigation is required, it must be cost-effective to operate and typically must have some yield impact to make the investment feasible. If it cannot be done cost-effectively, or if there is not a significant yield impact, then we may eliminate the irrigation option and possibly the species from consideration. And there are many other variables in fiber farming that have to be assessed in a similar way.

WiNR: Does Boise Cascade spend a lot of money on ecosystem or land use planning research?

Guthrie: The ecosystem management issue is important, so Boise Cascade is spending more than six million dollars over a three year period for three different projects in Washington, Idaho, and Minnesota. We are attempting to demonstrate how different management approaches and techniques can ensure the quality of fish and wildlife habitat in addition to providing a sustained supply of wood. There are also separate watershed studies in the Pacific northwest which will cost over three million dollars and focus on the interrelationship of hydrology, soil, climate, vegetation, roads, streams, and other environmental factors. The company is working towards management at an ecosystem and landscape level and this includes a collaborative effort with other landowners.

WiNR: What is the ecosystem research money spent for?

Guthrie: Numerous fish and wildlife surveys, habitat evaluations, models to indicate implications of management decisions—lots of good information and management tools.

WiNR: Does Boise Cascade spend large sums for compliance with regulations? Do you budget for cleanup or litigation?

Guthrie: We invest substantial capital to comply with federal, state, and local environmental laws and regulations and that amount has gone up significantly in the last decade. The 1997 Annual Report notes that in 1997, expenditures for our ongoing environmental compliance program amounted to $23.6 million and we expect to spend approximately $44.3 million in 1998. The company also reports in the annual report any potential financial exposure to environmental liabilities and at the end of 1997 the company had open issues related to 33 sites where we have received a demand or claim. In most cases, these situations go back many years and final responsibility has not been determined—Boise Cascade is only one of many potentially responsible parties—and our alleged contribution to these sites is relatively minor. In those cases where our potential responsibility can be estimated, we have established appropriate financial reserves for cleanup. We also estimate that we will have to spend between $100 - $150 million over the next several years to meet EPA air and water emissions (from pulp and paper mills) rules issued in 1997.

WiNR: Are trade associations available and useful to you?

Guthrie: Yes. The American Forest and Paper Association (AF&PA) is one of our key organizations, but there are many others for each of the specific businesses we have. AF&PA represents our industry and develops and promotes the industry's position on legislative and regulatory issues. They also develop and distribute communication and educational materials on forests, forest management, and the forest products industry. Boise Cascade also participates in a wide variety of natural resource research groups and professional societies for forestry, wildlife, fisheries, or hydrology, for example. For research on many environmental issues—because these are such big concerns—we often look for opportunities to share data across organizations.

The dilemma is how much time and how much money to spend on trade and other association activity. There's always a tradeoff—is it better for a large company to deal with issues internally, or to financially support many organizations which focus on the varied issues on your behalf?

WiNR: Are many women employed in leadership positions at Boise Cascade?

Guthrie: I would describe it as "room to grow" but growing, defining leadership as heads of business units or officers. We have two women in senior leadership roles at Boise Cascade. One is Carol B. Moerdyk, Vice President, and Senior Vice President, U.S. Contract Operations, Boise Cascade Office Products Corporation. The other is Karen E. Gowland, Vice President, Associate General Counsel, and Corporate Secretary. There are women in operating management too. In addition, there are two women on the Board of Directors: Anne Armstrong, former U.S. ambassador to Great Britain, and Jane E. Shaw, Chairman and CEO, AeroGen, Inc.

Early in my 20-year Mead career, there were no women at the officer level, no women as division presidents, and only one woman—Barbara Jordan—on Mead's Board of Directors. When I left Mead, one of the 10 division presidents was a woman, Patricia B. Robinson, and at the corporate officer level there were five others: Cynthia A. Niekamp, Sue K. McDonnell, Barbara R. Brasier, Elizabeth L. Russo, and Kay L. Stinson. So the top leadership went from one woman about 10 years ago to six, out of about 30. Mead still has one woman on the Board, Susan J. Kropf, Executive Vice President, Avon, U.S.

WiNR: That's progress.

Guthrie: Significant progress. The next level of progress will be when there are a number of women leading operating divisions or at the senior management and officer level including CEO. If you compare the forest products industry with state and federal natural resource agencies, I think the forest products industry tends to be very conservative. By that I mean slower to make progress in attaining a truly diverse workforce in leadership teams—particularly in the resource and manufacturing sectors.

WiNR: To what do you attribute that?

Guthrie: In part, remote locations for mills. Most mills are located in forested areas where it is difficult to increase diversity when it may not exist in the local population. Mead, for example, uses the internal auditing department at its headquarters in Dayton, Ohio, as an entry level job for finance positions throughout the company. They can develop a fairly diverse pool of candidates from college recruiting for positions in Dayton. Other opportunities in the company, however, which might include moving to Escanaba, Michigan, where I worked for a number of years—or a similar remote area—are not attractive to a lot of people, especially some minority groups. Unfortunately, in many organizations, the emphasis on diversifying often stops at recruiting and hiring of minorities and women when in fact it's a much broader issue involving development, retention, and promotion throughout the company.

WiNR: At Mead, was a mix of experience necessary to get ahead?

Guthrie: Mead placed a very high value on somebody who successfully had a number of jobs in corporate staff and business units. They also valued cross-functional experience—and that is the path I took as I described earlier. Knowing your interests, identifying and building skills, and understanding the values and opportunities within an organization—then putting it all together as you make career choices and steps is never easy or risk free though.

WiNR: I suppose that is where a seasoned mentor would be a good thing to have.

Guthrie: My mentors in the last few jobs were my bosses—at least they are the

closest I came to having in those years. These bosses were willing to discuss where I needed to develop and suggested how we together could accomplish that. They were all men, all very open to encourage my strengths, helped provide opportunities, trusted me to take a shot at something. All of them encouraged me to come in and say "oops, this is not going well." I did make some mistakes that I had to go in and say "oops" about. We talked about how to avoid that in the future—and how to recover. Consequently, it was hard to leave Mead after almost 20 years. There wasn't anything chasing me away from Mead, it was more the attraction of the opportunities as presented to me by Boise Cascade, along with some family interests in locating in the northwest.

WiNR: Have you always had supportive bosses?

Guthrie: No, I had one who was not supportive and a poor communicator, and because of him there was a time in my early career where I was ready to walk away. I switched bosses with a department reorganization and the new relationship was a nurturing one. The new boss told me "You're capable of a lot" and gave me a chance to run with some things. He was probably very important in keeping me where I was long enough to finally realize my capabilities and realize another great opportunity. That person is still a good friend.

WiNR: Did the non-supportive boss cause lingering doubts about yourself?

Guthrie: No, but the situation strengthened my commitment to get an MBA to increase my options. When I first started taking coursework again, I was married without any children, but by the time I enrolled for the MBA, I had a very young daughter. My husband was and still is a gem. I would come home from work and after dinner I would go into our extra bedroom and study until 11. He worked all day, too, as a field forester, so that was a major commitment on his part to cover for me. Part of my motivation was that I wasn't going to be stuck in my current job. I was also willing to move somewhere else if Mead hadn't seen the value of it. So either way this MBA was a good thing to do. But a poor boss is very devastating and there were moments where I was really beside myself as to what to do because jobs were not that plentiful particularly at the field forestry level.

WiNR: And then starting a family, probably didn't put you on the leading edge of those they were hoping to promote.

Guthrie: There were wagers, I found out later, among my peers, as to whether or not I'd ever come back after my first maternity leave in 1981. *Well, what can you expect with women. Well, they're sure they want to work but once their babies come, you know, it's less attractive, etc.* This rhetoric reinforced those who believe women should be kept at lower levels because the company can't count on them. However, by returning to work after each of our two children, and successfully progressing through different positions, I demonstrated clearly I could make a career and family work.

WiNR: Do you have a mentor in your new job?

Guthrie: Not a mentor, but what Boise Cascade did I was very pleasantly surprised by. My boss, David New, was also very new to the company and asked one of my peers in the department to be my sponsor, and so Craig Campbell, Manager of Technical Services in Timberland Resources, met me at the door and walked me through a number of the "you should know this right away" items. The company has an orientation notebook for new employees and it was very useful. I especially appreciated the notebook, because at Mead, one of the tasks I had in my last job was development of employees. Positions in my department were filled with people who had high potential, who would benefit from corporate experience and exposure to the company's businesses, and so by design, they turned over every two to three years. I was always hiring. I really needed a tool like Boise Cascade's notebook to start orienting them to the company quickly and effectively. Here at Boise, Craig continues to check with me in his role as "sponsor" in addition to our routine interactions—even after eight months.

WiNR: In the years you were hiring for Mead, for field work as well as other work, did you think students were well prepared to work in industrial forestry?

Guthrie: There were often gaps in their useful education, and sometimes the remedy for the company was to recruit at one school over others depending on the position since some require more business or management courses. As for students, there is a certain naivite with new graduates who were ready to dive into a management level job, hoping to bypass the field, undervaluing that field experience. Now in certain cases, that's not completely out of the question; I knew a number of people over the course

With her boss, David New, Vice President, Timberland Resources, in her office at Boise Cascade's headquarters in Boise, Idaho.

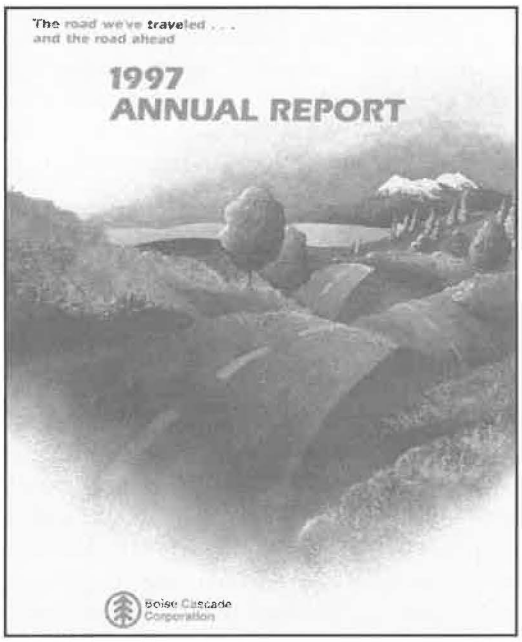
of my career who never worked in the field but are extremely successful in natural resource management and leadership positions. In Escanaba, at Mead's Publishing Paper Division, we had a student intern program that went beyond getting the bodies out in the field to work. Interns were assisting in the layout of timber sales, assisting or taking the lead on inspections over the course of the sale, working in the nursery, or assisting in research areas. We held orientation meetings and presentations so they understood how our business operated. They had the benefit of performance appraisals as well as professional career advice. I thought the intern program was a good concept and well developed. We had feedback that indicated that kind of experience was highly valued by employers within Mead and elsewhere.

WiNR: One of the complaints common to employers that I have heard over the years as an editor, is that students come out of a degree program not knowing how to write reports well, they don't know how to orally present a project to a group, they don't know how to testify in litigation.

Guthrie: As I look over my last six years as a general manager and in the corporate finance area, I have been surprised—not only within forestry, but outside of it—that well developed writing and presentation skills are the exception rather than the norm. That worries me. There's still a tendency to think communication skills are less important in a field like forestry than some of the other areas—but they are important!

WiNR: Are large forest products companies "doing the right thing" by the environment?

Guthrie: I was always very gratified by Mead's willingness and commitment to fully comply with all regulations and sometimes go well beyond requirements. The same is true at Boise Cascade. I never felt that I was being asked to do, or felt I was in a position to do, something that I didn't think was appropriate. If I questioned a Mead policy or procedure, there was a process in place which allowed professional consideration for a viewpoint contrary to the company's. There were times when there were different options, some reflecting different values than those of the company. Our efforts were always focused on using the best science to make good decisions, but recognizing, and sometimes accommodating the different values. I sat in on daily operating meetings at the pulp mill and I was at several divisions, so I know that sometimes it can be a challenge to comply with regulations and keep things in compliance. When we were out of compliance—a very small percentage of the time—it was quickly corrected and was due to unanticipated failures as opposed to willful negligence. Significant energy and resources were spent on staying in compliance.



The businesses were expected to be high return and number one in customer satisfaction in chosen markets—but Mead also recognized that when you demand that of people, you need to make it very clear that performance does not mean "at any cost." High performance conduct included complying with antitrust policies, preventing harassment, providing equal opportunity, safety, protecting the environment and health. I was held accountable when I was a general manager. I was very comfortable with those expectations and highly challenged by them.

Boise Cascade's Environmental Policy, which is published and circulated internally, reinforces its commitment to environmental responsibility—"All employees...must be committed to ensuring that the company's operations comply with both the letter and intent of all applicable environmental laws and regulations and pose no significant risk to human health or the environment." And there is a commitment to continuously improve company performance through "economically sound and technologically practical processes that are based on the best available science and which produce meaningful, measurable environmental improvements."

WiNR: What has been your involvement in Sustainable Forestry Initiatives (SFIs)?

Guthrie: As members of AF&PA, we support their SFI program and respond to the annual survey about how we're performing under SFI. In many cases, Boise Cascade's initiatives go well beyond those standards. Boise Cascade developed a policy of Forest Management Philosophy and Standards in 1992 which describes the intent: ensure protection and enhancement of water quality, wildlife habitat, soil productivity, cultural resources, recreational benefits, aesthetics, and ecological processes. The philosophy was developed to meet the specific need of explaining to the public the commitment to forest stewardship. In our case, the Standards provide guidelines for internal management of company owned or controlled lands. From

an industry perspective, the challenge is how to measure sustainability and then to determine the right way to report performance—individually and as an industry.

WiNR: Is there a downside to reporting on SFI?

Guthrie: Frankly, the extra administrative work that is required for SFI reporting is a negative aspect, especially when the final result is rolled up into industry-wide numbers. Most of the large companies, and many of the smaller ones, already support sustainable forestry, if for no other reason than that we intend to continue to operate into the future. Many of these companies are competitors and each has different businesses with different customers, shareholders, and communities to whom they are accountable for performance. Some feel there is very little value to them in the industry wide results published through SFI that present the industry in one set of statistics. The industry doesn't argue with the concept of sustainable forestry, but has concerns with the process of measuring, reporting, and verifying.

WiNR: How does the industry view certification of timber?

Guthrie: We will see a lot of that activity, particularly globally, but it's a contentious issue. The inevitable question is—what's the benefit versus the cost? At this stage we don't have demand from our customers for certified wood. We, as a company, are focusing on verification of sustainable forest practices and working through AF&PA's SFI to develop a methodology for verification. We do not support efforts to promote certification which disallows certain forest management practices such as the use of pesticides and herbicides which we believe are important to intensive silviculture.

WiNR: Is there a certain disconnect between what the forest products companies' media folks tell the public in order to sound "green"—and their real behavior?

Guthrie: In any industry there are companies—or organizations—that will attempt to deceive or at least use public relations techniques to make themselves look the way they perceive the public thinks they should look. So it would be naive to say that the forest products industry doesn't have examples of this. However, I am more familiar with examples of over zealous efforts to sound "green" or "greener than before." In many cases this is due to the industry's reaction to some extremely negative public perceptions, some of which caught the industry by surprise. Some of this bad reputation has been earned in the past, but some is more a result of conflicting values rather than practicing bad science—and because we have not made the effort to communicate and interact with the public. In the last decade, this industry really had to learn how to communicate and improve the public's perception of its environmental and resource management record.

WiNR: Is paper recycling successful?

Guthrie: I think that varies by company and product. Boise Cascade manufacturers recycled paper at many of its paper mills which ends up in products like copy papers, forms, envelopes, and offset printing paper. We have a wastepaper recycling plant in Jackson, Alabama that is designed to use over 115,000 tons of wastepaper each year. But our recycling also extends to pallets, construction waste, and ground up stumps recycled at our Wallula, Washington mill, some of which ends up in corrugated boxes. As everyone knows, recycled fiber is one of the ways to extend our fiber supple in the future. However, not all paper products are as suitable for recycled content as others, depending on market demands and the related paper specifications. And not all mills in this industry are situated well to buy or collect and use wastepaper. For example, a mill located in the heart of Michigan's Upper Peninsula may have to ship waste paper tremendous distances because of it's remote location. Although it keeps paper out of the landfill, it would burn up a lot of fossil fuel to truck it there. And that's as much a reflection on the imbalance in the supply (location and volumes) and demand for wastepaper and recycled paper products.

WiNR: Being uprooted and replanted is sometimes traumatic. How is the transition going, personally and professionally?

Guthrie: In terms of my personal life, my husband and two children are doing extremely well and we thoroughly enjoy living in the northwest. On the professional side, my position at Boise Cascade is a new one and the rest of the staff are learning right along with me about what I am responsible for, whether I should be included in something, or not.

Developing a network is a big challenge. At Mead my network was extensive and I would call on it more and more every year. It was a very important resource for what I did especially when I was a general manager. It didn't hit me how valuable that corporate network was until I switched companies and had to start all over again. I knew that was going to be part of making a change, but the value of that network continues to be in my mind as I struggle with being new.

WiNR: Since you've only been with Boise Cascade for a few months are you in a position yet to see how your future will be with them?

Guthrie: No, but I can guess. Within a year or two, after having learned more about the company, my hope is to be able to move into a significant management position in one of the regions. I'll shift from staff support to one where I actually have a leadership role with operating responsibilities. My skills are in general management and leadership—that really is what I like—I thrive on it.

Dixie Ehrenreich is Editor of Women in Natural Resources

International Paper, the largest land owner in the country, has joined forces with the Audobon Society and a group of other collaborators and research units to **study impacts of management on wildlife** on IP lands in South Carolina's coastal plain.

The Sustainable Forestry Initiative: *How well will it work for wildlife in specific locations?*

Donna Perison

More than 400 International Paper foresters went to work this morning with the same basic objective as did their counterparts at dozens of environmental organizations around the world: The maintenance of vibrant and healthy forests for generations to come. It often surprises people to learn that organizations they thought were adversaries are actually partners. But such partnerships are becoming increasingly common, and they hold the future of our forests.

Abraham Lincoln once said, "Laws change, people die, but the land always remains." In our case, we are the largest private landowner in the country, with more than six million acres under our care. Those acres of land provide many things that are vital to us all: Wood, paper and packaging products, jobs for the needs of people, home and habitat to wildlife essential to a balanced ecosystem, and the aesthetic beauty that draws people to the woods in an almost spiritual attraction. As the steward of six million acres of such richness, we share with the environmental and conservation community leadership responsibility for meeting those needs.

One way those of us in industry are putting teeth behind our stewardship responsibility is the Sustainable Forestry Initiative. SFI was developed by the American Forest & Paper Association with the help of many of its members, including International Paper. Now in its third year, SFI is a sweeping set of operating standards and guidelines to ensure that our forests continue to meet everyone's needs for wood products, clean air and water, wildlife habitat, recreation and aesthetics. Sustainable forestry meets the needs of the present, without compromising the needs and resources of the future.

An independent evaluation of the Initiative concluded that "the effects will be both significant and positive for the future of America's forests." International Paper feels so strongly about SFI that we have pledged to only do business with loggers who comply with the standards. The reality of today's marketplace is clear: Either the industry throws its full support behind sustainable forestry, or our industry will cease to exist.

Among the important elements of SFI is the protection of wildlife and their habitats. That is one area where we don't believe industry can do it alone. Just as you would turn to a forester for advice on how to grow trees, we are turning to environmental organizations for help in protecting wildlife.

One of the most noteworthy agreements is with the National Audubon Society for an extensive research partnership on our property that should lead to new ways to manage the forests to benefit both wildlife and the economy. The National Audubon Society understands that to meet the needs of today's society, trees need to be responsibly harvested. And International Paper understands the need to do so responsibly, ensuring the protection of the forests and the creatures that use them as home. United we hope to forge innovative forest management strategies that provide and protect the plethora of ecological and economic qualities inherent to sustainable forests.

The stated goal of the three year research project is to identify forest management practices on industrial private lands that can improve wildlife habitat while still providing reasonable economic returns. The research will help land managers understand the impacts of forest management on migratory bird species and herpetofaunal (amphibians & reptiles) communities. Data will be used to develop a model to measure the tradeoffs between habitat suitability and levels of timber productivity and economic return obtained under different management scenarios.

The research project is being conducted on a 30,000 acre landscape in the South Carolina Coastal Plain owned and managed by International Paper. The Woodbury tract makes up 20,000 acres of the landscape and is located at the confluence of the Little Pee Dee River, a blackwater river that originates in the Coastal Plain, and the Great Pee Dee, a red river that originates in the Piedmont. The Woodbury Tract includes many community types that are silviculturally managed across the South. The broad red river and blackwater floodplains of the two rivers embrace sandhill ridges interspersed with isolated wetlands, Carolina Bays, and cypress ponds. The Woodbury Tract's diversity and archeological importance make it a major conservation interest. The remaining 10,000 acres of the landscape lie in Giles Bay which is a wet flat/bay system that supports intensively managed loblolly pine plantations. Together these tracts are representative of many industrial land holdings in the Coastal Plain, including other lands owned by IP.

The research consists of several modules. The first component, which includes the National Audubon Society and researchers from North Carolina State University, is investigating migratory birds. The bird studies will estimate abundance and diversity of breeding birds in various habitat types. Estimates of breeding success will be determined for bird species that nest in the understory. To facilitate the modeling of species occurrence across habitat types, or forest management regimes, habitat characteristics will be measured and correlated with the occurrence of the various bird species. Habitat research will be conducted to characterize and quantify variables critical to bird populations.

The second component of the project, led by the Savannah River Ecology Lab, will broadly characterize the abundance and diversity of various reptiles and amphibians across habitat types. As with the bird study, habitat characteristics will be measured and correlated with the occurrence of the various herpetofauna. Clemson University also is involved in conducting a manipulative test in which three treatments will be imposed around isolated wetlands to investigate the effects of site preparation and clearcutting on herpetofaunal communities. Researchers have measured the variety, quantity and migration habits of herpetofauna around several different wetlands. Different site

preparation treatments will be made on each, and researchers will repeat their evaluations to determine which, if any, of the treatments has the greatest impact on the herpetofauna population.

The modeling portion of the project will offer a way to synthesize the information gathered in the bird and herpetofaunal components. A Geographic Information System (GIS) -based model will be developed by the U.S. Forest Service Center for Forested Wetlands that will evaluate proposed forest management activities at a landscape level for their effect on habitat suitability for select bird and herpetofaunal species, as well as timber productivity and economic return. The model will adapt to other landscapes and landowners and offers a critical tool for evaluating forest management decisions from a sustainable perspective.

Sites for this study were strategically selected to be representative of much of the Southeastern coastal plain, so that findings from it will be readily accepted and easily implemented across the vast and important landscape. More specifically, findings from this research project will be transferred to other International Paper field units in the form of management recommendations, as well as used to define future research needs. Concurrently, the National Audubon Society and International Paper are working together to develop a means of transferring research findings to other forest managers and stakeholders.

In addition to the broad range of research partners, funding support for this groundbreaking project is equally diverse. Financial support for the research project, either in the form of direct funding or significant in-kind support (equipment, staff and facilities), is coming from International Paper, the National Audubon Society, the National Fish & Wildlife Foundation, the National Council of the Paper Industry for Air & Stream Improvement, U.S. Forest Service Center for Forested Wetlands, and the Savannah River Ecology Lab.

The project is not without risks for everyone involved. Conventional wisdom is always at risk when serious research is undertaken, and we believe everyone involved in the project understands and accepts the ramifications of what these studies might tell us. The research could suggest changes in forest management practices—both for conservationists and for International Paper.

While one of the most noteworthy, this is just the latest in a series of partnerships International Paper and others in our industry have developed. Our company alone has nearly 100 partnerships with environmental, government and academic entities. These agreements are made possible by the common goal of healthy and vibrant forests. They also are made possible by the courage of leaders on both sides of the table, who understand that much more is accomplished by finding common ground than by seeking battle grounds.

It will take time to measure the true impacts of these latest efforts at collaboration. But at a minimum, the more we learn from the National Audubon Society and our other partners about how industrial forest management impacts wildlife, the better chance we have of achieving the balance we need to ensure healthy forests. Society's need for wood products and paper is not going away, and with proper management, neither are our forests.

Donna Perison is a Project Forester for International Paper in Wilmington, North Carolina (pictured below on a study site). She has been with the company for four years and started as the Section Leader for Wetlands and Ecosystems, providing technical and operational support on wetlands issues, as well as developing partnerships with environmental organizations. Her B.S. in resource management and forest biology is from The State University of New York College of Environmental Science and Forestry. Her M.S. and Ph.D. are from North Carolina State University in forest soils/forestry and wetlands ecology/forestry respectively. Her graduate research focused on the impact of timber harvest in blackwater bottomland hardwood wetlands.

Elusive Landscapes:

Public Policy Implications of Employing Nature to Sell Products

Kimberlee McDonald
Dorothy Paun

Introduction

There exists among academics an intense debate over the exact nature of "nature." Contested is whether nature exists as a separate entity "on its own" or whether nature is less derivative and more a constructed place, form, or utility.

Professional musings at conferences have evolved into multi-faceted, normative dialogues and debates on how to best conceptualize wilderness and operationalize its preservation. Coincident with these academic discussions of nature, another group of proclaimed stakeholders has increasingly turned its attention to nature. However, America, Inc. has leapfrogged beyond dialogue and is engaged quite actively in exercising the public domain of nature to sell products.

Marketing departments everywhere are employing nature to sell. Skim through a magazine of general circulation (e.g., *Time, People, Newsweek, New York Times Magazine, Business Week*) and soon you will discover numerous advertisements that focus on nature so as to reach and motivate a target audience to buy a specific product that, ironically, often has nothing to do with nature itself. Such ads are used to sell almost everything including insurance and other financial services, automobiles, pharmaceuticals, and clothing, to name a few. In this article, we will examine the avenues employed, results intended, and public policy implications of using nature to sell consumer products.

Nature: American History and Tradition

At the core of the on-going academic debate, between the essentialists and the constructionists, is the role, or lack thereof, of human culture on nature. Those that assert nature possesses its own essential element believe that human culture can not define nature. On the other hand, extreme social constructionists believe that nature only exists as a matter of culture. Each school of thought demonstrates its position through examinations of American interactions with nature over time.

A widely held belief is that Native Americans lived in some equilibrium with nature (Cronon 1983). In fact, our society has vested Native Americans with an unique spiritual connection with nature (Nash 1967). This spiritual link may have been an enunciation of Native American policy toward nature. Whether nomadic, migratory, or stationary, Native Americans were deeply reliant on nature to provide food, clothing, and shelter. Such dependency meant that to ensure survival, Native Americans had to exercise a consistent policy toward protecting nature.

Colonists, early explorers, and pioneers clearly saw nature less as a partner and more a commodity to be conquered, consumed, and bartered (Cronon 1983). The landscape became not a system in which one sought co-existence but rather a series of unlinked, separate entities such as timber, game, water power, that could be bought and sold. Major alterations to the landscape focused around bounding the land and developing evidence of ownership. This perception of nature revolved around physical labor on the land. Through altering nature, many colonists believed they were outwardly demonstrating their connection with a working God.

Transcendentalists like Ralph Waldo Emerson and Henry David Thoreau also were pioneers, but the frontier they explored embodied a shift from penetrating nature through exploring and conquering to internalizing nature through reflection and natural philosophy. Thoreau's writings became the foundation for a belief that there existed an "otherness" in nature. His famous statement that "in wilderness is the preservation of the world" became a rallying cry for a growing belief that nature needed to be respected and preserved. Imbedded in his philosophy was that in preserving nature, our species would find collective salvation.

Thoreau's writings coincided with the beginnings of the industrial revolution, and thus began the tension between recognizing the value of preservation and the desire for economic growth through automated production and consumption. Thoreau may not have viewed himself as a preservationist, but his philosophy became the fertile ground from which other philosophies began to grow. Most notable was the philosophy of John Muir, who believed that the natural world must be preserved. Muir viewed nature as something separate from humans and believed that people needed to interact with nature merely as visitors and not owners (Oelschlaeger, 1991). The well documented battle that later ensued between Muir and Gifford Pinchot focused on nature as a separate entity versus nature as a commodity that could offer a variety of coexisting uses. This debate exists still today at the core of the conflict between the essentialists and constructionists.

Contested Nature: Essentialists versus Constructionists

The post-modernism era has unleashed two major trends in the study and understanding of the natural world. First is a recognition that culture constructs our understanding of nature. Second, there is, in defense of nature, a belief that nature is

autonomous and valuable in its own right. Often this debate can be divided into disciplines, with sociologists, historians, and other de-constructionists in one camp (referred to as constructionists) and scientists and conservationists in another (essentialists).

Essentially, the question is epistemological: is there a nature that is its own reality or do we create it? It is a question as old as humans, that of reality. The debate over culture as creation of nature or nature as a real entity has precipitated an academic debate similar to other reality testing theories, and it has also created a firestorm of right and wrong accusations. Nature as a cultural creation has implications for conservationists on whether preservation of nature (primarily wilderness) has its own value. Conservationists have argued that the nature de-constructionists are undermining the preservation movement and allowing preservation opponents to challenge the value of protecting something that essentially does not exist at all.

Social constructionists argue that by ignoring the essential role of culture in the creation of nature we perpetuate an elitist and neo-colonial concept that western thought shall prevail. Social constructionists go so far as to question who can define nature or who is allowed to say what is nature and why (Lease 1995). Clearly this debate also is about power and politics. Creating and protecting conservation policies requires unanimity among the public. Since 1980, many environmental and conservation statutes have been questioned by policy makers (Worster 1997). Preservationists believe that without agreement on what is nature, the current policies will be revoked and the last stands of nature will be eliminated. Thus, alleging that nature is elusive raises the stakes for the preservationists.

There is a great irony that exists concerning nature and it's stewards and the potential for unintended consequences is substantial due to hidden or elusive landscapes. Speaking relatively, the lively debate between the essentialists and constructionists can be viewed as one member of the choir preaching to another member of the choir. While these two groups debate the physicality of nature, a third stakeholder plows forward into the nature preserve, with wild abandon. There is a line in a book by Tom Robbins that goes something like "to Madison Avenue, even infinity is marketable," so it should come as no surprise that as nature becomes less accessible to humans in a real or physical sense due to legislation as well as sheer availability, America, Inc. is increasingly penetrating psychological nature to sell products.

Nature as a Selling Agent

Successfully marketing products requires both art and science. The science of marketing involves the quantitative aspects of optimal production processes and economies of scale and learning to achieve healthy revenues, reasonable costs, and respectable profits. It also involves creating meaningful products that truly satisfy the wants and needs of targeted consumers. To accomplish this, companies have engaged, to varying degrees, in new business practices aimed at offering products that constitute a good value (all things considered) and being more socially responsible. One primary change has been a shift from the old paradigm of a production orientation whereby companies simply sold what they made (Henry Ford used to say "You can have any color Model T you want so long as it is black") to a market orientation where the overriding philosophy is "we make what is needed by our customers." Being market oriented means that a company makes it a priority to continuously collect information about customers' needs and competitors' capabilities so that the company can provide meaningful, high-quality, reasonably-priced products to at least satisfy and hopefully delight customers.

Marketing departments everywhere are employing nature to sell. Skim through a magazine of general circulation (e.g., *Time, People, Newsweek, New York Times Magazine, Business Week*) and soon you will discover numerous advertisements that focus on nature so as to reach and motivate a target audience to buy a specific product that, ironically, often has *nothing* to do with nature itself.

As compared to this marketing "science," the art of marketing is much more elusive and difficult to manage because it involves unpredictable consumer behavior. Consumers encounter many alternatives in the marketplace, and these are changing constantly due to accelerating technological advances and intense international business competition. They not only face a multitude of competing products, but often the information that consumers have about the quality and equivalency of alternative products is uncertain. The multifaceted nature of consumer decision-making means that companies can never know for certain if a particular consumer will buy their product, and so a type of artistry is employed to increase the likelihood of making a successful sale.

Anthropologists are known for observing the behavior of people and to then infer from such behaviors the dominate values of a particular society. In business, much research has been conducted on what motivates a person to actually move from becoming aware of, interested in, desirous of having, to actually purchasing one particular product. Values play an important role to marketers because research has shown that unmet needs and associated values acts as motivators. Nearly 40 years ago, a psychologist by the name of Abraham Maslow proposed a model of a hierarchy of needs. Maslow said that different people have different needs or things that they value, and that people seek to satisfy unmet needs. His model is hierarchical because as lower-level needs, like basic shelter and safety, are satisfied, higher-level needs like belonging, esteem, and self-actualization, become motivators. Marketers use value categories (e.g. excitement and fun, being well respected, accomplishment, security, self-fulfillment, self-respect, belonging) to segment general markets into smaller groups of relatively homogeneous people (Kahle, Beatty, and Homer 1986). Having segmented a market, companies choose which segments to target their marketing

Figure 1

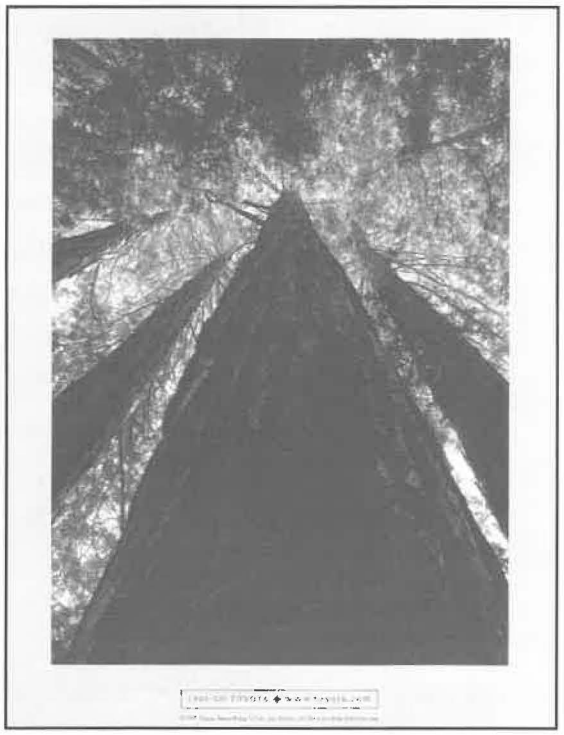


Figure 1 Text

we understand that

It takes more than days or weeks or months. It takes years and even decades. To grow and nurture and

to grow up big and strong

develop into something that stands proud and magnificent. Pay tribute to the determination required

and stable takes a really,

to produce such hearty roots. And let us all live by its simple creed: grow, blossom and flourish.

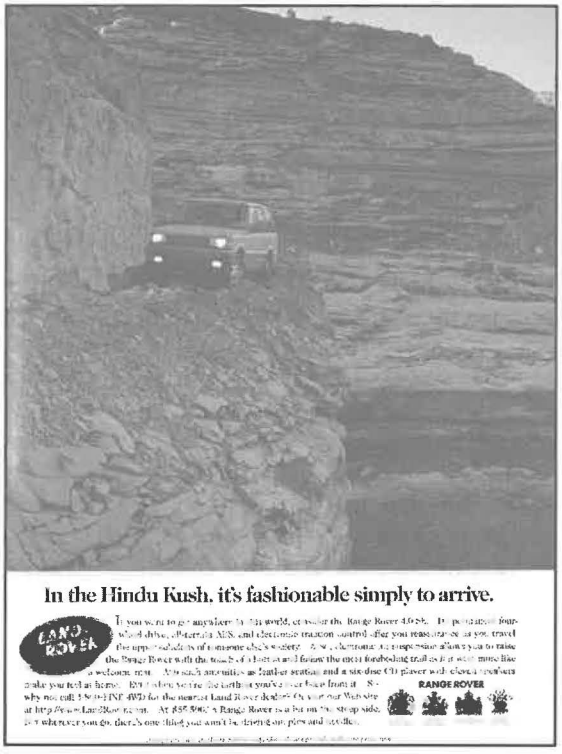
really, really long time.

Toyota\ *everyday*

efforts toward. They then use the prominent values of that segment as a common language for their promotional efforts. Coupled with the common language of values is the choice of a context for communicating those values; over and over again, nature is chosen as the "environment" in which to house a value.

In the ad shown in Figure 1, there is a stand of particularly healthy, obviously old, trees photographed from the forest floor with an upward view of the canopy. The ad tells us that to grow up "big and strong and stable" takes a long time. The underlying value portrayed here is that of safety and security. "Big" and "strong" translate to safety (power and control) while "stable" translates to security (predictability). It is interesting to note that the Toyota advertisement discusses no particular car model or price. Rather, in emphasizing security and stability, the word "everyday" follows the Toyota label at the bottom of the ad. Toyota is selling not an automobile but the company itself as a vehicle for ensuring safety and stability, day in and out. In sum, this ad seeks to sell Toyota to that segment of the population that most values and is motivated by attaining security.

Figure 2



Contrast this with the advertisement featured in Figure 2. This ad also uses the nature motif, but mother nature is not comforting and soothing but rather a partner in providing extreme adventure in more ways than one. This striking pose of a recreational vehicle perilously close to toppling over the edge of a dangerous cliff in an exotic place is not intended to communicate with safety seekers but rather with consumers who most value excitement and fun. The ad text boldly states that "if you want to get anywhere in the world," consider buying a $55,000, "a bit on the steep side," Range Rover. You will be able to "follow the most foreboding trail as if it were more like a welcome mat." In this ad, no mention is made of the company that makes the Range Rover, and the price is prominently discussed as though it further enhances the attractiveness of this "fun" product offering that won't leave you "driving on pins and needles."

Contrary to the policy debate by essentialists and constructionists, who may not disagree on much more than "whose reality," corporations are dictating both the terms of what is natural and access to it. While the primary intent of one example presented here is to capitalize on a fun and excitement value system to sell a vehicle, it is important to recognize that the product itself is a $55,000 machine that will surely enable the wealthy urbanite to further penetrate the wilderness. Said another way, wilderness could become extinct while the essentialists and constructionists argue about what it is. America, Inc. knows exactly what nature is and how to exploit it for advantage, and public policy people would do well to follow the successful lessons by industry.

America, Inc. is effecting both essentialists and constructionists. When corporations use nature in ads they do so because they believe that nature is a common language and place available to and open for everyone to use. Essentialists believe that nature is a

separate entity from humans, to be protected by the public but not penetrated or used. The use of nature in advertisements sends an opposite message, that nature is something we all enjoy and is part of our everyday experience. On the other hand, constructionists believe that nature is defined by our various cultures, that each person creates their own vision of nature. America, Inc., however, is saying that as a society we have a common vision of nature. The advertisements insert into the construction a version that appeals to universal values and creates a common view regardless of the individual vision. Corporate America essentially is forcing the debate over what is nature and who can gain access to the natural.

Public Policy Implications

As the essentialists and constructionists throw words at one another on what is nature, marketers are engaging the public for their own "cause." In this, then, wilderness is a polarity. On one side are the academicians who speak to one another about whether lines on maps actually define wilderness. On the other side of this line is the public, who view and digest commercial messages featuring nature that appeal to their values. Wilderness in ads is neither an abstraction nor a pristine "some place." Policy dialogue between the essentialists and the constructionists should move itself from the academic language of biodiversity and social construction. Both groups should examine how marketers appeal to values, and the impact that successful marketing has on nature consumption.

Corporations believe that nature is versatile; it can be packaged as safe and secure mother nature or a dangerous partner in extreme adventure. The net result is that wilderness becomes more and more accessible to each of us who strive to achieve our values and dreams. The United States Forest Service reports that requests for wilderness backcountry permits exponentially increased over the past three years. Sales of outdoor equipment have skyrocketed. Land adjacent to wilderness areas is being quickly converted to single family primary homes.

The images and language that corporations use to sell products also is selling a concept that nature belongs to everyone and should be used. While the use may be different (for adventure, for comfort, for strength), it is providing a landscape that is vastly different from the one de-constructed or preserved by the academicians. It is an elusive landscape to some (essentialists and constructionists) but not to corporations that develop ads and associated products that make nature more accessible by those who buy $55,000 penetration vehicles or the camping gear that guarantees comfort in extremely adverse conditions. By examining the tools used successfully by marketers, those who care passionately about wilderness can perhaps begin a dialogue with the vast numbers of Americans who can actually influence wilderness policy through voting. Perhaps those seeking to influence public policy should appeal to values such as security or belonging or respect when attempting to gain wilderness advocates.

America, Inc. is creating a view of nature that thousands of people are digesting and that view may become embedded in policy and law. For example, the corporate view that forests are a renewable resource was incorporated in resource policy including the National Forest Management Act with its requirements for sustained yield. The view that nature is accessible and penetrable could dictate the terms of wilderness preservation and who can gain access. This view could lead to major shifts in the policy debate such as how wilderness is used and by whom rather than how much should be protected.

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Dorothy Paun is an Assistant Professor of Forest Products Marketing at the University of Washington, College of Forest Resources. She earned her PhD from the University of Oregon and MBA from the Universiteit of Leuven. Professor Paun is the Program Chair of the Forest Products Marketing Graduate Program. Her current research has to do with public perceptions of the pulp and paper industry, how to achieve successful business-to-business relationships between forest products suppliers and distributors, and product bundling strategies in the forest products industry.

The Patent Program, by virtue of the exclusivity that patents and licenses provide for new technologies, fosters the development and diffusion of technologies that otherwise would have remained on the shelf.

The Forest Service's *patenting* and *licensing* program

Janet Stockhausen

Introduction

During the 1980s, several Federal laws were passed by the U.S. Congress that mandated Federal research laboratories consider patenting and licensing as part of their technology transfer programs. This was a result of studies indicating that some Federal technology was not being used because the Federal government was not able to give exclusivity in the marketplace to developers. Until these laws were passed, Federal researchers did not have the authority to give exclusive licenses and patenting was not encouraged as a technology transfer tool.

Since the Federal laws were passed, the culture has changed. Federal scientists and engineers are now encouraged to seek patents and work with industry to transfer technology to the private sector. Transferring technologies provides additional jobs in the marketplace, generates additional revenues, and provides systems for improved resource utilization.

To extend its technology transfer efforts, the USDA Forest Service instituted a National Patent and Licensing Program in the 1980s. I am a patent attorney and work for the USDA Forest Service. Officially, my title is Patent Advisor and in this capacity, I handle all aspects of patenting and licensing for the Forest Service—from conception of an invention to licensing the technology to the marketplace.

The Patent Process

When Forest Service scientists and engineers think they have a new invention that might be worth patenting, they contact me through the Forest Service Patent and Licensing Program. At that point, we discuss the novel aspects of their invention, and I more than likely will do a patent search. A patent search involves using key words related to the invention in an electronic database to check if others have already invented the idea or how close other patents are to the current invention. When it has been determined that the idea is distinguishable from the prior art (all printed materials, such as patents, publications, and other documents, that can be searched), I will usually make the decision to prepare and file a patent application on the invention at the U.S. Patent and Trademark Office. An attractive aspect of the patent law for Federal employees is that they will receive at least 15 percent of all royalties the agency receives from marketing revenues from any patent on which the employee is an inventor.

After the patent is filed, I work with the Patent and Trademark Office in a process called "patent prosecution." This refers to the process during which every patent application is assigned to a patent examiner. The examiner's job is to review all applications assigned to them based on prior art in their files. All examiners have technical backgrounds in the particular area they work in at the Patent and Trademark Office. After their review, the examiners draft an "office action" which typically will reject an application based on the prior art. These office actions must be responded to by the inventor. After the examiner is convinced that a particular invention is distinguishable from the prior art, he/she will issue a "Notice of Allowance," which notifies the inventor that a patent will be issued on their invention. This process generally takes from one to four years.

After the patent is issued, it must be licensed to be practiced. A "license" allows a user to practice an invention without infringing on the rights of the patent owner. Both the inventors and the Patent Program will contact potential licensees to see if they want to market and manufacture the patented technology.

Frequently, during the development of a new technology, there is the need for technology transfer agreements that will help the process along, such as confidentiality agreements, Cooperative Research and Development Agreements (CRADAs), and biological materials exchange agreements. These agreements provide vehicles for the Federal government, industry, and/or universities to work together. This helps to ensure that the research will be targeted to the questions that need answers prior to a new product entering the marketplace. The U.S. Congress views these agreements as a more effective use of the Federal laboratory resource and more likely to result in the successful transfer of technology.

Technology transfer agreements are needed when the inventors are working on their research with an industrial cooperator. If a CRADA or other technology transfer agreement is needed, terms must be negotiated with the cooperator, such as confidentiality, projected budget for the proposed joint research effort, timelines for project completion, and research goals. Agreements are becoming a more important part of the technology development process due to a general decrease in R&D funding in both public and private sectors.

Many times, other related legal issues will need to be addressed for the project to proceed smoothly. Examples are copyright and/or trademark issues, specific concerns related to software, and the Freedom of Information Act and how it impacts the availability of business and/or confidential company information to their competitors if that information has been disclosed to the Federal government.

The Patent Program, by virtue of the exclusivity that patents and licenses provide for new technologies, fosters the development and diffusion of technologies that otherwise would have remained on the shelf. Exclusivity provides an incentive for companies, especially many small, start-up companies to try taking new technologies to the marketplace because it provides them with time to recoup capital expenses prior to having competition in the marketplace. The Forest Service is just getting its Patent program off the ground but is hopeful that within a few years the royalties collected will be substantial. For example, the Agricultural Research Service, another USDA agency, receives about $1-2 million each year from patent income.

Patent Examples

Overall, technologies developed by the Forest Service look to solve problems in a more environmentally sensitive fashion that will extend the wood resource and help to manage Federal lands. The breadth of Forest Service technology is diverse, ranging from biotechnology to logging equipment to fire retardants to wood adhesives. Many of the technology transfer patents I work with are related to forest products.

For example, a technology that was recently licensed provides a way to nondestructively test for wetwood prior to drying through the use of sound waves. This saves both time and money for lumber producers because it allows them to detect defects in the wood early in the manufacturing process. The timber resource is extended by this technology because it allows the sawmill to sort lumber prior to drying and subsequent processing reducing energy requirements for lumber drying and increasing drying quality and lumber remanufacturing value.

Another patented technology involves a product known by many as "Spaceboard." This is a pulp-molded product that can be used for many purposes such as packaging, furniture, and vehicles. This technology, including five patents and several pending patent applications, was exclusively licensed to three different companies for various fields of use. These companies all participated in CRADAs to further develop the product for the marketplace.

Biopulping technology uses natural wood decay fungi to "soften" wood chips prior to mechanical pulping, thereby reducing energy costs by as much as 30 percent and producing a stronger paper. This technology includes three patents and three pending patent applications that resulted from a joint research effort over several years between the University of Wisconsin, University of Minnesota, USDA Forest Service Forest Products Laboratory, and industrial cooperators.

Yet another technology provides a method for electronically controlling livestock. This invention resulted from Forest Service Research efforts to manage grazing cattle in riparian areas to protect fish habitat and reduce watershed degradation. The cows wear an ear tag that provides an auditory signal, followed by an electronic signal, alerting the cow that it is about to enter the enclosed area. This avoids the expense of a fence and effectively limits the grazing area to the desired area.

Another Forest Service technology developed under the Patent and Licensing Program uses knowledge of insect ecology and chemistry to invent an insect repellent for the southern pine beetle. This chemical technology was developed jointly by Forest Service scientists and a chemistry professor at Mississippi State University. It presents an advancement over the currently available technology because it does not kill the insects, rather it prevents aggregastion behavior that helps avoid the devastating outbreaks of thousands of acres of southern pines nearly every year.

Personal Values

Through my position as Patent Advisor for the Forest Service, I have combined my interest in environmental issues as well as science and technology. I have a job that allows me to transfer natural resource-related and environmental technologies from Federal laboratories to the private sector while working in the area of intellectual property law, which is both dynamic and challenging.

I find the job exciting; it requires working with a wide variety of people—from sawmill owners to corporate lawyers. In addition to the legal issues, I must be a negotiator, a good communicator, and be knowledgeable about all kinds of forestry-related technology. I am constantly learning about the newest and latest technology within the forestry industry. And in a small way, I am making a contribution to a better world.

Janet I. Stockhausen is Patent Advisor to the USDA Forest Service. Her B.S. in Natural Science Education (Biology) is from the University of Wisconsin-Madison, and her law degree (J.D.) is from Franklin Pierce Law Center, City and State. She is admitted in Minnesota, Wisconsin, and is registered to practice before the U.S. Patent and Trademark Office. Prior to this position, she was employed at the U.S. Court of Appeals for the Federal Circuit as a technical assistant.

Janet Stockhausen (standing left) and Professor Mary Waller (right) with business graduate students from the University of Wisconsin. Taken at the USDA Forest Service Forest Products Lab, Madison, Wisconsin.

SUPER VISION

A Management Column
by
Barb Springer Beck

Supervision in the workplace has changed significantly over the past several decades. This has occurred in large part because the nature of work itself has changed, but also because employees' expectations of their work environment have changed. The once great factories and production lines where the majority of the workforce toiled have now become computer work stations and meeting rooms. Fortunately, we in natural resource work still have some connection to the land, but the new ground rules call for some super vision.

So, how do you feel about your supervisory skills, and what skills does a supervisor need to have and to hone?Supervision involves getting work done through others. I like to think of the responsibility in two ways. First, you have to assist your employees in understanding what is expected of them as far as job performance. And secondly, you need to ensure that each employee has the training and resources they need to accomplish the work they are to do.

You'll need to have a basic set of skills to be a good supervisor. When you have worked for a good supervisor, you may have observed firsthand the benefits of these skills. Take a minute to reflect on what those skills were. Conversely, if, like most people, you've had a poor supervisor, there's opportunity to learn from that situation as well. Unfortunately for some people, they are asked to assume supervisory duties without training. This can create problems for them and also for their hapless charges. Each supervisor seems to have a different style and combination of abilities, but I believe that there are a small number of basic skills upon which you can build, and which will serve you well as a supervisor. I also believe that all excellent supervisors possess these basic skills.

First, to practice supervision, you need to have vision—even better is super vision. Vision is a picture of the future you are striving to attain. It gives meaning to work and guides the work which must be done. For example, your vision as a Refuge Manager for the U.S. Fish and Wildlife Service might include providing excellent interpretive experiences, preparing environmental assessments in half the average time for refuges, valuing new ideas about how to accomplish work more efficiently, and increasing the quality of the refuge's waterfowl habitat.

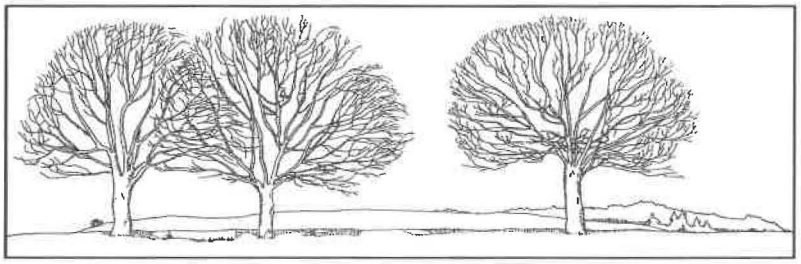
Vision is the focus of action and when communicated to others, helps clarify expectations. A well thought out, well expressed vision can serve as a motivating force. If you have vision, you may be able to avoid asking the embarrassing question, "I am their leader, which way did they go?" Second on the list is good communication skills. Recognizing that communication is a two-way street, you need to be able to listen *and also* to express yourself. Listening is important from the standpoint of understanding what an employee needs in the form of resources, training, time, or other support to get the job done. Taken a step further, your employee may come up with a great idea or a better way to get something accomplished on a task for which you are responsible.

You also need to be able to give direction clearly and concisely. One supervisor I know takes a long time to explain an assignment, yet his subordinates who are dedicated, experienced professionals never seem to understand what is expected of them at the end of the explanation. Practice active listening and encourage questions for clarification when giving instructions.

Third, you need to have coaching skills. A coach serves as a guide, recognizing and encouraging each person to strive for their best performance. Coaches know and respect the fact that each individual has a unique set of talents and differing levels of competence. They offer support, encouragement and feedback specific to each individual's development needs. A good coach can help someone see what they can be and raise their expectations of themselves. Find out from your employees what stands in the way of great performance for them and set about removing those barriers. You can bet that the coach of the U.S. Women's Olympic hockey team encouraged his players to believe they could win gold, and they did!

Finally, while personal integrity may not be called a skill, it is all-important to being a good supervisor. Your employees need to know your word can be trusted and that you'll follow through on what you promise. Have you ever committed yourself to a tight deadline with the understanding that certain critical resources were available to help you meet that deadline...for example, fisheries input for a biological opinion on endangered species? Then you come to find out later that the resource (the fisheries biologist) was assigned elsewhere and there was no relief for your deadline? Employees need to be able to count on you, your honesty and your support. They should also understand that accountability is in part the personal integrity you'll model and expect from them. Behaving with integrity builds trust, respect and commitment. A working environment with these elements is a positive and productive one.

As a supervisor, it's important to recognize the fact that one size doesn't fit all. Different people have different levels of skill, ability, and confidence, in relation to specific tasks or projects. So, how do you know how closely to monitor someone's work and how frequently to communicate or check in with them? The answer to this question will depend on two things, the person's abilities related to the particular project, and their willingness to perform this work.You may have a highly motivated star performer, but if she is unfamiliar with the type of work you are asking from her, she may need more guidance and closer contact. Let's say you have a social scientist who for the first time is placed on an interdisciplinary team to plan a project. She will undoubtedly have a good understanding of the effects of the project on a community, but may need help



in understanding her role on the team and in the planning process. On the other hand, if you have an employee who could perform a task blindfolded, say, filling out time sheets or writing a burn plan, but is unmotivated or unwilling, that person may also require closer supervision. Less frequent interaction will be needed when you are supervising someone who is motivated to perform and for whom the work is well understood. A trail crew foreman who has been on the job four seasons and loves her work, probably won't need much supervision even on a major trail reconstruction project.

Part of the job of being a supervisor, one of the best parts, is to recognize and reward employees. Remember and value individual differences when considering recognition. While it's helpful to think about what motivates you for example, you can't assume that everyone is motivated in the same way or by the same things. One person may appreciate a day off as a reward, while another could use a small cash bonus or some overtime. Yet another would welcome a special assignment which would elevate her visibility or broaden her experience. Some may be proud to receive an award in front of their peers and others may be caused great embarrassment by the same recognition. Find out what makes each person tick, and when you reward them, make sure the reward is meaningful for them.

Obviously supervising others' work can be challenging, so why would anyone want to do it? Well, first of all, not everyone is cut out to be a supervisor. And that's ok. But if you are interested in tackling the challenges, there's an opportunity for great rewards.

The rewards of supervising come in two forms, first, getting work done, and second, personal satisfaction. All other things being equal, people who work for good supervisors are more productive and work at levels at or close to their potential.Good supervisors create an environment where employees feel comfortable and appreciated. A great deal of work gets done and it's likely to be of high quality.

If you earn a reputation as a good supervisor, talented people will actively seek out opportunities to work for you. This can even lead to a situation where sometimes you lead, and sometimes you follow! The employees of a Forest Service Appeals Coordinator I worked with raved about her supervision of their work. The appeals unit had been downsized and the work was demanding. Despite the downsizing and pressures in the appeals unit, morale and productivity were high and other employees watched for vacancies to apply for the chance to work on this woman's team.

As a supervisor, your responsibility goes beyond giving direction and asking for accountability. You also have the challenge of modeling behavior which sets the standards for your employees as far as integrity and respect for others. While this can be demanding, in the long run, meeting this challenge will help make you a better person and performer too. You will see potential in others and encourage them to strive towards it. It's almost impossible to describe the satisfaction that comes from seeing another person succeed, knowing that your encouragement played a role in that success. If you are a supervisor, make it your personal goal to be the best one you can be.It calls for super vision, but you can do it!

Barb Springer Beck is President of Beck Consulting, a firm that specializes in meeting facilitation and managing personal and organizational change. Prior to starting her own business in Red Lodge, Montana, she was a District Ranger for the USDA Forest Service.

News & Notes

Honoring the Rosies

Where the Kaiser Shipyards once throbbed with the concentrated effort of thousands of wartime workers on the bayshore of Richmond, California now lies a broad green lawn surrounded by comfy condominiums. There's no sign that this spot stood at the heart of California's "Second Gold Rush." The City of Richmond's Rosie the Riveter Memorial Committee is working both to remind us of that era and to honor those who were part of it, especially the women. In February 1998, the Committee announced five finalists in a competition held to select an artist who will design the permanent memorial to be placed at Marina Green and Park, the former site of Kaiser Shipyard Number Two. "This memorial will help a broad audience understand the crucial role women played in helping the U.S. win the war—and the changes that those new jobs ushered in for women and their families," state Richmond City Councilwoman Donna Powers.

Florence Berg says: They hired men at first, then they started hiring women for the graveyard shift. I had two brothers overseas. My mother, my sister, my stepfather, and I all worked in the shipyards, my grandfather, too. We lived in San Francisco, so I took the streetcar and the ferry. It took two hours to get to Richmond. My mother and stepfather got in as shipfitters, my sister was hired as steel expediter, and I got in welding in 1942. They taught you right there how to weld. I did that for six months, until I hurt my eye real bad. It's still blurred if I take off my glasses. I did wear goggles, but I lifted them up to check something and someone beside me struck an arc and that was it. So after a while, I was in charge of the plate shop. I had men under me. I did really enjoy it, I think it was one of the nicest parts of my life... There weren't many young men—most were old enough to be my grandfather... On July 1, 1943 I got married. My husband had been in Pearl Harbor and also in Guadalcanal. The Navy sent him back to San Francisco because he had malaria, but in 1944 he went back to active duty again, in Hawaii. I took off to have our first child, then went back to work. I got another Navy wife to move in with me and she took care of my baby in exchange for staying in the house. Then [after the war], in 1945, they started laying people off, little by little. Women went first, and I was one of the first because I had taken time off.

Willa Thomas says: We came in 1942 [to the Richmond shipyards] from Lewisville, Arkansas. I was 17, my husband was 19... We lived with my brother, sister-in-law, and two or three sisters in one room for about a month, and then my husband found a place for us to stay. The housing was very bad, but people really shared. If they had one or two bedrooms, 10 people m,ay have stayed there at different times. I got my job at the shipyard after our daughter was born. My husband took care of her in the daytime. I'd come back at four or five o'clock and cook and he could sleep some more before he went to work at midnight. I worked in the double bottom of the ships as a scaler.

California Coast and Ocean, Spring 1998, Vol 14 No 1

Ah, the Bears of Summer

Charles Robbins, a Washington State University, Pullman (WSU) wildlife nutritionist has led studies of bears' dietary habits for a dozen years. The grizzly and black bears in residence at WSU are in an ambitious ecological study of the role bears and salmon play in the environment. Grant Hilderbrand, a WSU doctoral candidate, working with Charles Robbins on the bears, is studying the importance of various kinds of foods to bears both past and present. The researchers have more work ahead in Alaska tracing how nutrients cycle from fish to land animals to plants. The Bear Research, Education, and Conservation Program at Washington State University provided the test subjects to work out the method.

Through the years, Robbins and his students have fed the bears varied diets ranging from tons of commercially grown blueberries to steelhead and salmon from Dworshak National Fish Hatchery at Ahsahka, Idaho. By analyzing concentrations of nitrogen and carbon isotopes in various samples from bears ranging from red blood cells to bones, Hilderbrand can tell the proportion of meat, fish, or plants in the diet. The carbon tells him whether the meat originated on land or in the ocean. The nitrogen offers further evidence because it accumulates at each step of the food chain and those in the ocean are generally longer than those on land. That's true for cave bears that died more than 11,000 years ago in Europe to grizzlies from the Columbia Basin collected for museums during the last century or to brown bears still living in Alaska. The ability to determine the diet of long-dead bears—as well as living ones—can help trace the ecological webs that tie the food chain together. A single adult grizzly sow in Alaska might eat as much as 2,500 pounds of salmon as it prepares for hibernation. That will translate into about 120 pounds of fat, the essential energy source that will carry the bear through winter hibernation. An adult grizzly can eat 15 percent of its body weight in fish a day; a 300-pound bear could munch 45 pounds... That single bear will spread the equivalent of 600 pounds of garden fertilizer on the stream banks during the season, fulfilling its part of the natural contract.... There's little doubt that grizzlies adapt to a diet without salmon. Bears in eastern Montana and Wyoming live without fish, relying heavily on land animals and plants, Robbins said.

Bill Loftus, *Lewiston Morning Tribute*, April 2, 1998

Detecting Land Mines

Geo Search is a business which has developed a system to detect underground air cavities. Tomita Hiroshi created a technology using high-frequency waves which was first used to inspect the ground surrounding water tunnels. Then, it was modified to detect the air cavities below road surfaces which cause sinkholes. It uses electromagnetic waves to find air pockets in the boundaries between asphalt, gravel, sand, and other materials using a hand-held radar system. It has detection rates of over 90 percent. Next came equipment to detect successive layers of materials under the surface of roads to aid in repairs.

Now, Hiroshi is working for the United Nations, using the company's technology to detect land mines. According to the Red Cross, there are 120 million more mines in about 70 countries and regions, killing 10,000 people each year. Only 100,000 can be detected each year because newer mines are made of plastic and traditional detection methodologies use metal detection. In 1997, Geo Search developed Mine Eye which sends electromagnetic waves into the ground and uses a computer to analyze the data from the signals reflected back. The shape of the buried object is displayed on a monitor in different colors for different materials. The three dimensional images showed plastic mines and unexploded shells and tells the operator the depth of the buried object. Production is underway.

Katayama Osamu, *Look Japan*, May 1998.

Shocking Experiences

On outings uninterrupted by flotsam in the water, fisheries managers use shocking boats for a variety of purposes. The North Dakota Game and Fish Department has three 18-foot reinforced flat-bottom shocker crafts with sturdy railings in front and steering consoles in back. Next to the driver's seat is housing for a portable generator to produce electric current that runs via wire to a basketball-sized aluminum sphere suspended by a hollow metal pole about 10 feet in front of the boat. When juiced for action, the sphere rides along just a few inches under the water's surface. Regardless of clarity, shockers travel close to shore in water less than five feet deep, finding lots of fish. Electroshocking is about the only way fisheries managers across the state can gather much information on either largemouth or small mouth bass because they avoid frame or gill nets used to survey other fish species.

The boat driver follows part of a lake's shoreline for a set amount of time, usually about 20 minutes. When the time is up, the scooping crew counts, weighs, measures, and releases all fish, not just bass, in the onboard tank. To thoroughly sample, three timed segments are required in the slow-moving boat, but that's enough to let fisheries managers know what's in a lake. The shockers are used also to take adult bass from established populations to lakes that need a jump start. Fish from lakes in danger of freezing out or winterkilling have been shocked and moved to other waters. The department also shocks spawning salmon in order to collect eggs for hatcheries if other spawning methodologies have failed. The shocking vessels also survey areas of huge Lake Sakakawea that were monitored for soil types when the water was down. The idea, Hendrickson says, is to relate species abundance with bottom composition.

Craig Bihrle, *North Dakota Outdoors*, April-May 1998

Tiger Conservation

A half-baked plan is no plan at all. This is a well-known statement at World Wildlife Fund (WWF), one of the largest conservation organizations in the world. And it is for this reason that the WWF uses GIS as its primary technology tool for its conservation program of the *Panthera tigris*. Using innovative mapping and spatial analysis capabilities, WWF has developed a new approach that can help the world's largest cat change course from its current path of extinction. By taking a holistic approach that targets not only the tiger species but also the ecoregions they inhabit, their prey, and other wildlife that live in these ecoregions, conservationists can now make effective strategies that work. Using ARC/INFO, combined with leading field data methods such as GPS, WWF collected and analyzed critical habitat and population data to map out locations of 159 areas called Tiger Conservation Units or TCUs, where tigers still live. Each TCU was analyzed for attributes such as tiger size, integrity, tiger prey, poaching threats, habitat viability, and more. They analyzed other factors by mapping and overlaying data sets such as subspecies population, distinct bioregions, ecosystems, and habitat types. After classifying the TCUs into categories of viability, WWF disseminated its data to governments and other groups, giving them a scientific basis for creating and enforcing laws to help protect tigers in a more effective manner. The analysis also revealed an interesting fact: although the tigers in Indochina are quite different from tigers in the Russian Far East, most of the high-priority areas that needed a lot of protection run very close together. This led WWF to launch a campaign for creating corridors between areas so that tigers can move from one region to another. And by seeing exactly where illegal hunting is still rampant, WWF can better target trade control efforts. Eleven countries with TCUs and four countries into which flow a great deal of tiger medicines were pinpointed for increased conservation effort.

ARC News, Volume 19 No. 4

Forest Products With a Price

The horde of loggers that once swarmed through the Pacific northwest is much diminished today, as is the forest itself. But amid the second growth, a burgeoning crowd now seeks smaller treasures: mushrooms, berries, herbs, moss, and leaves. Largely ignored a decade ago—before Big Timber met the spotted owl—the harvest of such special forest products now is worth at least $200 million a year in Washington and Oregon, according to James Freed, a forester with the Washington State University Cooperative Extension. Nearly all the picking occurs on land owned by big timber companies or the government, which try to regulate (and profit from) the harvest with permit fees and limits on the number of pickers allowed. But in the woods, where law enforcement is weak, the rules that many live by are straight out of the Old West: take what you can, don't get caught, and carry a gun. Poachers prowl for morel mushrooms in northern Idaho and for bear grass in Washington's Cascade Range. Each fall in the Cascades of Oregon, some 2,000 mushroom hunters pursue the matsutake, a cinnamon-scented delicacy prized in Japan. Forest rangers there try to keep the harvest legal, but they are outflanked by pickers who are armed and protective of their secret spots. At night in the mushroom camps, drinking, gambling and fighting are the favored pastimes. Extra patrols helped keep the peace in 1997, but 1996 was more typical with five shootings, one of them fatal.

Like Oregon's mushroom hunters, the brush pickers here are mostly foreign-born: Hispanic and southeast Asian. Many are illegal immigrants, willing to work long hours for piecework wages in exchange for a job that conceals them all day in the woods. More pickers arrive each year. Rustlers without proper permits steal millions of dollars in brush, e.g., salal, used in flower arrangements. Lennie Morris is president of Mill Creek Floral Greens International, a big player in Washington's brush-picking trade. He trades in huckleberry, ferns, bear grass, and moss, but salal is the biggest seller. He spends tens of thousands of dollars a year for brush-picking rights to private land and charges each of his pickers $75 for a two-week permit. But he must compete with fly-by-night buyers who ask no questions and pay in cash, thus giving poachers a market. Each year, thieves pick up to 35 percent of the salal on his leased land and cost him more than $1 million.

David Foster, Associated Press, February 22, 1998

Citizenry and the State: Shaping Environmental Policy

China suffers from severe environmental problems: agricultural land reduced from about one-fifth to one-tenth of a hectare per capita as the population has exploded since 1949; forests disappearing; most of the rivers, lakes, and airsheds severely polluted; a burgeoning economy and consumer revolution that promise even more environmental stress. Yet there seems to be relatively little consciousness of these problems among the general public. That is not true of the government, which in 1979 appropriated virtually the entire complex of land, water, and air pollution laws, standards, and criteria as they existed in the Unived States at that time. What China lacks is an environmental movement, or any kind of organized commitment on the part of ordinary citizens to deal with these challanges. In fact, autonomous organizations are actively discouraged. Although Laws are in place, individuals and state-run entitties frequently flaunt them..... Finland offers a different paradigm. It is an exemplary nation in many respects—sensible government, high living standards, people very close to nature... Although surveys showed that many Finns were highly concerned about air and water pollution in the global environment, fewer were worried about problems in their own country, and fewer still about their locale.... South Africa provides the most heartening story... Thousands of citizens from all walks of life were engaged in the most extraordinary process of participatory democracy to develop a national environmental policy. What they were coming up with was comprehensive, fair-minded, and farsighted, its tenets carefully integrated with the government's program for reconstruction and development.... Mindful of such examples, I would like to encourage more attention to the relationship of citizens and the state in our own historical tradition. We have tended for so long to focus on policies emanating from the federal government that we may have missed the significance of what was happening within individual states and localities and especially among the citizenry.

Susan L. Flader, *Environmental History,* Volume 3 No 1, January 1998

Spousal Accommodation

What has caused such drastic changes in corporate ideas about nepotism in general and foreign assignments in particular? Companies big and small are scrambling to expand their business abroad, and if they aren't willing to accommodate working spouses, says Ed Butcher of Citibank's global expatriate services, "they can't always get the best person for the job." Besides, any man considered for such a transfer is likely to be married to a working woman. Yet in 1996, only 14 percent of working expatriates were women.

More often than not, one half of a couple gives up a job when the other half is transferred—a mere 20 percent of trailing spouses were employed during foreign postings in 1996, although 57 percent had held jobs prior to the assignment, according to a survey by Windham International, a consulting firm, and the National Foreign Trade Council. That's a lot of interrupted careers, and it explains why two different surveys reported that spouse concerns were the primary reason potential expats resisted or refused assignments. Of course, the probability that a company has married employees who are qualified for the same posting at the same time is fairly low. But it is becoming more common to handle any transfer as a two-career transfer, even when both people don't work for the same employer. Expat postings are hugely expensive—and it's even more costly when assignments are shortened because of spouses' conflicting career needs.

In the American Foreign Service,there are more than 300 successful husband and wife teams, known in the foreign service as "tandems." To keep marriages from being too disrupted, the AFS has extensive written guidelines on tandem postings, including strategies for shifting the chain of command so that one spouse doesn't supervise the other. And if there aren't two positions available, all tandems are offered unpaid leaves of absence, without penalty or stigma.

Maggie Jones, *Working Woman*, November 1997

Is Immigration an Environmental Issue?

The fact that at least 60 percent of the United States' three million annual population growth is a direct result of imigration presents a challenge. How are environmentalists to come to grips with this issue, particularly when the advocacy of limits on immigration is, whether rightly or wrongly, often linked in the media with extremist causes of dubious intent or with a lack of compassion? Carrying Capacity Network has reported and advocated extensively on immigration issues and has excellent reasons to consider the subject to be a carrying capacity concern. The United State is by far the fastest-growing industrialized nation in the world, adding almost three million people to is population every year—that's 58,000 additional people every week. If current trends continue, the U.S. will nearly double to half a billion by 2050. Reasonable estimates put the number added by immigration between 1.6 and 1.7 million annually, with legal immigration accounting for over one million. The approximation results from the difficulty of determining precisely net illegal immigration. This increase in human numbers poses the ultimate environmental threat.

That U.S. immigration policy makes every attempt to reunite families reflects a commendable intent. However, for every one immigrant who chooses to come to the U.S. and to become a U.S. citizen, a whole family becomes legally eligible to immigrate here. The "pierceable cap" provisions of the 1990 Immigration Act mean that there are effectively no limits on family categories. Thus there is the potential for virtually unlimited "chain migration" as additional relatives continually become eligible. Given the current law, it is not surprising that the U.S. takes in more legal immigrants than other combined countries in the industrialized world

Carrying Capacity Net, March-April 1998

Use It or Lose It

Why do people with more "brain reserve" appear better able to withstand the ravages of Alzheimer's disease? One theory is that mentally active individuals develop more neurons and more elaborate interconnections between brain cells. They also have more problem-solving strategies at their disposal. Thus, if some brain cells sustain damage, other brain pathways may take up the slack, delaying or even preventing Alzheimer's symptoms. This theory is supported by autopsies in which substantial evidence of Alzheimer's disease was found in the brains of people who paradoxically showed no symptoms of cognitive decline. Of course, there's no guarantee that life-long learning is a magic bullet. But it clearly can't hurt. Good ways to hone analytical, language, memory, or spatial skills include complex puzzles and games, writing letters and poems, learning a foreign language, studying music, solving math problems without a calculator.

Women's Health Advocate, January 1998

Ugh

"You must know how to cut it, how to light it, when to blow out through the cigar to receive true flavor, how to keep it from overheating, take account of what you are eating and drinking and how to pick a compatible cigar." No, that's not from the pages of *Cigar Aficionado* magazine. It's advice given in a Texas high-school newspaper! And it's evidence that public-health experts' worst fears are coming true: the same abrupt rebound in popularity that has led some adults to pick up cigars for the first time is encouraging many kids to do the same. One survey in Massachusetts found that one in four high-school boys, and one in 17 high-school girls, had smoked a cigar in the past month.

Consumer Reports, May 1998

Common property resource management is the topic for the conference scheduled June 10-14, 1998 in Vancouver BC Canada. Contact Evelyn Pinkerton, School of Resource and Environmental Management, Simon Fraser University at iascp98@sfu.ca or at http://www.sfu.ca/~iascp98/

The U.S. Geological Survey is asking for the public's help with deformed amphibian research. U.S. and Canadian residents should call the North American Reporting Center for Amphibian Research in Jamestown ND at 1-800-238-9801 or use the data entry form on the website http://www.npsc.nbs.gov/narcom. NARCOM is interested in normal or malformed amphibians.

Global Warming 9, is scheduled for June 9-11 1998 in Hong Kong. Contact the program committee at CWIC, PO Box 5275, Woodridge IL 60517-0275 for news about registration.

Graduate students working in tropical research can apply for Short-Term Fellowships at the Smithsonian Tropical Research Institute in Panama. Applications are due four times a year. Contact STRI Office of Education 507-227-4918 in Panama.

The Association for International Agriculture and Rural Development fosters international collaboration between development workers from universities, private voluntary organizations, donor agencies and foundations. It has a website at http://www.aces.uiuc.edu/~aiard/

Looking for a government job? The Automated Vacancy Announcement Distribution System (AVADS) for government positions can be accessed at http://www.info.er.usgs.gov/doi/avads/index.html. Candidates may apply for most jobs with the Optional Application for Federal Employment (OF-612), a resume, or any other written format. Please review Optional Form 510 which lists all the required information that will need to be included. Check the college credits you need for a job with the Fish and Wildlife Service at http://www/fws/gov/who/careers.html. Other federal vacancies: http://www.usajobs.opm.gov or state employment agencies or http://safetynet.doleta.gov.

An International Conference on the Inventory and Monitoring of Forested Ecosystems will be held in Boise, Idaho on August 16-20, 1998. For more information contact Mark Hansen, USDAFS, hansen034@maroon.tc.umn.edu

The International Conference of the Society for Ecological Restoration will be held in Austin Texas September 28-30, 1998. The theme is Making Connections, meaning forming partnerships and alliances. For information access http://www.phil.unt.edu/ser/call.htm or email ser@vms2.macc.wisc.edu

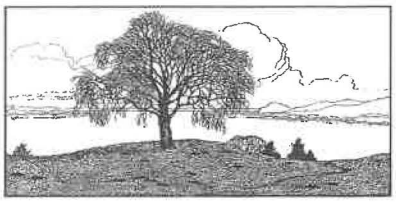
The Society of American Foresters will hold their conference in Traverse City, Michigan September 20-23, 1998. For information check out the website at http://www.safnet.org/conv/main.html. In the past, women have met during the conference, and each year those programs have become more diverse. This year, the Diversity Breakfast is Monday September 20th from 6:30-8:00 am and the cost is $5.00 for students and $12.00 for all others.

Gendered Landscapes: An Interdisciplinary Exploration of Past Place and Space will be held May 31-June 1, 1999 at Penn State. Call for papers and panels due December 11, 1998. Contact: email Conferenceflnfo1@cde.psu.edu

The Forest History Society is a non-profit educational institution established in 1946 to promote the study of human interaction with the natural environment from an historical perspective. Their website is at http://www.lib.duke.edu/forest/

The 6th Agroforestry Conference will be held in Hot Springs Arkansas on June 12-16, 1999. The theme is Sustainable Land-Use Management for the 21st Century and papers are called for before October 1, 1998. For information on papers, contact Terry R. Clason at TCLASON@agctr.lsu.edu or Catalino A. Blanche at cblance@yell.com.

Farming the Agroforest for Specialty Products will be held October 4-7, 1998 in Minneapolis. Focus is on growing and marketing products and woodlot/landowner outreach. Contact Scott Josiah email josia001@maroon.tc.umn.edu



KIOSK

The International Woodworking Machinery & Furniture Supply Fair will be held at the Georgia World Congress Center, Atlanta, on August 20-23, 1998. Contact IWF at 770-246-0608.

Green and Gold: California Environments will be held July 30-August 2, 1998 in Santa Cruz and sponsored by the University of California. The theme has to do with the discovery of gold in 1848 and the green of environments. Contact greengold@nature.berkeley.edu

The National Wilderness Stewardship Training course will be held September 10-17, 1998 at the Arthur Carhart National Wilderness Training Center in Huson, Montana. The cost is $700 and includes tuition, meals, lodging, and a field trip. Contact Chris Ryan 406-626-5208 ext 17.

The Natural Areas Conference will be held October 6-10, 1998 in Mission Point, Michigan. The theme is Planning for the Seventh Generation, and the organization celebrates it's 25th conference. The web site is http://wildlife.dnr.state.mi.us/HomePages/Meetings/Natural_Areas1998.

MOVING? Don't forget to send WiNR your address label along with your new address.

TO SUBMIT A MANUSCRIPT to Women in Natural Resources journal, send to the editorial office a single spaced preliminary draft by FAX (208-885-5878) for consideration to Dr. Dixie L. Ehrenreich, Editor. To discuss a topic, please call 208-885-6754 or email dixie@uidaho.edu.

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