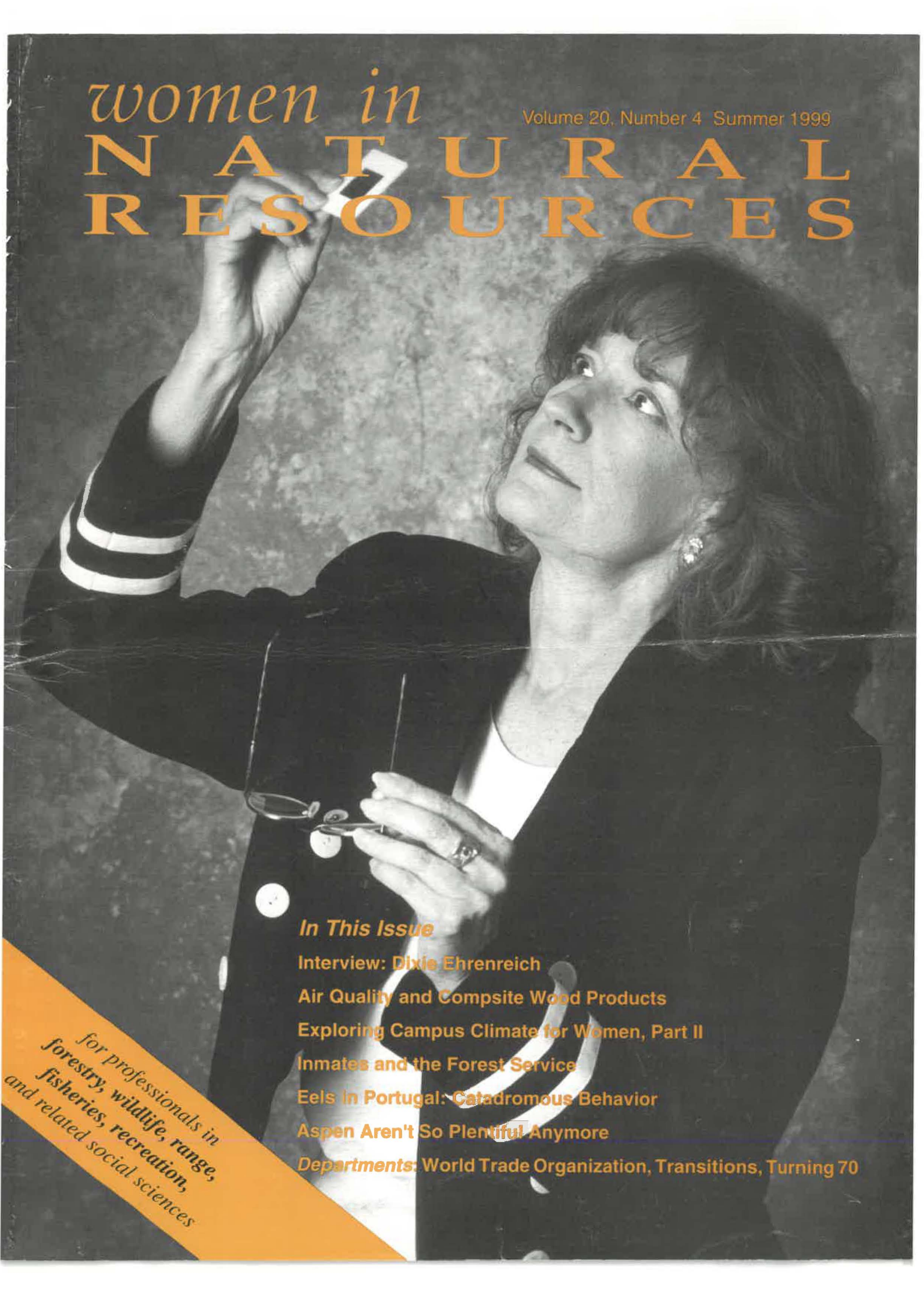
Volume 20, Number 4 Summer 1999

women in NATURAL RESOURCES



In This Issue

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

Editorial
Daina Dravnieks Apple

twenty short years

This is the 20th year for Women in Natural Resources journal and its precursor, Women in Forestry. Upon such an occasion, it seems appropriate to interview the editor, Dixie Ehrenreich, who has been with it a very long time. She was reticent about doing an interview, but I'm persistent. So this editorial and the interview are a celebration of longevity, that of the journal and Dixie, and of those who have worked on it, written for it, and been loyal subscribers.

Women in Natural Resources developed into a unique publication that inspired the loyalty of many female natural resource professionals. It provided opportunities for women to develop writing skills and publish their work. In addition to the traditional journal articles of research, management, and policy, many of the authors addressed issues of gender discrimination or family impacts from their professional work which had no other forum for discussion. In the early years, through subscriptions to federal women's program managers and word of mouth, the journal increased awareness of barriers and fostered changes in personnel policies. I've watched the transition myself and know the impact WiNR has had.

Writing for Ehrenreich is an experience we all wish we had more of in our academic and professional work. She has high standards, but a gentle hand. She listens to ideas enthusiastically and encourages authors to be creative, then works to sharpen and focus their text into a clear, interesting article. We all became better writers from her coaching.

She's been a remarkable person to work with the 13 years I have written for the journal. Ours has been a "virtual" relationship: I've only met her twice. Most of the contributing editors communicate by phone, fax, and email, but we always manage to meet publication deadlines.

I think it is fair to say that Ehrenreich and WiNR inspired a generation of women natural resource professionals. She and the other editors nurtured hundreds of aspiring authors who enjoyed writing about their work and other women's accomplishments.

Ehrenreich has shown a lot of leadership initiative. She has had the will to overcome all the obstacles, which makes her an outstanding model for other women. She mastered the role of being an entrepreneur, which is to be a jack of all trades in the journal publishing business. There is no doubt that she had—and has—a lot of help and a lot of luck in her friends, the WiNR editors, her colleagues at the University of Idaho, her family, and the space she occupies on the timeline of the history of women.

Women today are so capable, so successful, and so numerous in natural resources; it is difficult to imagine the barriers many women faced in their professional lives just a few years ago. In the interview, I was moved by her description of the treatment of one young female professional in the late 1970s and by the description of how Ehrenreich's mother had been treated in the 1930s and 40s. Both were educated women, 35 years separated in time, who had experienced institutional blocks and outright discrimination that impeded their ability to follow their originally chosen professions.

For me, it has been a privilege to be associated with WiNR and Ehrenreich, taking part in a period of major social change and expanded options for women professionals. The aim was to contribute to making natural resources a better career choice. For another 20 years, we need the journal to continue its policy of being open and inclusive in accepting new—and at times—unpopular ideas, and to continue providing a voice for future generations of aspiring women.

Daina Dravnieks Apple

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WOMEN IN NATURAL RESOURCES

Summer 1999

Our 20th Year!!

Volume 20, Number 4

FEATURES

DEPARTMENTS

The cover photo is of
Dixie L. Ehrenreich
Editor, Women in Natural Resources
See page 15

FEATURES

Letters & Stuff

I really enjoyed the article on Women in Agriculture in Vol. 20, No. 3. This summer has found me filing for water rights and submitting a Natural Resource Conservation Service grant for wildlife rehabilitation on the ranch. That article really hit home.

Helen Ruth Aspaas, Hesperus, Colorado

Today I picked up *Newseek* and noticed again how nature is used to sell all kinds of things. One of them was a Subaru ad (but a car was never pictured) lauding the 100th anniversary of President William McKinley signing the documents making Mount Ranier a National Park. I must say that having read Kimberlee McDonald and Dorothy Paun's article Elusive Landscapes: Public Policy Implications of Employing Nature to Sell Products in WiNR Vol 19 No 3 has made me laugh more than a few times at the connections some companies are making between their products and nature. But hey, don't mess with the little dog selling tacos or the frogs and gators selling beer. Somehow they seem to fit.

Alison Watterly, Dallas, Texas

There are some very interesting figures in the National Park Service budget on page 17 of WiNR 20:3. I had no idea that the Park Service paid out their appropriations for a lot of the stuff listed. Like most people I think only of trails, historic homes/sites, parks, campgrounds, salaries, etc. And page 14 on personnel also surprised me. I had thought that NPS was a friendlier place (than, say, the Forest Service, F&WS, or BLM) for blacks, Hispanics, and other ethnic groups, but I was wrong. Just a tiny fraction of the totals of men or women are not white. And another disappointment is that white men still fill 59 percent of the NPS professional permanent positions and 53 percent of the administrative ones with white women and both sexes of minorities combining to make up the rest. I was glad to read that Deputy Director Jackie Lowey has a plan to modify that and other imbalances. Over the years, I have come to rely on Women in Natural Resources to lay out the unfiltered figures for these agencies. Keep it up.

Charles Eduardo, Tampa, Florida

Loved that article by Winifred Kessler on North America's Newest Forestry Program at the University of Northern British Columbia, Canada in the last issue. Was there an intended contrast between the cheerfulness and ability to move quickly and solve problems in Kessler's department and what was happening to the women in the article Exploring Campus Climate for Women and *their* department heads? Does Kessler have any position openings?

N. R. Williams-Black, Toronto Canada

OPINION

In July, a workshop was held, sponsored by the Committee on National Capacity in Forestry Research. This topic is important, it was sponsored and attended by people at the highest levels in forestry research, to chart the course for the next several years. But there were NO women included! Is this the face of forestry for the 21st Century as perceived by the Board on Agriculture and Natural Resources of the National Research Council?

WOOD QUALITY/FOREST PRODUCTS **University of Georgia**

Assistant Professor of Wood Quality/Forest Products, tenure-track, twelve-month (75% research, 25% teaching) appointment with salary commensurate with qualifications. Ph.D. degree in Forest Products or a related discipline and strong research background in wood properties. Experience in wood chemistry, wood anatomy, and the biology of wood formation as they relate to intensive forest management given preferential consideration. Will develop extramural funding for an active research program to improve understanding of how intensive forest management affects both solid wood quality and pulping characteristics of southern pines. Additional responsibilities: teaching undergraduate wood properties and utilization courses, supervision of graduate students, development of partnerships with the forest industry, other private landowners, and public agencies, and participation in the newly formed Wood Quality Consortium. Collaboration with the School's Plantation Management Research Cooperative (PMRC), the Herty lab, the Institute for Paper Science and Technology, and the Forest Service is strongly encouraged. **To assure full consideration, apply by November 1, 1999.** Provide curriculum vitae, a statement of research and teaching interests, names of three references, transcripts of all college level work, and reprints of selected research publications to: Dr. Barry D. Shiver, Forest Products/Wood Quality Search Committee, Voice 706-542-3009: Fax 706-542-8356: email shiver@smokey.forestry.uga.edu

POST-DOCTORAL RESEARCH SCIENTIST Quantifying Wood Quality in Intensively Managed Southern Pines, two-year post-doctoral position with the newly created Wood Quality Research Consortium. Duties: 1) exhaustive literature review on the effects of environmental factors and intensive management on wood and fiber properties; 2) compilation and analysis of available data and models on wood properties applicable to southern pine species; and 3) development of preliminary models of wood properties as a function of silvicultural and environmental influences for inclusion in decision models. **Qualifications**: 1) Recent Ph.D. in Forest Biometrics with skills in modeling and ability to synthesize wood and fiber concepts. Alternatively, 2) a recent Ph.D. in Forest Products with strong quantitative skills and the ability and interests to model wood and fiber properties. **Salary**: Commensurate with qualifications. Minimum rate: $35,000/ year plus University benefits. **Screening starts November 1, 1999**. Letter of interest, resume, and 3 references should be sent to: Dr. R. F. Daniels, Phone: (706) 542-7298: Email: ddaniels@smokey.forestry.uga.edu

MAILING ADDRESS FOR BOTH POSITIONS: Daniel B. Warnell School of Forest Resources, The University of Georgia, Athens, GA 30602-2152 *An Equal Opportunity/Affirmative Action Employer*

University of Minnesota

Extension Service Extension Educator

Forest Land Ecology & Management

Located at Cloquet Forestry Center, Cloquet, Minnestota.

Required: A bachelor's degree; at least one degree in a natural resources field; course work or professional experience in forest management, fisheries or wildlife management, ecology, and education; strong skills in oral communications; experience working with diverse groups and on collaborative programs.

Preferred: Professional experience or course work in the design, delivery, and evaluation of educational programs; experience or college course work or training in landscape ecology, water resources management, soil resources, and group facilitation; knowledge of land-scape level planning and geographic information systems.

Deadline for materials: October 8, 1999.

To obtain complete position announcement & application materials, call U of Minnesota's Human Resources at 612-624-3717, or download from web page: www.extension.umn.edu/extension/jobs.html. *The University of Minnesota is EOE*

UNIVERSITY OF WISCONSIN ***Mammalian Ecology/Animal Behavior***

The Department of Wildlife Ecology seeks an individual with broad expertise in mammalian ecology/animal behavior, especially as they relate to a) wildlife conservation and management; b) inter- and intra-specific interactions of wildlife species; and c) the distribution and abundance of animals.

Responsibilities: This 12-month tenure track position consists of 50 percent research and 50 percent instructioinal responsibilities. The successful applicant must be able to secure extramural funding for a strong research program dealing with the effects of land use and environmental perturbations on wildlife species. Will also teach at least two graduate or undergraduate courses each year; participate in individualized instruction such as internships and undergraduate advising, and periodically lead graduate seminars. Teaching responsibilities require strong quantitative skills and demonstrated expertise in mammalian/behavioral ecology.

Qualifications: Ph.D. in Wildlife/Biology/Management required and post-doctoral teaching and research experience are highly desirable. Should meet criteria for certification by the Wildlife Society. Expected to interact effectively with wildlife managers, research scientists, and administrators of state and federal natural resource agencies and non-governmental organizations.

To apply: Submit a professional resume, college/graduate transcripts, three letters of recommendation plus the names of 3-4 additional references, and letter of application stating research and teaching interests to: Dr. Scott R. Craven, Search Committee, Dept of Wildlife Ecology, 226 Russell Labs, University of Wisconsin, Madison WI 53706 (608-263-6325: email Srcraven@facstaff.wisc.edu).

Closes 15 November 1999. *EO/AAE. Unless confidentiality is requested in writing, information regarding applicants and nominees must be released upon request.*

Increasingly, building owners and designers are requiring that building materials and furnishings meet indoor air quality criteria.

Air Quality and Composite Wood Products

Melissa G.D. Baumann

CAAA	Clean Air Act Amendments
FPL	Forest Products Laboratory
HAP	Hazardous air pollutant
MACT	Maximum achievable control technology
MDF	Medium density fiberboard
OSB	Oriented strandboard
PF	Phenol-formaldehyde
pMDI	Polymeric methylene diisocyanate
VOC	Volatile organic compound

As high quality timber for lumber becomes increasingly scarce, composite wood products will become even more important in replacing solid wood for many applications. In the United States, the 1997 shipments of particleboard and medium-density fiberboard (MDF) totaled more than 540 million square meters (19-mm basis) , and 1998 production of oriented strandboard (OSB) and softwood plywood totaled 2.69 billion square meters (9.5-mm basis) (Composite Panel Association 1998; Adair, 1999). Production will most likely increase for all of these products, except plywood, during the next five years.

Current environmental awareness has led consumers, manufacturers, and regulatory agencies to raise questions about environmental impacts that may be associated with the manufacture and use of wood composite products. While wood is viewed as a natural building and furnishing material, the processing and the addition of adhesive necessary in the preparation of wood composite products, have caused concern. Consumer and regulatory interest in assuring that citizens are able to work and live in "healthy buildings" has increased the need for information about the types, quantities, and persistence of volatile organic compounds (VOCs) that are emitted from building materials and furnishings, including wood products. The 1990 amendments to the Clean Air Act have increased the pressures on wood products manufacturers to document and control the VOC emissions from their manufacturing facilities.

Research at the USDA Forest Service, Forest Products Laboratory (FPL) is being conducted to identify the compounds emitted from wood products during their manufacture and subsequent use. The FPL researchers are measuring the types and quantities of VOCs that are emitted from particleboard and MDF products to provide quantitative emissions information. This information can be used by other researchers studying indoor air quality of homes and offices where these products are used. The FPL researchers are also evaluating emissions during the manufacture of various composite wood products. Measuring emissions during manufacture of wood composites provides information about the relationship between manufacturing conditions and the types and quantities of emissions. This information will help determine whether changes in manufacturing conditions can be used to reduce emission levels and what the best control strategies are for the types of compounds that are emitted.

Emissions from products

As consumers have become more conscious of energy conservation, they have decreased air exchange rates in home and office buildings. This tightening of the buildings has resulted in increased levels of compounds in the indoor air, and reports of illness related to poor indoor air quality have increased. Many products used indoors (such as furniture, upholstery, drapery, and carpeting) and activities of the building occupants (such as use of cleaning supplies, cooking, and smoking) contribute VOCs to the indoor air. In past years, formaldehyde emissions from wood products, primarily particleboard and hardwood plywood, have been studied because the adhesive used to bond these products emits formaldehyde. Improvements in adhesive technology and manufacturing techniques have largely allayed concerns about formaldehyde emissions, but questions have been raised about whether there are emissions of other compounds that may adversely impact indoor air quality. Increasingly, building owners and designers are requiring that building materials and furnishings meet indoor air quality criteria. With very little information available for wood composite products, there is no scientific basis upon which to form decisions about product use.

To address this lack of information, researchers at FPL, with assistance from the Composite Panel Association, Gaithersburg, Maryland, obtained samples of particleboard and MDF from mills throughout the United States. Products representing more than 85% of the industry were included in this survey (Baumann, Battermans, and Zhang, 1999). Wood specimens were housed in stainless steel chambers with clean air passing over them providing conditions similar to what would be found in a home or office. Emissions from the specimens were measured throughout a 4-day period. These measurements showed that the primary compounds emitted from the wood were secondary components of wood, such as a-pinene and b-pinene, and wood degradation products, such as alcohols and aldehydes (Table 1). The types of compounds emitted depended upon both the wood species and whether the panel was particleboard or MDF.

Particleboard panels made with pine had the highest emissions levels, primarily due to the terpenoid compounds, which are natural volatile components of the wood. Generally, panels of MDF had lower emissions than panels of particleboard. This difference is probably due to VOCs being driven off during the manufacturing of MDF. In this research, the significant number and amounts of degradation products (such as pentanal, hexanal, and nonanal) in the emissions was surprising because these compounds are not components of the adhesives and they have not previously been identified in the extractable compounds from wood. Further work is being conducted to determine how these compounds are formed, and research on emissions from composite wood products will be extended to include other products such as plywood and OSB.

Emissions during manufacture

The passage of the Clean Air Act Amendments (CAAA) in 1990 brought large sectors of the wood composites

	Number of samples						
	Southern Pine		Other pines		Hardwood		Douglas Fir
Compound	Particle-board(22)	MDF (6)	Particle-board (8)	MDF (5)	Particle-board (3)	MDF (5)	Particle-board (4)
Terpenes							
α-pinene	22	0	8	0	3	0	3
Camphene	16	0	4	0	0	0	0
β-pinene	22	0	7	0	2	0	1
3-carene	0	0	8	1	2	0	1
p-cymene	22	2	8	2	0	1	2
Limonene	15	1	8	2	0	1	1
Borneol	22	5	8	5	0	2	3
Aldehydes							
Formaldehyde	22	6	8	5	3	5	4
Acetaldehyde	22	6	8	3	2	5	3
Propanal	12	1	4	0	2	0	0
Butanal	13	3	2	2	1	1	1
Pentanal	22	5	8	1	3	0	0
Hexanal	22	5	8	4	3	5	4
Heptanal	21	5	8	1	1	0	0
Benzaldehyde	22	5	8	5	2	2	1
Octanal	22	5	8	3	3	1	1
t-2-octenal	22	5	8	2	3	1	2
Nonanal	22	5	8	4	3	1	1
Ketones							
Acetone	22	6	8	4	3	2	3
2-heptanone	22	4	8	1	1	0	0
Alcohols							
1-pentanol	3	2	2	0	0	0	0
1-heptanol	18	4	6	1	0	0	0
Other							
Acetic acid	3	0	1	2	2	3	0
2-pentylfuran	22	6	8	3	3	1	1

industry under new regulations. Emissions of VOCs that are precursors for the formation of tropospheric ozone are limited depending upon the air quality of the area where the manufacturing site is located. For a special class of 188 compounds designated as hazardous air pollutants (HAPs), the CAAA requires control by use of maximum achievable control technology (MACT) if emissions of HAPs exceed threshold levels. The MACT regulations are set by EPA for each industry.

The next two years will be crucial for the wood products industry because their MACT regulations are scheduled to be promulgated in November 2000. To develop adequate MACT regulations, information about the types and quantities of emissions from wood products manufacturing is needed to determine: (1) what VOCs are emitted and at what emission rates, (2) whether manufacturing process changes can help to control or eliminate VOC emissions, and (3) which types of wood products manufacturing facilities emit high enough levels of VOCs that they will be required to install the MACT controls.

Most of the compounds, such as terpenes, emitted during the manufacture of wood products are likely to fall under general VOC regulation, and will not be subject to MACT regulation. However, the adhesives used to manufacture composite wood products all contain at least one of the special group of compounds classified as HAPs. The HAPs that are known to be present in wood adhesives are formaldehyde, methanol, phenol, and the methylene diisocyanate monomer. Other HAPs that have been identified in emissions from wood product manufacturing include acetaldehyde, acrolein, benzene, naphthalene, toluene, and xylenes.

Collecting emissions information at actual manufacturing facilities is prohibitively expensive and often very difficult. To avoid these costs, FPL researchers, in collaboration with industry and university researchers, are working on laboratory tests that can provide the needed information. Research is being conducted to determine whether a laboratory test method can be used to estimate the expected emissions from a product being pressed in a manufacturing facility and to determine how conditions during pressing affect the types and quantities of VOC emissions.

In one study, a laboratory test method was developed and compared with stack test data from manufacturing facilities. During this research, the National Council of the Paper Industry for Air and Stream Improvement was responsible for collecting emissions from manufacturing facilities while members of the Amino and Phenolic Wood Adhesives Association and researchers at FPL tested emissions from panels as they were pressed under laboratory conditions. In this work, the stack testing data correlated well with the laboratory data for methanol and formaldehyde. Correlations for other compounds, such as terpenes, and for the total amount of VOCs were not as successful, perhaps due to aging and outgassing of the wood between the time of emission collection and panel pressing. Products that were included in this study were particleboard, hardboard, plywood, and OSB with a variety of wood species. Compounds detected during the laboratory phase of the research included many of the same compounds as in the product tests reported above. Terpenes were the predominant emissions from the softwood products, but in all products, oxidized compounds such as alcohols and aldehydes were also present in significant quantities.

To determine the effects of press conditions on VOC emissions, FPL and University of Maine researchers completed an in-depth study of press emissions while pressing panels with all three of the major adhesives used in wood composites, phenol-formaldehyde (PF), urea-formaldehyde (UF), and polymeric methylene diisocyanate (pMDI). Similar to what was found in the product emission measurements, the compounds emitted during pressing of panels were primarily materials present in wood and degradation products from the wood, including terpenes and aldehydes. The addition of the adhesive resin was not shown to significantly increase the emissions of most VOCs, and for pMDI, the application of the resin actually decreased the VOC emissions. The wood alone was found to have some formaldehyde emissions, and these emissions decreased upon pressing with either PF or pMDI resin.

The increased use of composite wood products as substitutes for lumber in many applications requires that we must know more about the VOCs that these products emit during manufacture and use. The research outlined in this article should contribute to the basic information necessary to evaluate these composite products and determine whether or not they are contributing to air quality problems.

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Melissa Baumann is a Research Chemist at the USDA Forest Service, Forest Products Laboratory in Madison, Wisconsin. She is a member of the Wood Adhesives Science and Technology Research Work Unit studying the environmental effects of wood adhesives during manufacture and use. Research in this area has primarily focused on emissions of VOCs from wood composite products such as particleboard, fiberboard, plywood, and oriented strandboard. Baumann received her bachelor's degrees in chemistry and environmental studies from Tufts University in Medford, Massachusetts, and a doctoral degree in inorganic chemistry from the University of Wisconsin-Madison.

BOOK REVIEW
by
Jonne Hower

On Women Turning 70
Honoring the Voices of Wisdom
Cathleen Rountree

Jossey-Bass Publishers
San Francisco, 1999.

It is summer. It is way too hot. I am tired and overworked. Vacation still won't come until next month. Also, I have an impending birthday. Although not one ending in "0"—I nevertheless needed inspiration. And I found it. Right there on the shelf in the bookstore. This is Cathleen Rountree's latest book in her self-described "decade-series" and is a lovingly presented series of interviews and photography with 16 women. Some were familiar to me; some were not.

Almost the first lines of *On Women Turning 70,* hooked me. "Time and trouble will tame an advanced young woman, but an advanced old woman is uncontrollable by any earthly force," wrote Dorothy Sayer. Although I am not sure I know exactly what this means, I find it heartwarming. I conclude that—as I age—I will be invincible, or at least, irrepressible!

The book is organized so you can read it sequentially, or just dip into it for short periods at a time, and is divided into a section for each woman. Each section begins with a black and white photograph of the interviewee, a quote from them, a short profile, and then a lengthy interview. I found that I wanted to read a little at a time; that way, it was like the gift of an afternoon visit with each of the several mature, and for the most part, rather famous women featured in the book. I'd like to introduce you to some of my favorite women.

Meet 74-year old gossip columnist Liz Smith. She says, "Basically, I don't think people should act like they're old. I think they're just as old as they act..." and concludes her interview with, "I've been lucky, really lucky."

Spend an afternoon with writers Doris Lessing or Madelaeine L'Engle. Asked if she had advice for writers, the 78-year old L'Engle replied: "One of the main things a writer does is listen.... When you write, don't think. Write... Writing is easy. You just sit and wait for drops of blood to form on your forehead." She concluded with, "Write every day.... Imagination is a divine gift."

Artist Ruth Asawa has focused on art and art education in the public schools, where she volunteered to teach art for more than 30 years. Speaking of the connections between art, work, good habits learned early, and growing up on a farm, she says, "In the summer... we'd start at 7:00 in the morning and work until midnight. It has nothing to do with art; it has to do with the habit of working. It was a necessity."

Some of the women have shaped our work life, such as feminist Betty Friedan. The 77-year old says, "Women in their thirties have been raised with just taking for granted the equity that now exists. They don't even know what it used to be like. That's what I think. They really don't know that women didn't always have it this way." I had to agree, based on my own foray into resource management in the early 1970's.

I studied each picture and tried to imagine myself in my 70's; not a feat I accomplished with any success. Sometimes I was able to see a reflection of my far-off, yet-to-be self in these essays. Sometimes they were just stories. But, I did find inspiration.

The other books in the decade series are *On Women Turning 40: Coming into our Fullness; On Women Turning 50: Celebrating Midlife Discoveries;* and *On Women Turning 60: Embracing the Age of Fulfillment.* Since I personally believe in planning ahead, I encourage you to read "far out" from your own age. Don't wait for the closest birthday to the decade. Dream of what you could become. Then, go out and do whatever it takes to accomplish the dream. Maybe we'll be lucky like Liz Smith, or invincible like Dorothy Sayer.

Jonne Hower is Public Affairs Specialist, Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho. She previously worked for the Bureau of Land Management in eastern Oregon. Her Bachelor's is in Range Management. She is a long-time WiNR Editor.

Global Frontiers

Sheila Helgath

The World Trade Organization

With increasing globalization there is a movement to reduce tariffs and other trade barriers in a whole range of goods and services. Next November, Seattle will host the World Trade Organization Ministerial Meeting where tariffs affecting the fisheries and forest industries will be discussed, and an agreement to reduce tariffs for these goods may be approved.

These agreements are not without controversy. Many of the arguments opposing these agreements are similar to those presented during the North American Free Trade Agreement (NAFTA).

Since we will be hearing a great deal about the WTO meeting, we asked the WTO press office in Geneva, Switzerland, and one of the environmental organizations, Pacific Environment and Resources Center in Oakland, California, who oppose the WTO's actions, to present their respective perspectives on the fisheries and forestry agreements. It is obvious from both of these articles that world trade, international treaties, and national economic policies affect natural resource managers in a fundamental way. To access more information on this divisive topic, the authors' websites are included in their biographical notes. *Sheila Helgath*

Hans-Peter Werner

A new round of multilateral trade negotiations is to be launched in Seattle, Washington, at the end of the year. Agriculture and services trade are on the agenda and further reductions in industrial tariffs and other key subjects may be added. But what is the WTO? How will another round of trade negotiations enhance sustainable development?

What is the WTO?

The World Trade Organization (WTO) was established on 1 January 1995. It is the legal and institutional basis of the multilateral trading system and embodies the main contractual obligations which determine how governments formulate and apply their laws and regulations relating to trade. It is also the framework for the conduct of trade relations among the now 134 governments which are members of the WTO. Another 30 governments including China, Russia and Saudi Arabia have applied to join the organization. It is important to remember that more than two-thirds of the WTO's members are developing countries.

The WTO's set of trade rules were negotiated from 1986 to 1993 by individual government representatives participating in the Uruguay Round of trade talks. These talks were held under the auspices of the General Agreement on Tariffs and Trade (GATT). Each government's national parliament, including the US Congress, subsequently ratified the WTO agreements in 1994. The agreements constitute an international treaty and represent a binding set of rules, obligations and rights for all member governments.

It is a common misconception that the WTO is a supra-national organization because its rules surpass the rights of sovereign states to enact their own laws. In fact, no WTO member government is forced in any way to abide by WTO obligations if it does not wish to do so. Nor are governments forced to accept standards, environmental or otherwise, if they can prove that such standards do not meet national environmental objectives or international health and safety requirements. What the system does require, however, is that governments treat imports from their trading partners no less favorably than they treat products produced in their own countries.

Before the WTO, the GATT was applied on a provisional basis, first by 23 countries in 1948, later by more than 120 in 1993. GATT was a multilateral agreement containing rules relating to trade in goods. Although it operated like a permanent agreement, it was without a permanent institutional framework. The WTO, however, provides a permanent institutional framework for the multilateral trading system and its rules cover not only trade in goods, but also trade in services and trade-related aspects of intellectual property rights. The dispute settlement mechanism which resolves trade differences between WTO member governments was also considerably strengthened with the arrival of the WTO.

In the preamble of the agreement establishing the WTO, governments recognize that "trade and economic endeavor should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development..." The agreement recognizes the need for "positive efforts to ensure that developing countries, and especially the least-developed among them, secure a share in the growth in international trade commensurate with the needs of their economic development."

The WTO's 3rd Ministerial Conference

The WTO is also a forum for conducting further multilateral negotiations. Already during the Uruguay Round, governments agreed that further negotiations on agriculture and services trade be held five years after the entry into force of the WTO. The WTO's 3rd Ministerial Conference in Seattle, 30 November to 3 December 1999, will launch these negotiations. Trade ministers and other senior officials from over 150 governments are expected to attend.

Many WTO member governments have already said they are interested in adding to the list of subjects up for negotiation. A majority of developing countries also want questions related to the implementation of existing WTO agreements —such as textiles and clothing trade, the use of subsidies and anti-dumping measures by industrialized countries, tariff escalation for processed agricultural goods, and questions linked to intellectual property protection—to be at the forefront in the next round of talks. Most of their concerns focus on enhanced market access on preferential terms for their exports. Developing countries also want to ensure that special and differential treatment for them is preserved and enhanced and that the trade rules reflect the economic and development conditions within their countries.

Industrialized countries like the United States, the European Union, and Japan are now debating on which subjects to include in the next talks. Among those proposed for negotiation so far are further tariff reductions on industrial products, talks on trade and environment issues, trade and investment, labor standards, competition policy, anti-dumping and subsidies issues, improved dispute settlement procedures, and enhanced transparency. Other issues include trade facilitation, transparency in government procurement, regional trading arrangements and the trade policy review process for WTO member governments.

The WTO and trade and environment issues

Proposals calling for the inclusion of trade and environment concerns in the next round have so far been received from the European Union and Norway. Both are interested in seeing a greater incorporation of environmental concerns into the international trade framework and added clarification of the relationship between multilateral environmental agreements and WTO rules.

Although there is no specific agreement dealing with the environment in the WTO, there are a number of existing WTO agreements which contain provisions dealing with environmental protection. In fact, the preamble of the WTO agreement states that member governments recognize that "their relations in the field of trade and economic endeavor should be conducted with a view to allowing for the optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with the their respective needs and concerns at different levels of economic development."

Article XX of the WTO allows governments to restrict imports of certain products under certain conditions, provided they do not exhibit "arbitrary or unjustifiable discrimination between countries" or represent "a disguised restriction on international trade." These exceptions to WTO rules can be applied in cases where governments deem it necessary to protect human, animal or plant life or health. Governments may also prohibit products from entering their countries if they are produced by prison labor or if they relate to the conservation of exhaustible natural resources. If used, such import prohibition measures must be applied in a consistent manner to all WTO members and to domestically produced goods.

Since its establishment in 1994, the Committee on Trade and Environment (CTE) has discussed a wide number of issues related to the trade and environment interface. The Committee has looked at two broad themes: the interface between trade and environmental policies, and the effect on the environment of opening markets. Related subjects include the relationship between the WTO and multilateral environmental agreements such as CITES, the Montreal Protocol or the Basle Convention, eco-labeling practices, market access restrictions, and green protectionism. Critics of the CTE argue the committee has not moved quickly enough in its work and has not been able to forward recommendations for decision by WTO member governments. It is important to remember that not all member governments agree on what the role of the WTO should be in dealing with the environment. This is all the more difficult when decisions in the WTO must be reached by consensus. Also, it should be understood—and especially by the WTO's most severe critics—that the development of environmental policies will never be the role of the CTE. The committee can only appeal to other specialized forums such as other inter-governmental organizations which have a mandated environmental role or to national governments which are capable of implementing sound environmental policies.

Dispute settlement between WTO members, especially when trade and environment issues are concerned, is another area where the WTO has often been targeted for being too narrow in its legal reasoning. The WTO deals with environmental issues only in cases where trade sanctions have been applied. The Dispute Settlement Body has dealt with only a limited number of cases of an environmental nature since 1995. Perhaps the best known of these cases is the Shrimp-Turtle case, which concerned the U.S. policy of banning the import of shrimp caught using nets not equipped with turtle excluder devices (TEDs).

The U.S. lost both its cases before the dispute settlement panel and the appellate body primarily because it did not apply its restrictions equally. Countries in the western hemisphere, mainly in the Caribbean, were given technical and financial assistance and were granted longer transition periods for implementing the TEDs than were the five Asian nations which brought the U.S. to the

APEC	Asian Pacific Economic Cooperative
CTE	Committee on Trade & Environment
GATT	General Agreement on Tariffs & Trade
NTM	Non-Tariff Measures
TED	Turtle Excluder Device
WTO	World Trade Organization

Dispute Settlement Body. The U.S. did, however, win one major point with the appellate body and that was the right to take measures to protect exhaustible natural resources. Such measures can be taken but they must be applied in a non-discriminatory fashion. Many environmentalists have failed to recognize the importance of this legal ruling. It effectively condones the right of governments to take action for environmental purposes within the confines of WTO Article XX.

The debate on the environment in the WTO is complicated by the fact that many developing countries believe industrialized countries use trade sanctions as a stick with which to prod them into adopting environmental policies which have been set by capitals in rich, industrialized countries. Many developing countries, frankly, see this as both protectionism and an intrusion into their domestic affairs. This view was reflected under Principle 12 of the Declaration from the 1992 Rio Earth Summit which stated: "Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided."

Much of the trade and environment discussions under GATT were instigated in 1991 by the Tuna/Dolphin dispute between Mexico and the U.S. The dispute dealt with a U.S. ban on the importation of tuna from Mexico, caught using purse seine nets, which caused the incidental kill of dolphins. The ban on the importation of tuna did not have to do with tuna as a product, but instead, with the way in which it was caught.

Since that dispute, developing countries have feared the extraterritorial imposition by developed countries of their environmental standards through the attachment of an "environmental conditionality" to their exports (with the condition being, in the Tuna/Dolphin dispute, the use of different fishing techniques by Mexico). Such conditionality, they argue, runs counter to the economic argument that different countries have different "optimum levels of pollution" or different trade-offs between environmental and developmental concerns. As optimum levels of pollution differ between countries, a country should not impose its environmental standards on another.

Developing countries argue that the prevention of product differentiation based on processes of production allows countries to set standards, whether environmental or otherwise, that are appropriate for their level of development, rather than having inappropriate ones imposed on them from the outside. In other words, it allows them to trade their developmental needs against their needs for environmental protection in a manner that is consistent with how they themselves value these needs and not on the basis of how others value them for them.

Developing countries resent having the higher environmental standards of their trading partners imposed on them as a condition for trade. This in effect punishes them for not having the resources to address environmental challenges. Moreover, they argue that many of the global environmental problems that the world currently faces have been created by developed countries and not themselves. It is those countries, therefore, that should shoulder the greatest burden for their resolution.

At the moment, there is no consensus among WTO members that trade sanctions should be used in cases involving the environment. This does not mean that the WTO has no role to play in preserving and protecting the environment. Among the main recommendations of the 1992 Rio Earth Summit were the notions that trade liberalization leads to more efficient allocation of resources, including environmental resources and that liberalization has the capacity to generate the income that developing countries require to protect their environment. As we prepare for the next round of negotiations, members have made a great many proposals on how these talks can be conducted and completed with an optimum outcome for sustainable development.

Many countries have argued that a reduction in production-linked subsidies in agriculture, energy, mining, and fishing would have a positive impact on the environment. U.S. Trade Representative Charlene Barshefsky has long been an advocate for the removal of all restrictions on trade in goods and services related to environmental protection. The Asian Pacific Economic Cooperation forum (APEC) has now taken up this position as well.

There is a growing recognition among WTO member governments—advanced economies and developing countries alike—that a reduction of some subsidies and greater tariff cuts in general, especially in regard to tariff escalation, would help reduce over-capacity in the production of agricultural products and other exhaustible resources. It is now generally understood that some subsidies not only distort trade patterns, but seriously undermine the sustainable utilization of fish stocks, of forests, and of other exhaustible resources, thereby hampering sustainable development objectives. Subsidies or higher tariffs in industrialized countries for processed agricultural products and for fish products also hamper development objectives in that they encourage developing countries to over-export their natural resources without adding product value by processing such resources before they are exported. The removal of these subsidies and other tariffs would benefit developing countries most and encourage sustainable development. It represents a clear "win-win" achievement in the area of trade, the environment, and sustainable development.

In March 1999, the WTO held a high level symposium on Trade and the Environment. By virtually all accounts, this meeting was a great success. It went some distance toward removing the barriers to communication that had often hindered dialogue between trade officials and the environmental community. At that meeting some important concrete suggestions were put forward that may well influence the course of action on environmental issues and the WTO. Far from ignoring environment and sustainable development issues, the WTO and its member governments have studied the trade and environment interface in great detail. The debate, however, does not stop here. The Ministerial Conference in Seattle will mark an important point in the trade and environment debate. A course of action may be initiated that will not only stimulate trade and alleviate poverty but help to achieve the overriding objective of improving sustainable development.

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A. Paige Fischer

As you read this article, members of the world's most powerful trade body are considering negotiating the planet's most destructive forest trade plan. The World Trade Organization (WTO) is in private talks with governments including the U.S. and Japan, to potentially devise a global agreement for free trade in forest products. This agreement has the potential to invalidate environmental safeguards and trade controls simply because corporations view them as barriers to trade. According to an industry group's own projections, the agreement will significantly increase consumption of forest products world-wide. This agreement will have a negative effect on the world's dwindling "Frontier Forests" and forest biological diversity unless it is halted. This article explains the threat WTO is creating to forest ecosystems and the undemocratic and irresponsible trade policies the organization is proposing.

What does the WTO have to do with forests?

The WTO is a global trade body which makes legally binding agreements and mediates disputes over trade barriers. At the meeting in Seattle, the WTO members may, at the request of the United States, New Zealand, and Canada, force forest product trade liberalization on all countries including a reluctant Japan.

The forest trade agreement was born in the 1994 Uruguay Round of the WTO negotiations. Due to resistance from Japan, the agreement made little headway. In 1997, the Asian Pacific Economic Cooperative (APEC) took responsibility for liberalizing forest product trade around the Pacific Rim, the region in which the world's largest consumers and producers of forest products are located. In November 1998, APEC failed to get Japan's agreement on its forest trade plan. Now APEC members hope to work with the WTO to finalize the forest product trade plan over the next few months so it will be ready for the WTO stamp of approval at the November Ministerial meeting.

Corporations vs. citizens

The WTO is an undemocratic and ecologically ignorant trade body. The WTO shapes its policies by seeking advice from trade agencies and industry groups, including major wood product corporations. The WTO refuses to accommodate the concerns of environmental groups and to conduct environmental impact assessments of its trade plans. With no formal channels for receiving input from environmental groups and ecologists, the WTO ignores the environmental consequences of its decisions.

The agreement: bulldozing environmental safeguards

The WTO forest product agreement, proposed by 16 countries including the U.S., will eliminate tariffs on wood products, making all types of forest products cheaper and easier to buy. According to industry projections, this alone will signifcantly increase wood consumption world wide. Some governments are also expected to introduce non-tariff measures (NTMs) into the negotiations. NTMs include environmental regulations and other controls on timber production and trade, many of which are meant to safeguard forests. Environmental safeguards that could be invalidated by WTO policies include:

- Import restrictions on forest products that carry invasive pests;
- Certification or eco-labelling schemes;
- "Unreasonably" high standards for forest management and production.

Threats to forests

Liberalization of the forest product trade will lower prices, increase consumption, and make the world's forest ecosystems more vulnerable to logging, mismanagement, and disease than they ever were. There are four ways the WTO forest products agreement will increase pressure on forest ecosystems:

Taxing forests instead of consumers

One of the most immediate barriers to trade that some WTO members want to

eliminate is the "tariff." A tariff is like a tax that a country imposes on an imported good, often to discourage its consumption over what is made at home. Japan, for example, imposes tariffs on paper, two-by-fours, and other processed forest product imports. Japan does not impose tariffs on raw logs or wood chips because it wants to process them inside its own borders and benefit from the value that Japanese industry adds to the product.

Most of the tariffs that remain on internationally traded forest products are on processed products, making it harder for the forest endowed countries to export value added products. It is true that some good would result from Japan lifting its tariffs on processed wood products. Indonesia, Brazil, and Canada would be able to employ their own people to add value before selling it to the world's biggest consumers of wood and paper, Japan, and the U.S.

But getting rid of the remaining taxes on internationally-traded wood products (instead of imposing new ones) could have negative effects that reach farther than the positive. Eliminating all tariffs on wood products will lower prices and expand markets, thus increasing consumption across the board. Forest dependent communities around the world need a full discussion of tariff elimination in order to come up with a position on the proposed WTO agreement.

Invasions by alien species

As the volume of forest product trade increases, so do the chances of alien species invasions. Exotic beetles, moths, fungi, and other pests often "hitchhike" on international shipments of wood products that have not been processed or treated with chemicals and fumigants. When imported into a country where forest ecosystems do not have natural immunities against these pests, large-scale infestations, disease, and destruction result.

The only way to stop exotic species from crossing the oceans is to impose border controls that either prohibit imports of all unprocessed wood products or require that they be treated with strong chemicals. But many free trade proponents—basing their arguments on the little known "Sanitary and Phytosanitary Agreement"—believe that regulatory agencies must choose the least trade restrictive of all possible laws. Also, they believe that the laws should be implemented only after clear proof exists of the danger of a potential invasion. For example, the U.S. recently restricted imports of untreated wood packing material from China and Hong Kong due to the high incidence of the destructive Asian Long Horned beetle. Hong Kong is now threatening to challenge this decision before the WTO, not only on the grounds that the rule violates the WTO rules, but also because the U.S. import restrictions deny Hong Kong corporations of profits that they consider rightly theirs.

Certification violates trade law

Third part in certification of sustainably harvested wood products is under siege by the WTO. Labels that certify forest products aim to influence consumers by letting them know about the sustainable way in which forest products are produced and processed. But the WTO only recognizes product labels which indicate how a product performs on the job. The WTO sees all other kinds of labels as barriers to trade. It is likely that some WTO members will accuse certification and eco-labelling of violating WTO trade laws.

If the WTO rules that certification is a trade barrier, governments will no longer be able to set procurement policies for buying wood. Citizens will not be able to pressure their governments to make environmentally responsible purchasing decisions. Furthermore, governments themselves will be under pressure by the WTO to bring private sector initiatives in line with WTO policies. It is likely that voluntary standards set by private bodies such as the Forest Stewardship Council will be under increasing scrutiny by the WTO and will likely lose out in any trade dispute that a corporation or industry association brings before the WTO.

Standards diluted everywhere

Many people say that the logical conclusion of the WTO's forest product agreement would be to harmonize standards for forest management, production, and processing. Through trade liberalization, the WTO wants to create a "level playing field" on which forest product corporations from all countries will be able to compete. Part of that level playing field will be a single standard acceptable to all WTO countries, from Canada to Congo to Chile. The WTO plan to harmonize standards could prohibit cutting edge environmental laws, dilute remaining rules, and require that all standards be set by international bodies made up of corporations and industry representatives

What forest activists are doing

Forest activists are demanding that trade policy-makers halt the forest trade plan. The environmental community is calling for the U.S. government to postpone negotiations for all new agreements until they have assessed the effects of the agreements that have already been created. Activists are asking that citizen groups be engaged in trade negotiations on equal standing with industry groups and that environmental impact statements be developed before discussing liberalization. In November, Pacific Environment and Resources Center and a coalition of environmental groups will be present in Seattle to oppose the forest agreement.

A. Paige Fischer is the Pacific Rim Timber Trade Campaigner for The Pacific Environment and Resources Center, located in Oakland, California. Their website is at www.pacenv.org. She coordinates a Pacific Rim wide campaign to educate and moblize forest activists to confront international trade and investement's impacts on forests and communities. The campaign pressures governments, including the U.S. government, to halt all negotiations on timber trade—especially at the WTO—until certain conditions are met.

Sheila Helgath invites comments and contributions for this column. She can be reached by email at shelgath@nwlink.com

Forest Service Enters New Territory with Mobile Inmate Camp

K.D. Leperi

In front of the mess tent, left to right, top, Sally Collins, Forest Supervisor; Oregon National Guard SFC Wendell Loop. Front, David Summers, Natural Resources Team Leader, Forest Service; and Jeff Forbes, Camp Commander, Oregon Department of Corrections

There's plenty of work to do in the Forest Service's National Forests. Activities like noxious weed removal, or precommercial thinning, cutting, and piling slash are labor intensive and costly. Without these activities, forests become overcrowded, weakened trees compete for limited nutrients while becoming prime targets for insects, infestations, and disease. Fuel loads increase to hazardous levels presenting lethal conditions for wildfire.

The paradox is that with declining federal budgets, Forest Supervisors find it increasingly difficult to get the work done. While appropriated dollars have stayed static over the last several years, the real purchasing power of the dollar is further eroded because of inflation. This happens simultaneously while labor costs increase. Sally Collins, Forest Supervisor for the Deschutes National Forest in Oregon said, "We just don't have the money to do everything we need to." She had to find nontraditional means to get the work done.

Collins believes she has found a solution with the Mobile Inmate Conservation Camp. So, in a first for the Forest Service and the Deschutes National Forest, an agreement was struck, for the summer of 1999, among nontraditional partners including the Oregon Department of Corrections and the Oregon National Guard to address two thorny public issues —environmental restoration and criminal justice. The voters of Oregon had assisted when they passed Measure 17, stating that inmates should help repay their debt and costs to society through work.

The idea for a mobile conservation camp to accomplish work on public lands emerged, based partially on similar minimum security programs used by the states of California, New Mexico, and Minnesota. The main difference is that inmates on these programs return to an institution at night. Since there is no correctional facility within 60 miles of the Deschutes National Forest, that was not an option.

Instead, a prototype mobile camp based on the fire camp model, was used for the camp design. Close to forested worksites, inmates slept in tents with meals served by a mobile kitchen under the 24-hour security of unarmed officials. All inmates were minimum security with good work records, and had no sex offenses or arson in their background. Due to security concerns, the site was located off the main public road in an undisclosed location to prevent access by unauthorized visitors. Supervision of forest work was provided by three Forest Service employees with surveillance and security provided by Oregon State Department of Corrections.

The prototype temporary prison camp was situated in Central Oregon's Cascade Mountains. For eight weeks, 85 minimum custody inmates worked 10 -hour days, six days a week sawing, stacking, bucking, and cleaning understory, while reducing fuel load, improving forest health and enhancing landscape aesthetics. While the initial goal was to clear an acre per day per man, inmates worked one and a half acres per day per man according to Captain Jeff Forbes, Camp Commander of the Oregon Department of Corrections. That equates to about 3,200 acres of forested land treated by hard-working inmates, including 470 acres of noxious weed control and 530 acres of plantation maintenance.

The Forest Service cost was $25,000 per week, which included on-site training, supervision, and equipment. Contrast this with an average cost of $134,000 per week for a self-contained fire camp, or an average contractor cost of $85,000 per week. Other camp costs such as the purchase of tents, cots and sleeping bags (purchased from Federal Surplus), mo-

bile shower units and toilets, and kitchen and messing costs were borne by the Department of Correction and the Oregon National Guard. Total cost for the eight weeks was $325,000. Many of these costs would have been incurred anyway, such as the housing and feeding of inmates.

David Summers, Natural Resources Team Leader of the Forest Service, sees success. "The camp," Summers assesses, "has proven itself economically and environmentally. The Forest Service cost for land treatment was about $80 an acre contrasted to an average of $100-$300 per acre if contracted out." Summers adds, "Intangible benefits for inmates and to society include self-esteem and individual responsibility that comes from a hard day of work."

At this stage, it would appear that Summers is right: the inmates did benefit by performing meaningful work. Some acquired new job skills. For example, 25 inmates trained in chain saw operations, went on to become certified sawyers. All field trainings stressed safety while providing workers with an understanding of the forest environment and ecology. Topics included fire ecology and wildland firefighting, matting and tube maintenance, building proper slash piles, human relationships to wildlife habitat, fireland safety, and recreation impacts on the economy of central Oregon. The offered optional field ranger courses ranged from archeology, geology, and wildlife biology, to noxious weed identification. They proved popular to both inmates and staff.

"Wilderness is better than four prison walls," said one inmate emphatically. Many cited the quality and quantity of food relative to what they got in prison as real incentives, while others simply enjoyed breathing fresh air. For some, it was their first experience in the outdoors. Several inmates witnessed a doe birthing a fawn. Others recounted the sighting of osprey, elk, and black bear. Two bald eagles and a golden eagle flew symbolically over camp the first day of forest training, prompting Native American inmates to obtain permission to build a sweat lodge to honor the land.

Sally Collins, Forest Supervisor, discusses fire safety for the sweat lodge with David Summers, Natural Resources Team Leader. The lodge and medicine wheel are located in a natural sink, which is partially filled with snowmelt.

If deemed successful, the Cascade Camp Model will be replicated in other locations throughout Oregon and possibly extended to include female inmates. Evaluation criteria used to determine the success of the mobile camp include: cost effectiveness, meaningful natural resources work, opportunities for inmates to repay costs to society, safety of community, and the provision of real job skills to inmates.

Another significant success was the perfect safety record—a remarkable achievement considering the hazards of this kind of work. "Not a single day was lost due to accidents; there was no lost time," according to Walt Schloer, District Ranger for Bend/Ft. Rock.

Because of a willingness to try non-traditional solutions, Sally Collins is breathing easier these days knowing that much needed forest work is done. She also believes the public will approve: "We need to build bridges. We need to find ways to intersect with community interests while managing public lands."

The inmates want success so that other inmates can benefit from the program. Several prisoners with longer terms are hoping to return next year. Albert "Chino" Washington of Portland, Oregon states, "Incarceration is not where it is at." When asked what worked about the camp experience for him, he said, "Giving back to society and not always taking, taking, taking. I'm not interested in taking any more."

K.D. (Karin) Leperi holds an M.S. in Public Administration and a B.A. in Political Science from California State University at Los Angeles. A Senior Executive Service Development Candidate for the U.S. Department of Agriculture, she is on assignment with the Forest Service in Deschutes National Forest in Oregon as a partial requirement for the program.

Leperi serves as Special Assistant to the Deputy Administrator for International Services in the Animal & Plant Health Inspection Service, providing strategic planning and policy analysis for world trade initiatives. Previously, she worked as a senior budget analyst for the Department of Energy's emerging energy resources, which included solar, conservation, geothermal, coal, uranium enrichment, and power marketing administration programs.

In her 20 years as a Naval Reserve Officer, her experience ranges from public affairs to flight engineer and country desk officer. Recent experience includes working within the NATO community.

INTERVIEW

DIXIE L. EHRENREICH

AN INTERVIEW BY DAINA DRAVNIEKS APPLE

WiNR: What does an editor do on a day to day basis? Most people have, I think, a vision of someone sitting for eight hours a day with a red pencil vigorously marking up the prose of hardworking authors.

Ehrenreich: I think it depends a lot on the publication. If it is a goodsized commerical operation, no doubt there are editors who do exactly that. In most small to medium operations, however, the editor does that and a lot more: talking to authors, interacting with the publication's other editors, doing backgrounding on a particular topic, arranging for peer review, visualizing the final publication and sizing articles to meet those needs, dealing with photo acquisition and selection, doing the voluminous correspondence that goes with the business, mailing out brochures/sample copies/information, watching and modifying deadlines, writing editorials/opinion pieces. In smaller publications, the editor's responsibilities go even further and merge into that of the publisher: formatting, acquiring and arranging for advertising, talking about costs and techniques with the printer, staying abreast of useful technology, and managing budgets, subscriptions, and personnel.

WiNR: Why is there almost a universal feeling that editors are too demanding and have too much power?

Ehrenreich: Well, some of them are and do have too much power. They send you a style sheet that's five pages long, tell you that you are 79th on the waiting list, and give you transmittal instructions for your article that reads like code to get into the war room at the Pentagon. Many also charge you a not-insignificant page fee to publish. When we started 20 years ago, women didn't go to conferences, publish papers, or know what peer reviewers did. We had to be very hands-on with advice, support, and outline very specific suggestions for rewrites. We decided to let authors use the style sheet that their major discipline used (within limits), rather than forcing them to redo the manuscript—as long as it was internally consistent. Now that women publish in journals and deliver papers at meetings routinely, it is much less work for an editor, but we still give a lot of advice.

WiNR: What mistakes do authors make the most often?

Ehrenreich: I wouldn't characterize them as mistakes, and I can only speak for myself, but I think authors should talk to an editor about the project after they've done the first draft—or even when it is just an idea. Because we cover many natural resources disciplines, there are times I look for an article with a particular approach and will move it to the head of the line if we haven't had enough of that particular topic over the past few issues. So by talking to me, that author knows to speed up and get it in. If we're doing a focus issue on range or air quality, for example, I'm looking for a wide spread, not three articles about the same thing; if an author talks to me early enough, her duplicated work can be reshaped or abandoned. Another problem with women is that they rarely have good (read: usable) photos of themselves. We don't print on coated paper, so our photos are so-so at best, but women need to get some stock photos together of head shots and action shots in color and black and white and keep that file updated. Also, women sometimes tend to write in grand generalizations: I think that the phrases I use most are, "we need more specificity, more examples, more hard data." I push for more budget/personnel/research graphics, or more quotes to make sense of the generalizations. And last, writing down to our very well educated readers doesn't happen very often, but needs to be watched.

WiNR: Are editors allowed to put their own stamp on a publication?

Ehrenreich: With journals like ours, yes, because we are completely independent. In others, which have a narrower focus and constituency, perhaps not. And it depends on the relationship between the editor and the owner or parent organization's policy (perhaps a professional society) as to how much leeway the editor has. Some medium to large professional societies, for example, have an editor or publications staff at their home offices, and rotate volunteer editors for their publications. These volunteers have jobs at universities, agencies, or not-for-profits. At WiNR, our section editors don't rotate, but they work at the same kinds of places, and they are free to put their distinctive stamp on the column or article they supply. Jessie Micales, a Project Director at the Forest Products Laboratory, who edits the Research in Progress column, chooses her own topics and contributors and hands me the finished product. Barb Beck, who owns her own consulting firm, researches her column on management and emails me the whole thing.

WiNR: At professional societies, there is a hierarchy, too, several levels removed from the editors: a council or board, elected to set policy and budgets for the membership, an executive who runs the daily operations, and then the staff who handle editorial/publications, advertising, marketing, and the database. At WiNR, what is the hierarchy?

Ehrenreich: Well, we are a lot flatter today in my office than we have been at other times, so there is practically no hierarchy. I'm the boss and chief salaried employee all rolled into one. The advent of desktop publishing, electronic conveyance systems, and database management software has significantly reduced personnel needs. Our editors manage their own sections—Jonne Hower even buys her own books—and transmit their stuff to me as I explained earlier. Tamara Blett checks spelling, grammar, and consistency of format, before the final copy goes to the printer. Our off-campus journal printer takes the most sophisticated photo and graphic transmissions from email, disk, or off a website. I have the advantage of a fully operational university mailroom, another campus printshop for the flyers, and the university phone system, all of which the journal pays to use, but I don't have to manage those systems—they are there.

WiNR: So there is an advantage in being situated at a university. But you've been very critical over the years of the way universities have treated women faculty.

Ehrenreich: Yes, there is an advantage and I still am critical. There are far too few women teaching and researching in natural resources and other sciences in most universities. There are far too few women administrators overall. It just astounds people outside universities that this is allowed to happen.

WiNR: Haven't there been lawsuits showing discrimination?

Ehrenreich: Lots and lots of very expensive lawsuits, but the fundamentals don't change. By that I mean the way a university does its hiring, evaluating, tenuring, and promoting—which are what need to change. That system seems to be in a 100 year time warp. Lawsuits don't dent that methodology, and usually—not always—injure women who try to do a frontal assault on it.

WiNR: You've been with the journal for 17 years. What still holds your interest?

Ehrenreich: Clearly it is because there is a lot still to say. Women who work in a traditionally male field are usually very capable, well educated, determined to succeed, well paid, and are doing really fascinating work. I want to give readers a sample of their research, their techniques for handling workplace situations, their management principles, or maybe their fieldwork insights. Sometimes authors want to talk about their families, their agencies or universities, the law, policy, or perhaps humorous situations. All in all, they are fun to work with.

You've been with the journal yourself for many years, interviewing women who are working their way to the top of their career ladders. What keeps you with WiNR?

WiNR: I have worked with you since the mid 1980's when I was still in the Regional Office in San Francisco. I remember seeing the magazine and thinking "what a great idea!" Shortly after that Gerry Larson became the first female forest supervisor, and I thought I would interview her to see if the Journal would be interested in publishing the article. You did and I have been a contributing editor ever since. My academic background fits in well, too. I was trained in the political economy of natural resources, ideally suited for working in a natural resource agency, and especially the Forest Service in the late 1970's when the agency was undergoing political upheavals and fundamental challenges to its mission. I found it easy to relate to the external political forces and their effects on the institutional structure of the agency, and I had the opportunity to design and implement important structural changes that were needed to help the Forest Service deal with the future. And WiNR was publishing articles about change, too. So there was a natural fit. Your Ph.D. is in diplomatic history, though, so how did you end up editing WiNR?

Ehrenreich: I do have a Bachelor's and Master's in English, however, from the University of Missouri. How did I end up editor? In the early 1980s, when Linda Donoghue, the first editor of Women in Forestry, (and now Director of the Forest Service's North Central Research Station) found she didn't have time for the newsletter anymore, Molly Stock, now professor jointly appointed in Forestry and Computer Science here at the University of Idaho, and I thought it would be a nice and easy way to get a few licks in for young women who were being kicked around as they tried to advance. TheUniversity of Idaho was unusual in the early 1980s, having three women faculty in natural resources and a large female student enrollment, so we thought we could speak from the high ground. We were co-editors for awhile, upgrading the newsletter to a journal, going to conferences, beating the bushes for contributors, and generally having a good time being spokespersons for

Giving a presentation at the University of Idaho.

women like ourselves and the generation of students at our university.

WiNR: Was it nice and easy? Did you have a good time?

Ehrenreich: No, it wasn't nice and easy, but yes, we had a good time. And we were successful at it, doing it very cheaply, begging and borrowing resources where we could since subscription income was low. My husband, who was Dean of the College of Forestry, Wildlife, and Range Sciences, wanted to see women succeed, so for several years, he let us use the services of their publication unit to format and paste up three or four times a year. (Our accounting still runs through that college.) I got secretarial help for inputting pages for maybe three years and extra office space from the Bowers Lab, where I am located in the College of Letters and Science. And some of our editors started contributing then, too, like Karen Lyman, who managed the books for years, and is still with us. Then Molly went on sabbatical and left the journal, and the whole dynamic changed.

WiNR: What do you mean, changed?

Ehrenreich: It changed in several ways. First, when Molly left, the workload fell on me and I found I wasn't prepared to give up a significant portion of my other work to keep it going. Lei Lane Burrus Bammel, then a Professor at West Virginia University, stepped in as manuscript editor for several years, giving much needed help. She had been writing and researching diversity in natural resources work for a long time so it was a good fit. Other editors, like you and Linda Hardesty, now Associate Professor from Washington State University, came on board and stayed with us. Elaine Zieroth, a District Ranger with the Forest Service, also joined us as an editor about then. By the time Lei was ready to give up her part, I cleared the deck to handle that as well. Second, our family started a log export business to Pacific Rim countries, so WiNR got some financial support and expertise from the company. New laws and strong sentiments against log exports put an end to that adventure (and the support), however, so I got a crash course in desktop publishing. Another change was that the journal was being taken very seriously by women and by men who wanted to see equity in natural resources personnel. The aspect changed from being somewhat of a novelty to becoming an engine for change.

WiNR: Who subscribed in the early years?

Ehrenreich: The original newsletter arose from a network of Forest Service women who met in 1979 (with the Forest Service's blessing) and started it. They recognized, however, that for it to succeed it had to stay independent. So Forest Service women were the predominant individual subscribers in the early years and the Federal Women's Program subscriptions (from all agencies) were our largest group of agency subscriptions for awhile. I would guess that agency women are still one of the larger subscriber groups, but that would be logical. The survey of readers that we did about six years ago indicated that federal agencies were the predominent employers of women natural resource professionals.

WiNR: Why is that?

Ehrenreich: Federal equal opportunity laws, some litigation, and the dawning of reality: gosh, women can do the work; gee whiz, they make excellent employees; golly, women make good colleagues; it's so cool, half the population is like them—and so on.

WiNR: What has changed over the years you've been editing WiNR?

Ehrenreich: I've already mentioned desktop publishing techniques and sophisticated software as welcome changes. We started accepting advertising for the journal, started an advertising flyer some years ago, and now we also have an internet site. I suppose the most dramatic change is in who writes articles for us. In the early 1980s we beat the bushes for (1) the very few available professional women who (2) felt secure enough to publish with us. It wasn't always the most politically astute thing to do. In the early years, the publication reflected the anger and frustration of competent women denied a fair chance to do the work they were trained for. A lot of them were trained in the era of large percentages of women in natural resources curriculum in the 70s and 80s, but left natural resources work in disgust and frustration as late as the mid 80s because they were mistreated or couldn't find upwardly mobile positions. Now, of course, our pages and covers are a who's who of successful women filling agencies, universities, and businesses. They have lots to say about their work and personal successes—so that's another big change.

WiNR: Of all the personal stories you've heard is there one that really got under your skin?

Ehrenreich: I've heard all kinds: stories with successful endings and some that really broke my heart—with most in between. One of the saddest concerned a young women who took a job with a large private timber concern in the late 70s.

She had worked summers for the Forest Service and another big, private firm before graduation so she was not inexperienced. And it had not been easy in the early 70s to take classes from and with mostly men, so she thought she had what it took. But she was in no way prepared for what happened. Later, she'd remark that the university needed to teach a class called "The Real World: How to Work with People Who Hate You." Her boss and her immediate supervisor told her the first day that they deeply resented being stuck with her and that women didn't belong in the field. It went downhill from there. She finally reported one of her own subordinates for sexual harrassment and insubordination. (She felt there was no use in reporting her bosses.) Personnel management at the highest level promised to deal with this employee about whom others had also complained. She later discovered that he had been promoted and given a plum job in another town. She was isolated in her rural community, because the timber company's employees routinely and publicly called her a slut, daddy's girl, and a drunk, to name a few—and the company was the principal employer. In the end, she lasted two years before escaping. She did find satisfying work in her field later, but still wonders if she should have sued.

WiNR: What about her contemporaries in the 70s? Did they fare better?

Ehrenreich: As you would expect, the women who dropped out don't subscribe so we don't know as much as we should. But this woman discovered that not one of the other six women in her class in the 70s were still in the field five years after graduation. She knows that three of them had experiences like her own and were pounded into bits day after day until they ran screaming.

WiNR: The survey that WiNR did in the mid-90s, 20 years later than the story you just recounted, also showed that a huge proportion of women in natural resources work had experienced gender/sexual harrassment at some time in their careers, didn't it?

Ehrenreich: Yes, and a good percentage of them reported it as very recent. So all is not yet as it should be, but we are definitely moving in the right direction with good speed.

WiNR: Where did you grow up? What was your early life like?

Ehrenreich: I grew up in Denver, one of five children. My parents went directly from the deprivation of 10 years of world depression to a civilian's deprivation of all out war, so I think it is fair to say that they took nothing for granted. I was a kid during World War II and I vaguely remember the war time food rationing, riding a streetcar everywhere because there was no gas, students collecting door to door for newspaper and tin for recycling, tending a "victory" garden, and everybody having decrepit cars because there was no civilian car production. Each kid was rationed to one pair of new shoes per year (not counting hand-me-downs), not much in the way of clothing (or fabric), one set of sheets per family per year, no new blankets that I can remember, very few new toys. I think back on the war-time tension and drabness of Denver, our very middle-class family living in what would be considered today a rather threadbare existence, but everyone then was in the same boat. I thought it was the way people lived.

WiNR: What gives you your perspective? What has influenced you personally?

Ehrenreich: My mother was of the generation of teachers (only female ones) who were forced to resign their jobs after marriage. She often brought up that and the indignities of not being able to own property, open a bank account, buy a car, or inherit in her own name because she was married. At the same time, during World War II, women were running the country in the absence of most men—so the disconnect of gender competence logic really galled her. These inequities must have impressed me, too. I remember giving a speech when I was on the debate team (Colorado State University); it had to do with the worst punishments that the armed services meted out to recruits—KP and latrine duty. These were the cooking/cleaning cornerstones of the housewife's life that American post-war political thinkers pushed on all women—educated, experienced, with children, or otherwise—as full time jobs in the late 40s, 50s and early 60s. Once again, the disconnect seemed apparent, flogging housewifery as the epitome for one gender and the worst punishment to the other. If our democratic system is going to spend money educating women, it was pretty stupid to punish them when they attempted to contribute in meaningful ways, but that was the norm. By the 60s and early 70s, the quantitative research methodologies of historians and other social scientists looking at voting records, education information, military service, employment records, property ownership, and other available statistics, laid bare evidence of vast racial and gender rights inequities. Men of conscience, power, and good will looked squarely at the evidence, paid attention to the social unrest fueled by the new information, and started bridging the disconnects I mentioned earlier with remedies of law and policy. Watching the transitions and participating in the research impressed me. I believe that things would not have changed for women or minorities without the iron fist of federal laws saying "it will change."

WiNR: Do you think the federal iron fist is still needed?

Ehrenreich: Yes. Things are vastly different now and most women would not and should not credit federal laws for their successes. But those of us who have studied it know that equality for women in the workplace has a history which is about an inch thick and might be as long lasting as the next election, the next university dean, the next company president, or the next depression.

WiNR: Sitting where you sit, as an editor, you have a different perspective on what is happening with women in natural resources agencies than those of us who have a one-agency viewpoint. Is there a succinct way to characterize what is going on?

Ehrenreich: I think what is happening with women is part and parcel of what is happening generally with many federal and state natural resource agen-

cies. Going on is a massive sorting out and realigning of old expectations, old missions, out-dated top dog disciplines within agencies, old hierarchical structures, crumbling budgets, and over-the-top litigation expenses. In the last decade, reining in the bully boys of timber in one agency, deer or salmon kings in another, beef barons in yet another, also made good sense. Part of the reordering we've been seeing is a result of a lack of balance, a withholding of participation, funds, or power by whole disciplines from other disciplines within agencies. (And, I might add parenthetically, withholding from women and ethnic groups.) In addition to being not-so-good for the resource, it has led to a martialing of forces bent on overthrowing the old order, both from within and from outside each agency. Behave like a bully and a discipline or sector brings down on its head a combining against them of those who ordinarily would not collaborate. In hindsight, we can see that this was not necessary; warning signs proliferated. Good managers welcome, accommodate, and plan ahead for balance and they listen to and value the not-so-loud voices. As the environmental movement has gained strength both inside and outside of agencies, agencies have swung between climbing aboard that train or blowing up the tracks. Environmentalists eventually will run the same risk of becoming an old order bully, too.

WiNR: Any organization that locks itself into a set path or philosophy and does not constantly scan the environment to assess what changes might be taking place requiring organizational realignment, risks becoming rigid and outdated. The rate of external change is greater now—and that requires an ability to respond quickly. In my agency, the Forest Service, we are trying to open new avenues of input, especially from the public, and break down organizational structures that no longer serve us well, in order to be better managers of public lands.

Ehrenreich: I also like the small shift to interagency task forces to deal with things like fire, air quality, noxious weeds, and grizzly bears, to name just a few—it makes good sense. These mergings take into account different perspectives, efficient use of funds and personnel, and different publics.

On Hainan Island, China, in 1983, with Tropical Forest Research Institute scientists.

WiNR: What would you recommend for mid-career women, sort of stuck in one spot, but who want to move.

Ehrenreich: Ellie Towns, the Forest Service's Regional Forester in Albuquerque said it very well when you interviewed her. She said nobody in mid-career will move upward if they have not gone back to school, or gotten some big, new, and serious education components recently. We agree on that—start cracking the books again. Next, I would include what 19th century fathers told their young sons—travel is very broadening. Work abroad if you possibly can. I did it often, usually in conjunction with a project my husband was on, but it is a wonderfully bracing experience much in demand by employers. We've always carried a lot of international articles in the journal and now Sheila Helgath, a new editor, has a regular column on women who work abroad.

WiNR: There are some gender issues which aren't necessarily germane to the journal, but you've been sensitized, so I'll ask: is there a best time for a professional woman to have children?

Ehrenreich: I have come full circle on that one, but I'll give you my opinion. I had my two children at a very young age (my two kids and I were in college together just as I was finishing my Ph.D.). I believed for most of my adult life that having them after becoming established in one's profession would be the better way. Now I see fertility as a larger issue because it takes women longer and longer to become established as professionals—often pushing them into their mid to late 30s before they feel secure enough to work pregnant and then take some time off. Many forego children because there is never a good time. So now I think having kids while the parents are still in college or soon thereafter is a good idea. In our case, at mid-life, they became our best friends and—*now* we're getting to the germane part—both helped me out a lot with the journal.

WiNR: I'm glad you agreed to do this interview. I've been trying to get you to do it for years.

Ehrenreich: Well, it's kind of unusual to feature the editor in an interview, but hey, we're an unusual journal.

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Understanding transition, and planning for it, can help organizations—and individuals within them—to succeed in changing.

A Management Column
by
Barb Springer Beck

Manage Your Transitions

How many times have you been through reorganization, realignment, or right-sizing in your career? Chances are, that if you've been in the work world for long, you've been directly affected by at least one major change. In an increasingly interdependent, rapidly changing, highly competitive, world, change has become necessary. Organizations that are to survive must be able to change.

Although it's uncomfortable to admit it, and costly too, the success of change efforts is seldom monitored. The truth is, sometimes organizational changes don't succeed. There are three primary reasons for this.

•The first is that the foundation for the change isn't solid. In other words, the reasons for making the change may not be valid or clear, or perhaps the change proposed is not the action which will address the identified problem.

•The second reason change may fail is inadequate communication, communication of *why* the change is needed and/or communication during implementation of the change.

•Thirdly, change may not succeed because not enough attention is paid to the transition associated with the change. While volumes have been written about strategic planning and organizational communication, the transition process goes unrecognized in many organizational changes. Understanding transition, and planning for it, can help both organizations and individuals within them to succeed in changing.

Consultant William Bridges has studied transition management since the mid-1970's, and assisted numerous corporations and the federal government in dealing with change. As a result, Bridges' work on the subject of transition has gained wide recognition. It is Bridges' work that forms the basis for the insights into transition which follow.

Although the words *change* and *transition* are often used interchangeably, they are not the same thing. Let's look at some examples to illustrate the difference. You can think of change as an event, or something that happens on chronological time. Examples of change include: retirement, getting a new supervisor, closing on a house, death of a parent, adopting a baby, or relocating your office. These events occur at a specific time, whether or not we are ready. Some changes, such as getting a promotion, are viewed as positive, while other changes, such as the loss of a loved one are negative. These feelings toward certain changes are shaped, by among other things, our past experiences, the total amount of change we are experiencing, and whether we have any control over the change. Regardless of whether you view a specific change as positive or negative, any change that affects you will mean making adjustments.

Transition, by contrast, is the psychological process each of us goes through to deal with change, to cope with change. Transition does not depend on a clock or calender, but happens at each individual's pace. This means that not everyone in an office will accept a change or move forward at the same rate. In fact, you can assume they won't process change at the same pace. Are those people who don't immediately "get on board" with a change bad or disloyal employees? Of course not, they're simply trying to find meaning in giving up the old and accepting the new. Questioning the need for change is actually a valuable self preservation mechanism. Reluctance to give up systems of order and meaning is only natural. Even though we often underestimate people's ability to resist change, resisting change alone doesn't make for bad employees.

Bridges has found through his work, that each of us goes through three stages in adjusting to any change. These stages are an ending, the neutral zone, and a new beginning. Although it may seem counter-intuitive, the ending is the first step in dealing with a change. Before anything new can begin, the old way must end. Before you can report to a new supervisor, the old supervisor must leave or become something else. Before you can organize your work by watersheds, you must give up your organization along functional lines. Before you can drive your new car off the lot, you must leave your old car behind.

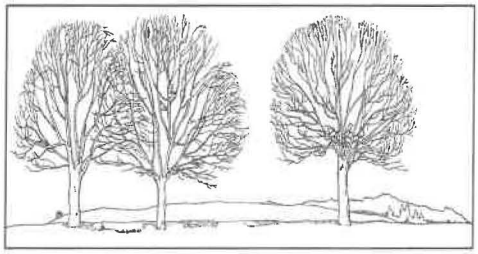
Communications during an ending need to help clarify for people what is happening and what is truly over. The importance of endings is seldom recognized in organizations. When something ends for you, you usually have feelings of loss, many of these feelings parallel the grieving process. Think back to a change that was particularly difficult for you and try to identify the losses you experienced.

The neutral zone is a period of varying length, which follows the ending. Once the old ways are given up, the process of finding the way of the future begins. This can be a messy, chaotic time when people feel disori-

ented and lost. Things don't make sense. Interestingly, the analogy used by Bridges is that of being in the wilderness, in a vast land with no directional markings. All people experience stress during times of uncertainty, but those who place a high value on order and organization will find this time especially difficult. If your National Forest has recently consolidated with another, it will for a time, be unclear how information is to be routed and who needs to sign which correspondence. When you hear comments like "I can't understand it" and "It just doesn't make sense" you can bet people are in the neutral zone.

Fortunately there's also good news about the neutral zone. This can be a period of great creativity, a time to reevaluate what you've been doing both personally and organizationally, and discard the old beliefs and ways that are no longer appropriate. Are all of those reports that your unit in the Regional Office requests from the field still necessary, or can the information be pulled from a shared data base instead? Rather than simply transferring the old floor plan to a new location when your BLM state office is relocated, ask the question, can the design of the space provide better service to the public? When the sideboards are down, new ideas can bubble up. So, while stress may be high, so too can creativity. Perhaps the most helpful thing to realize as you an others around you experience the neutral zone, is that this period of time is a natural part of dealing with change. Just knowing and expecting to go through this unsettling time, can help ease some of the feelings of disorientation. The tendency, however, is to want to rush through the neutral zone. If you do, however, you may miss some of the creative benefits of the chaos. Although it's easier said than done, you'll do yourself a favor by accepting a lower degree of certainty for the time being, and use this period for some introspection.

The new beginning is the third and final stage of the transition process. People have given up the past psychologically and are starting to accept the changes. Grieving over what has been lost has occurred. Individuals are starting to understand how and where they fit in the new order and what work needs to be done. Some sense of regaining control over work has returned and small wins are experienced from working in new ways. In one western county undergoing a great deal of growth, the lone planner was unable to keep up with the demands for subdivision reviews. A second planning position was added. Once a new system for distributing the reviews was in place and working, the original planner was finally able to feel relief from the heavy workload.



Non-stop change can cause what Bridges refers to as a "transition deficit," a situation where people haven't had the chance to process one change when another, then yet another, comes along. When there are additive factors in natural resource management we call it cumulative effects. The same thing can happen to us with non-stop change. Let's look at just one example.

Prior to 1994, Department of Interior researchers who worked in natural resources were employed directly by the National Park Service, the U.S. Fish and Wildlife Service, and other bureaus. Then in 1995, with the stroke of a pen, a new agency called the National Biological Survey (NBS) was created. Researchers who had long been with those other agencies suddenly found themselves part of a new agency. This agency had no history and had a future dependent upon the political winds. For those individuals, the sense of loss must have been tremendous. There was loss of association with former peers and coworkers, loss of status, loss of security, loss of supervisors, loss of a future with their original agency, and loss of stability and certainty. The question of "Where do I fit?" loomed large.

Soon after the NBS was created—and while the new workforce was organizing and reorienting itself—the name of the agency was changed from the National Biological Survey to the National Biological Service. Although this name change may have seemed insignificant, it represented a philosophical shift from a non-political orientation to one very much in the political arena. And, if these changes weren't enough, the future of the agency remained in question. Powerful leaders in Congress threatened to withhold necessary operating funds and advocated for the agency's demise. As a final and additional change of significant magnitude, the decision was made to place the NBS into the U.S. Geological Service as a new division. It was once again renamed, and de-politicized. The new name is the Biological Resources Division. Thankfully for those affected employees, the agency has remained relatively stable for the past four years.

Stop and think for a minute about the changes you are currently dealing with and all of the changes you've dealt with over the past 18 months. You may now be your own example of non-stop change! So, if we accept that change is a given, how are we to cope? Well, although we may tend to resist change, and for good reason, we do need to be able to cope with it. Understanding the psychological transition process that each of us goes through, can help us as individuals and can also help us to successfully implement organizational change. We need to recognize endings and the losses associated with them; we should accept the fact that we will be uncomfortable in the neutral zone but try to use it creatively; and finally, we ought to promise ourselves to celebrate the new beginnings when we arrive. Good things can be born of change.

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Exploring Campus Climate for Women: Part II

Dianne L. Phillips-Miller, Karen Guilfoyle, Dixie Ehrenreich, Francesca Sammarruca, Barbara Howard Meldrum

Part I of Exploring Campus Climate for Women, described how 12 women faculty of all academic ranks at a small land-grant university have experienced campus climate in 11 different departments/units with very few women members. Part I gave an overview of the micro-inequities they experienced or did not experience; the design of the study and generation was laid out; the community model and analysis of the data were explained. Two forms of analysis were used in this study as is typical of qualitative and action research: ongoing and summative analysis. In the Findings section, Part I started with a description of A Continuum of Community which included a description of the sense of membership or exclusion from the group (in this case faculty), and influence (or a sense that these women mattered or did not matter) to the other departmental community members . Part II begins again with research from other studies and excerpts from the faculty women's interviews which illuminate their situation.

Findings: A Continuum of Community

The behavior of colleagues (almost all male) and administrators (all male) toward these women was possibly the single most important factor influencing how they experienced campus climate. The women did not describe isolated incidents but rather patterns of interpersonal behavior that they interpreted to mean that their opinions and ways of perceiving the world were, or were not, valued. In the worst circumstances, the faculty women felt a climate of hostility and fear created by administrators whom they perceived to be abusing their power—and by senior male faculty members they labeled "rogues" and "bullies." These powerful people appeared to the participants to silence even men of good will in faculty meetings and other contexts, so that the women felt left without overt support and validation in their own departments. In the most positive environments, administrators and colleagues were described as gender-sensitive and teachable.

All but one of the tenured women indicated a fear of speaking up about inequities prior to obtaining tenure. It was after tenure that they "found their voices." This should be of concern, because most women on campuses are in the lower academic ranks, and universities are not retaining them.

I was extremely concerned that I would ever get tenure if I spoke out about anything. I might still be in bad shape just because I have spoken out within the department on [equity of] *resources and those types of things, but I would have been in worse shape had I gone to them* [supervisors of the department head]. *I'm still somewhat concerned. I believe that when I get there* [tenure review], *I'm going to have to be at least 150-200 percent above anyone else in our department.* (P4)

Some of the women found themselves in a double bind—if they were not assertive, they sometimes had difficulty obtaining what they needed to succeed and if they were assertive, they were negatively labeled and ostracized as expressed by one participant:

My colleague is a very powerful woman [research excellence, publications, teaching]. *During her fourth year in a tenure-track position, she was called a prima donna in an anonymous review sent to the department chair.* [Also,] *one of the senior faculty had a praying mantis in his lab that he named* [the name of the colleague]. *The graduate students were told this, and my colleague found out about it through them. I don't know if you know about praying mantises, but they kill their male mates.* (P10)

Seven of the 12 women interviewed had utilized the services of the affirmative action office with regard to sexual harassment and/or discrimination issues in their departments/colleges when their own efforts to influence an unsatisfactory environment had failed. Four also had contact with the faculty ombudsman. The consensus of the women concerning these services was that they received a warm welcome and found the individuals in these positions to be easy to talk to and effective in handling mediation between colleagues. However, the faculty women ultimately concluded that neither office had any authority to create change or bring consequences to bear. This left them feeling that they were on their own and at the mercy of administrators and colleagues.

I have talked to the affirmative action officer in regard to differences in resources and those types of things . . . . We visited about some different things that we could do and that's when she really kind of left it in my lap to make a decision. Certainly we could press ahead and do some kind of formal complaint or I could try to resolve it myself within the department . . . . She left it up to me. She would have talked to them personally had I requested it, and I did not. (P4)

We have an affirmative action office that is a nice facade. Anytime there is a problem, all that the [affirmative action officer] *says is "Well, there is no reason to believe, there is no evidence to believe,* [discrimination or harassment exists] *at this time. We don't really know." It is typical of this campus that certain things are just a nice facade and affirmative action is one of them.* (P9)

The support for affirmative action has to come from the very top. The people with the power have to actually invest that whole process with some kind of meaning. (P8)

One of the strongest and most consistent recommendations made by the women in this study was for the university to create an independent office on campus with the responsibility to monitor campus climate for all faculty—particularly for women and minorities—with the authority to enforce changes when necessary. In environments in which the efforts of some of the participants to achieve equity and fair treatment were futile, external support and validation became critical. If it was not provided by the institution as part of a commitment to faculty, those women who chose to stay and fight felt that they had no option but to turn to attorneys or to the teachers' union for assistance. The legal route, however, is costly for a university and for the individual. This immediately branded them as trouble-makers and as one woman commented,

The minute I go forward with a lawsuit, I've torched my career as a university teacher. (P8)

It was also apparent that the women had to consider carefully how to use their time and energy when selecting issues to tackle in the context of work. As one faculty member indicated,

I didn't want to teach the whole world how to treat women in my profession. (P5)

Attempting to influence members of a community who are not willing to allow that influence is an exceptionally difficult task and takes away from the work required to succeed in the academy, as is indicated in the following example.

I think I do have the freedom and opportunity to make a difference, at least in the interactions that I have with students. I think that's really important. If I weren't there, that's all they would get [a male perspective], *in a sense. I suppose I've resigned myself to realizing that we will have to wait for some of these people to retire, that changes are not going to be made . . . . Maybe I've got blinders on to some of that [*discrimination*] because that's the only way I can stand it. It's not going to do me any good to confront them* [faculty and administrators] *because the rest of the system is not there to confront them.* (P11)

The university community needs to consider seriously what kind of philosophy will underlie the hiring and mentoring of new faculty if it wishes to attract and retain women. It must also consider the real costs, as well as the psychological costs, of a philosophy that encourages some of the practices described above because these practices lead to problems with the retention and promotion of women.

•Reinforcement and Access to Resources

Several important issues related to reinforcement emerged in this study, such as access to resources necessary to succeed within the academy. Without sufficient resources, faculty felt greatly hindered in proving their competence to the group and in contributing to community success. This had the potential to lower their perceived status within the group and, ultimately, could prevent them from achieving tenure and continuing as members of the community. Inequitable teaching, advising, and service requirements also affected perceived competence and status within the academic community. These requirements sometimes hindered individuals from participating in research, the most valued competence of the academy with regard to rewards, unless they were willing to work unreasonably long hours. Spousal accommodation also emerged as an important resource issue.

Availability of resources: Some of the women in the study perceived gender discrepancies in availability of resources, particularly for new, untenured faculty women.

I have a laboratory but no laboratory support. All of the tenured faculty members and even untenured men hired before me received a full-time support scientist to do their laboratory work. I did not. . . . (P4)

I was told that my start-up money would be a certain amount, that this particular space would be my lab, that my starting salary would be whatever it was, and that there would be no negotiating . . . Then I found out that men went into that meeting and negotiated three or four thousand more for their salaries. I mean, how did they do that? (P2)

When I was a newly hired tenure-track assistant professor, I was not given the same teaching break that had been given to other newly hired people. I did not feel that I was treated like everyone else in terms of teaching load. I did not feel appreciated at all. (P9)

I know that they [beginning male professors] *got research space and I didn't. I was here, I think, for four years before I got any research space.* (P8)

I spent probably the first six months just getting the laboratory ready to do the type of research that I do. You would think that the benchmark things that you need, a centrifuge, a scale, those types of things, would be there. (P4)

According to these interviewees, lack of, or limited, resources was not taken into account at the time tenure decisions were made. Other participants reported different experiences with regard to resources needed to accomplish their work.

We have had the resources we needed. We've had travel dollars. We've had operating dollars that have been quite adequate all the way around. (P11)

When I came in, I did have a start-up package for the basic things I needed and one of the things that they did that was helpful, was to be very flexible with those funds. (P5)

Access to sufficient resources contributed to a sense of being valued for these participants and increased their confidence that they could be successful at the institution.

Teaching, advising and service loads: In addition to lack of resources, inequities in teaching, advising, and other duties further hindered the ability of many of the participants to engage in research, which they believed to be the most critical aspect of achieving tenure.

I'm teaching three classes a year. In addition, I have extensive duties as a program director [for a popular interdisciplinary major] *along with research and service responsibilities. It has really been an overload situation because my teaching load was not reduced with the addition of the extra* [program management] *duties.* (P11)

For many, many years, another woman faculty member and I would always take turns being the faculty advisor [to the student club] . . . . *I think what happens to a lot of women faculty members, especially in the sciences, is they all get the, you know, "Oh, it's a woman thing." You are going to be appointed to that and we all get buried.* (P11)

All of the participants emphasized the importance to them of excellence in teaching and advising. They also emphasized that they did not believe that these activities were truly valued by the institution and that they received little reward, recognition, or support for their efforts to help students succeed. The most common reward for their efforts was more work because students sought them out for assistance.

I got involved in teaching a course outside my subject area for the department, which took a huge amount of time after the third-year review. I probably shouldn't have volunteered to do it but no one else was qualified to teach it and the class is required for our major . . . . This cut into my research time. No one really told me what was going on, what I was expected to do in order to get tenure. We had a vague guideline—one publication a year. (P8)

We still do the science the way [men do]. *The hypothesis is still there. No one reading my papers would ever know, I think, if they took my name off who did it, but I don't think they also know the time I spend with students just on personal issues, really wanting to be involved in their lives, and making sure that I find research that fits their lives. No one did that for me.* (P7)

Sometimes they failed to ask for resources because they realized that their gain might be someone else's loss. One woman expressed this very well.

I guess it's not unfair because I should ask like everyone else, but it also would be nice if everybody didn't ask so that there was this pile of money at the end of the year and we could sit down and say, "All right, we've got this amount, what should we do with it?" If there were nine women in my department, that's what we would do. We would all be careful and parcel the money to the end and [then decide] *what we were going to do. As far as I can tell in my department there is no kind of monitoring of that. If I were running the department, I think I would try to look at who's buying and asking for what.* (P5)

Awareness of the whole as a complex network of interdependent parts is akin to what Eisler (1987) calls "the partnership way." Communities that adopt a partnership model see power in affiliation and linking of people and resources to solve problems rather than in domination over others. In this model, leadership is seen as service; individuals support each other rather than compete for resources in order to win the prize of tenure or fame. According to McIntosh (1985, 1989), women are more at home in such communities and may feel fraudulent in dominator systems which tend to be based on the belief that those in charge are more knowledgeable, talented, intelligent, and deserving of power and money than those they lead. The partnership model was apparent among this group of participants.

Spousal accommodation: One final issue relevant to reinforcement had to do with spousal accommodation. For these women, most of whom were (or were initially) involved in dual-career partnerships, university support for partners looking for satisfactory employment emerged as a critical retention factor that had serious implications for work and family life in a rural area.

It took my husband eons to get a job here. We were this far from moving because it was five years before he got a permanent job. He needs to be in that job a couple more years before he can move on for his career, so what am I going to do—yank him to another uncertain tenure situation some place else where he has to start all over again? (P8)

It is also important to note with regard to spousal accommodation that seven of the 12 women interviewed accompanied spouses to this rural area and would have found university efforts at spousal accommodation useful. Academics are much more likely to be in dual-career relationships now than in the past; thus the university may find it increasingly difficult to attract and retain young couples in rural areas or small cities without providing some kind of employment assistance. The problem of spousal accommodation disproportionately negatively affects faculty women who are more likely than male faculty to be in dual-career relationships.

•Shared Emotional Connection

Shared emotional connection is generally what is meant by a sense of community. The spirit of the work environment then incorporates that sense of being a valued part of something greater than the self. It can not occur among members of a community unless true membership has been extended to individuals, members have evidence that they matter to the community, and member needs relevant to the community have been adequately met. When sufficient trust has been established among members, they will risk genuine emotional connection. These are the conditions that foster loyalty and a willingness to sacrifice for the group.

Largely because of the different ways in which men and women are socialized in this culture, it can be difficult for them to find a common history, a factor that contributes to shared emotional connection. The following quotes describe ways in which the experiences of some male faculty and administrators were at odds with the experiences and needs of female faculty and graduate students with regard to pregnancy, supportive professional networks, expression of emotion, and academic culture, for example.

I think the rest of the faculty had no respect for me and no interest in communicating with me. I can't help but feel that they couldn't take me seriously as a scientist, seeing me pregnant.... There were tangible examples. I have a technique in my lab that I innovated and I have a technician who is carrying out that technique. One of the senior faculty members gave my technician, who has a bachelor of science degree, a grant proposal to review on this technique and never came to me, the P.I. [principal investigator] *of my own lab. This was the ultimate insult to me.* (P10)

No [I have not been able to develop a support network with other women on campus]. *I was involved with* [the women's faculty organization] *a little bit at first, and I'll tell you frankly that the group in my department was not very happy about it. They didn't think that I should be participating, and made a few comments. I guess it was politically incorrect.* (P4)

One faculty member had to turn down a very prestigious international invitation to present a research paper because her baby was almost due. She reflected on this in the following comment:

A man would never turn it down because he wouldn't be facing a due date. (P10)

Lack of shared history need not impede shared emotional connection if members of the community make an attempt to understand and relate to the experiences of others who are different from themselves (McMillan & Chavis, 1986). This requires the process of mutual respectful influence discussed earlier. When a community member is valued, others make an attempt to learn from him/her rather than discount different needs and experiences as inferior.

Quality of interaction: Perhaps more than any other factor, quality of interaction among members of a community is indicative of campus climate. Interactions illustrate the emotional connections that exist and whether individuals are treated with respect or disrespect. It is in this area that the participants most clearly described a continuum of community.

I tried to think that it wasn't a personal attack on being female. I [thought], *"That can't be it. People aren't like that," but my husband's here—he's in the same* [college]—*and he said to me one day, "You know, I would never have believed this stuff happened and I wouldn't have believed any of the sexual harassment or women not being treated fairly, but now, since I'm married to you, I think it's blatant." He sees that somehow I'm being treated totally differently than male colleagues in the same department.... I've had some difficulty with the department head before and that may be how some of this was precipitated. We haven't necessarily gotten along extremely well. I would consider him to be a chauvinistic-type of person who thought of me more as a little girl. I'm sure my* [young] *age doesn't help.* (P4)

Generally, I feel intimidation between faculty and administration here that I've never noticed any place else. I'm very surprised because I always figured that the administration was on our side and they should be helping, promoting us, and instead, I see them as a group of people holding us down. (P2)

Contrast these negative experiences with more positive ones:

My own view [of what contributes to a good climate] *is that it was the Dean's leadership. He was very good at taking care of us, was a very mentoring and nurturing Dean. I think he established a climate of that.* (P3)

My experience has really been central to this idea that there's a group of people I work with who care what I think and when I have an idea, they act on it, or at least let me do it.... My experience here has been wonderful. (P5)

I chose my department one hundred percent for the people in the department. I felt that they would be a good peer group for me and I have never regretted that for a minute. The people in my department have been very supportive of me. (P11)

It has been found that, unlike women, men are not adversely affected by a "null" environment (Arnold, 1995). Overt discrimination and harassment are not apparent in a null environment, but there is a lack of mentoring and support that can have a negative effect on women, in that they are less likely to pursue advanced degrees and do not obtain jobs with as much prestige and salary as men. Arnold (1995) says of women and minorities who graduated at the top of their high school class, "For these students, no linear relationship existed between ability, motivation, and professional outcomes. Complex interactions of gender, culture, race, and class refute the existence of a straightforward meritocracy" (p. 142). If null environments can significantly hinder the professional participation and success of women,

what is the likely impact of negative climates such as those described by some of the study participants? That the climate can be supportive in departments with few women faculty members is demonstrated, however, by the positive experiences described by some of the interviewees.

Sense of community and female students: In general, whatever the female faculty were experiencing was also what female students were reporting to them. All but three of the participants expressed their concerns about recruitment and retention of female graduate students. At best, even the more positive environments were described as more benign than actively supportive of students, similar to the "null" environment described in Arnold's (1995) research.

There are probably a number of factors [affecting the retention of women as graduate students] *. . . I think there are clearly some who have not had a great experience here and they just can't get away fast enough. We do have male faculty members in our college who say incredible things to women students and I hear about them. We have a faculty member who tells women students on a regular basis that they should not be in this discipline . . . . Some faculty are very welcoming but there are clearly some people who contribute to a negative climate for female students.* (P11)

I was in a meeting with [a female doctoral student] *with three senior* [male] *faculty. She was browbeaten by them. I felt that the way these graduate students were handled in the department was not acceptable.* (P10)

She [a female graduate student] *had been given an outrageous written exam and* [my female colleague] *felt it was outrageous.* [My colleague] *went to the Chair and said, "If I had to take this written exam, I would not pass." The Chair said, "Well, this is part of the process."* [This student] *and another female graduate student who had just taken her written exams both felt that they had been* [given more difficult exams]. *They had 20 questions and their male counterparts had nine questions . . . . I have no doubt that there was gender bias in the exams.* (P10)

Virtually all of the women spoke about their importance on campus to the retention of female students in traditionally male-dominated departments. The participants saw a need to counteract the negative messages and interactions of some of their male colleagues. Equally important to them was the opportunity for their students to explore different teaching methods and ways of conducting research. It is also vital that a university expose males to female intellectual authority at this stage in their training to promote long-term change in work environments.

What I see most is that the things the women in my college are committed to and involved in are different [from the male faculty]. *For example, I find myself much more involved with the lives of my students. I spend time with students on personal issues and really wanting to be involved in their lives and making sure their research fits their lives. No one did that for me.* (P5)

Mentoring: Mentoring by colleagues is a special kind of bond that is particularly important to women and is seen as the ultimate expression of valuing between supervisors and supervisees, or between senior and junior colleagues. It was often the topic of conversation in the researchers' dialogues with the participants.

The chair of my tenure committee has served as my unofficial mentor. He saw the struggles [to obtain resources] *I was going through. He knew that as a young researcher he would have never survived had he not had any support at all.* (P4)

I came in and was really mentored and nurtured by my colleagues. I have since sat as a neutral observer on a tenure appeal and I was on the ad hoc tenure-promotion committee. I can simply say that tenure and promotion does not happen in other colleges the way it happened in my college. I felt I knew exactly what I needed to do. I had colleagues who looked out for me. I had a Dean who would have felt that it was a failure on the college's part if I hadn't gotten tenure. It wasn't just my responsibility. (P3)

The other examples of advice that he [the department head] *gives, represent a mentoring situation that is not appropriate for a woman, or for the situation. You need a mentor who understands an individual's position.* (P10)

I don't think they [new male faculty] *are mentored either. I used to think it was more of a female thing.* [Now] *I just think it's self-serving, lack of caring, cover my own ass first, and* [doing] *what it takes to get ahead.* (P7)

For the most part, the women reported very high teaching evaluations and impressive grant-getting records that ranged up to one individual's $3,500,000 in a 17-year period—despite heavy teaching and advising loads. They thrived in climates that provided opportunities to work with others to address the very real global problems the world faces. That these strengths are not fully appreciated and rewarded by the current tenure process may be evident in the fact that women continue to be tenured at lower rates than men (47% compared to 69% nationally) (Leibenluft, Haviland, Dial, & Robinowitz, 1993; Penfold, 1987; Sandler, 1986).

Discussion

When all of the separate categories of the sense-of-community model are viewed as a whole, there is reason for both hope and despair for the inclusion of women in the academy. On the hopeful side, some departments were described as striving to provide the resources faculty members needed to begin and sustain research programs. Respectful accommodations were made for life's inevitable changes—childbirth, nurturing of young children, illness, and loss of a loved one. Behavior of administrators and colleagues consistently conveyed the message that the women were valued and respected members of the community and the women were actively mentored. An attitude of openness, tolerance, and flexibility was evident which allowed a process of mutual respectful influence. The women in these departments reported that they enjoyed their work and participation in these academic communities despite concerns with what they perceived as unreasonable and unhealthy workloads.

At the other end of the spectrum were environments described as places of fear and hostility; places where women found little evidence of respect for faculty, particularly female faculty, and where little trust was felt between administrators and faculty or between colleagues. In these environments, resources were believed to be used as evidence of power, to reward or withhold. The

tenure process was often viewed as adversarial and secretive, creating concern for academic women because, as Bateson notes, it is essential to move "away from secrecy and special exceptions toward regular and explicit processes of hiring and promotion, for the old secretive ways supported old patterns of power and privilege" (Bateson, 1989). The participants were adamant that there was very little sense of safety and justice for them in instances in which they had attempted to address issues of discrimination and harassment in these hostile environments. Retaliation was reported, even for male colleagues, and administrators were perceived as almost always being supported by the university in their versions of the "truth" of a matter. Bateson noted:

"It is not only in childhood that people of high potential can be encouraged or held back and their promise subverted or sustained. The year before I went to Amherst [as academic dean] a group of women had declined to stand for tenure. One of them simply said that after six years she was used up, too weary and too eroded by constant belittlement to accept tenure if it were offered to her. Women were worn down or burnt out. During the three years I spent as dean of the faculty, as I watched some young faculty members flourish and others falter, I gradually realized that the principal instrument of sexism was not the refusal to appoint women or even the refusal to promote (though both occurred, for minorities as well as women), but the habit of hiring women and then dealing with them in such a way that when the time came for promotion it would be reasonable to deny it."

The differences in department and college climates in the institution, without exception, were believed by the participants to be attributable to the attitudes and behaviors of administrators. Colleagues who were labeled by the participants as "bullies" and "rogues" were perceived as problematic for the women only when strong, positive leadership seemed to be lacking. In addition, the participants expressed adamantly that the absence of a mechanism on campus for enforcing gender equity in the work place with regard to resources and working environment contributed to the problem. The structure of the institution appeared to protect those who were most likely to violate the spirit and the law of affirmative action behind the shields of tenure and the power that comes with administrative positions. The participants believed that violators were not held accountable and nonviolators were not rewarded. This left the majority of women involved in this study with no option but to conclude that central administration had not been truly committed to a diverse and equitable workplace. However, the participants emphasized their hope that circumstances could change for the better. They were highly consistent in their recommendations for ways to improve campus climate for women.

Their suggestions/recommendations have been grouped according to themes that emerged in the data: Recommendations for a) central administration, b) affirmative action and advocacy, c) equity of resources, d) tenure and promotion, and e) women faculty, are discussed below.

Recommendations

•Central Administration

Send a clear message that no discriminatory or harassing behavior will be tolerated.

Hire and reward deans and department chairs who are gender sensitive, teach them how to change campus climate within their colleges and departments, and support them in making these changes.

Establish policies and procedures with which to hold administrators and faculty accountable for their behavior with regard to the treatment of women and minorities.

Work with faculty to eliminate gender inequities and to establish a campus climate conducive to the success of women through an open, democratic process.

Explore the real cost of a chilly campus climate with regard to loss of female faculty and students, loss of productivity, and low morale.

Continue to make shared governance a reality to remove mistrust and fear that may exist between faculty and administrators.

Expand "family friendly" policies that promote the success of all faculty and allow them to meet their need to balance work and family.

Explore ways to accommodate spouses and to attract and retain women faculty.

•Affirmative Action and Advocacy

Review the function and efficacy of the affirmative action office with regard to issues of hiring and campus climate.

Establish an independent body on campus to advocate for faculty which has the authority to investigate inequities and bring consequences to bear.

Consider a task force on the status of women with the authority to investigate and deal with grievances in hiring and tenure practices. This group should be gender-balanced and strive for gender balance on campus.

Establish well justified criteria regarding what constitutes a "hostile" campus climate and make them public.

Make the hiring of women a priority in order to create gender balance at the faculty and administrative levels.

Put a woman on every search, tenure and promotion committee, allowing real release time for these activities.

Educate search committees about affirmative action law and intent.

Educate search committees about the possible differences between female and male career paths.

Provide powerful, professional, mandatory training on gender issues for all faculty and administrators.

Recommend the campus women's organization as a mentoring resource for new women faculty.

•Equity of Resources

Review and establish equity in start-up packages for faculty with comparable research needs.

Establish equity within departments with regard to teaching and advising loads.

Establish procedures for monitoring the equitable allocation of resources for the fulfillment of teaching, research and service responsibilities within departments. This refers to research and teaching assistants as well as to other resources.

Consider establishing a dialogue between faculty and administration regarding the implications of existing practices (overt or covert) governing the allocation of resources for start-up packages and on-going research for women and minorities.

•Tenure and Promotion

Tie annual, third-year, and tenure reviews more closely together. Job descriptions should accurately reflect what a faculty member is actually doing. The process for negotiating job descriptions should be made explicit and public.

Make the tenure and promotion process open, fair, and democratic by communicating the process and expectations in writing for every faculty person.

Appoint at least one woman to every department, college and university tenure/promotion review committee as well as to the tenure review board.

Review tenure packages in the context of resources available throughout the process.

Encourage and give credit for interdisciplinary, collaborative teaching and research efforts, and program development.

Reward all forms of scholarship and excellence instead of just counting publications. Because women tend to do more teaching, advising, mentoring, and service, equal importance to research must be given to these other activities in the promotion, tenure and reward systems.

Consider options with regard to the tenure clock for faculty with family circumstances that are particularly time-consuming (birth of a child, young children at home, serious illness of a spouse, etc.).

Appoint a mentor and/or a tenure-review committee for each new faculty member that works with him/her throughout the tenure process to maximize possibility for success.

Provide more resources to support grant writing.

•Women Faculty

Be vocal from the beginning of your appointment and take action in your own behalf regarding resources, discrimination, and harassment.

Find a strong mentor on campus.

Unite and speak together so women will be heard regarding campus climate and equity issues.

Get everything in writing.

Document all incidents of sexual harassment or discrimination, including reports by students.

When negotiating or taking complaints to a dean or department head, have another faculty member with you as a witness.

Seek out the women's faculty organization as a source of mentoring and support.

Ginorio (1995) identified three phases through which the academy typically goes when addressing issues of campus climate. In the first phase, administrators ask themselves, "What's wrong with the women in these departments?" Then, as they begin to allow influence and learn from women, they ask, "What are we doing wrong?" When they have truly attained culture vision, the question changes to, "How can the academy provide what each faculty person needs so that s/he can thrive?" Only in this last phase can discrimination, which is based on the belief that difference is inferior, be eliminated from the culture that is academe.

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People

Anne Badgley just finished her first year as Regional Director of the U.S. Fish and Wildlife Service's Region 1, known as the Pacific Region. It is the largest of the Service's seven regions, stretching from Idaho to Guam. It includes the states of Washington, Oregon, Idaho, California, Nevada, Hawaii, and the U.S. Trust Territories in the Pacific Ocean. Prior to becoming Regional Director in August 1998, Badgley served as the Pacific Region's Assistant Regional Director of External Affairs. Before that, she held key positions with the Department of the Interior as the Deputy Director for Congressional and Intergovernmental Affairs and then with the National Park Service as the Director's Chief of Staff. Her experience with legislative affairs, public lands, and environmental policy issues began as a Legislative Aide to Sen. Brock Evans and continued as an attorney in private practice from 1991 to 1993. Her communications background includes working in television and radio in Seattle and Los Angeles. Badgley's degrees in communications and psychology are from the University of Washington; her MBA is from UCLA; and her law degree is from the University of Washington. As Regional Director, she oversees the work of 1,848 employees and a 1999 operating budget of $132 million. The Pacific Region has 670 endangered species—more than half the 1,177 listed species in the U.S.

Hilda Diaz-Soltero was named Associate Chief for Natural Resources for the USDA Forest Service in May, 1999. She has served as the Director of the Office of Protected Resources, National Marine Fisheries Service (NMFS); Southwest Regional Director of NMFS; and Deputy Assistant Regional Director, U.S. Fish & Wildlife Service. She has also held positions with Conservation International Foundation and the Nature Conservancy. Diaz-Soltero's Bachelor's is in geology from Vassar and her Master's is from the University of Puerto Rico. She attended the John F. Kennedy School of Government and the Penn State Management Program. The Forest Service manages 191 million acres of forest and grasslands.

The Aspen Advantage

Elaine J. Zieroth

Aspen adapted a very successful strategy over the past 10,000 years which gives it a competitive edge in a world of frequent fire disturbances. Unfortunately, fire suppression, livestock grazing, and other human factors have changed the playing field for Aspen competition.

The Forest Service published the Northern Region Overview (USDA, 1998) last October, in which they discussed ecosystem health and identified ecosystems at risk. Aspen was identified as an ecosystem at risk in the northern Rocky Mountains, which they define as an "ecological system disrupted by one or more agents of change." Quaking aspen (*Populus tremuloides*) is the most widelydistributed native tree species in North America (Jones, 1985). It grows in a wide variety of habitats, elevations, and soil types. How could such a widespread, adaptable species be at risk?

The report listed the two biggest agents of change in the aspen environment as fire suppression and livestock (and sometimes big game) grazing. Aspen is a short-lived tree (60-120 years) that is usually dependent on fire to stimulate new sprouts and reduce competition by conifers, sagebrush, and other species (USDA, 1998). Fire suppression has allowed aspen stands to die out without regenerating, and has given shade-tolerant conifers an advantage to take over the sites. In open settings, fire intolerant sagebrush has taken over many aspen stands and heavy grazing and browsing by herbivores can wipe out new sprouts that emerge when the mature aspen start dying. Grazing pressure also reduces the fuels, which lessens the chances that fire will stimulate aspen regeneration. The Northern Region Overview estimated that 50-70 percent of the quaking aspen in the northern Rocky Mountains have been lost (USDA, 1998).

What's So Special About Aspen?

Aspen is a very important species for wildlife. DeByle (1985) lists 135 species of birds that associate with aspen in the West. Ruffed grouse are dependent on quaking and bigtooth aspen for food and cover across the northern

Aspen with stems browsed by big game and leaves eaten by insects.

states. Black bear climb aspen trees in the spring to feed on leaf buds, which are high in protein. Aspen sprouts and bark, which is living tissue, are eaten by elk, moose, bison, and deer. Some stands have wide black bands around the trees where all the bark has been chewed by hungry elk in the winter months. The high protein content of aspen sprouts (7-17 percent) make it a critical winter food source. DeByle (1985) lists 56 species of mammals using aspen forests in the western states and Canada.

Aspen also contribute leaf litter to the soils every year, helping to replenish nutrients, and support soil microbes and insects. In some areas, aspen grow on shallow soils, steep slopes, and wet areas, and their mass of interconnected roots help stabilize the hillsides.

Aspen has had a limited commercial value, which helps explain why little attention has been focused on its status. The wood can be used for wall panelling, shakes, chip board, furniture, decorative bowls and vases, livestock feed, excelsior, and matting material. In some areas there are large stands of tall, straight trees that are suitable for logging, but many stands are small, isolated, or of poor commercial quality.

Aspen Biology

Aspen stands develop as clones, where the entire clump of trees sprout or sucker from an individual seedling. New shoots sucker from the interconnected roots, producing new trees that are genetically identical (Jones and DeByle, 1985). Clones can persist for thousands of years and can expand from a single tree to a clone covering over 100 acres. Roots can extend 100 feet beyond the edge of the clone, with hundreds of root buds that potentially can become new trees. Research has found (Schier, et al, 1985) up to 600 sucker buds on one 18 inch segment of roots, with the potential of producing 20,000 - 30,000 suckers per acre in a clone disturbed by fire or harvest activities.

The mature trees produce the growth hormone auxin, which flows through the root system and inhibits buds from suckering and new suckers from growing vigorously. In a way, the auxin holds the reproduction, which could compete with the mature clone for resources, in check until it is needed. When a clone starts to fall apart, and most of the trees are dead or dying, or if the clone is cut or burned, auxin production decreases and cytokinens in the root system causes thousands of suckers to be released (Mueggler, 1984). Sometimes suckers are produced from the roots extending out from the edge of the clones, possibly because auxin has to travel farther from the tree and the warmer soils in the open break down the auxin. A ring of suckers called a "fairy ring" develops.

These young trees may not flourish if the clone is still vigorous, because some auxin will reach them, but they can be valuable as wildlife food. Due to the clonal nature of aspen, thinning or partial cutting of clones is rarely effective in stimulating effective reproduction. And because stands

are clones, the next generation of trees will be identical to the stand there now, so you cannot do much to improve on the characteristics of the stand through management.

Aspen is the Food of Choice for Just About Everything

When I worked in Colorado, I sent some suckers to the pathologist because they were dying of some mysterious disease. The pathologist report said, "I have identified over 25 fungi, bacteria, and insects feeding on the samples you sent me, but unfortunately I could not discover what is killing your aspen." Aspen leaves are frequently attacked by insects such as tent caterpillar and large aspen tortrix moths. Since they are deciduous, a healthy tree can usually survive heavy defoliation for 2-3 years before carbohydrate reserves are depleted (Jones, et al, 1985). Aspen bark is living tissue, so any wounds, cracks, sunscald, or animal bites open a path for fungi, bacteria, galls, and other infections to attack the tree.

Managing Aspen: My View

One thing I learned long ago with aspen: those who call themselves expert on the species and say they know exactly what it will do, have not been around enough. The growing sites, habitat types, soil conditions, and quirks of individual clones, can vary tremendously across the wide range of the species. When I first started working on aspen management for wildlife in Colorado in 1980, some of the literature said that aspen only sucker from root buds, and that the last aspen seedling was produced from seeds 10,000 years ago. After digging up plenty of aspen seedlings, I found this to be generally true. However, I did find some seedlings coming back after a wildfire that were definitely from seed. When the sprouts come from the roots, you can dig down (aspen is a shallow-rooted species) and find the large lateral root connected to the sprout.

Aspen seeds are small and need an open seedbed with plenty of light and moisture to successfully germinate and grow. Aspen seedlings do not compete as well as suckers do with other vegetation, partly because they do not have an established root system to draw from. The need for an open seedbed with little plant competition is an adaptation to regenerate after a fire disturbance.

Another report that I read said that the root system dies after the last tree dies, and it will no longer be able to produce suckers.

Aspen trying to compete with conifers in a harvest unit.

I have seen a few stands of conifers that were clearcut, where there were no aspen trees within the area; nor was there a sign of previous aspen stands—but the clearcut came back to thousands of aspen suckers. I recently saw a one-acre lodgepole clearcut where we cut two live aspen trees, and we had suckers fill the entire clearcut. It appeared that suckers originated from roots well beyond the reach of the two remaining trees we cut. This further confirms my suspicion that root systems remain capable of sprouting for many years after the trees are dead.

Aspen is not tolerant of shade, so some clones die out when the surrounding forest encroaches on the aspen and inhibits successful suckering. The best method I have found to perpetuate aspen has been to clearcut the entire clone and any other trees around the clone for at least 100 feet. This reduces competition and opens the stand up to enough light to stimulate suckering (Zieroth, 1987). If you can underburn the stand before the suckers appear, this further reduces competition, releases nutrients, and warms the soil to reduce residual auxin in the roots and stimulate suckers to break bud (Zieroth, 1984). Since aspen sucker from an established root system, they can grow fast and have a competitive advantage over other trees, shrubs, and forbs that have to rely on sprouting from seeds and establishing a root system.

The palatability of aspen seems to vary by clone. You can sometimes see a clone that is heavily browsed by livestock or big game, with visible bark damage from chewing, right next to a clone that is barely utilized. I have seen no research findings on what qualities of the aspen make it more palatable. If the aspen stand is a tasty one, the next generation should be too, since it should be genetically identical. If you are regenerating aspen for wildlife food, work with the more palatable stand, but treat a large area so the animals cannot wipe out all the new sprouts. Once again, if underburned, regrowth of grass and forbs that are stimulated by the fire will also be more palatable and attract animals (Zieroth, 1984). Livestock can also destroy a stand of suckers, so consider using a temporary electric fence or leave the cut aspen on the ground to create a physical barrier to livestock movement.

Aspen have shallow lateral roots and the roots can be easily damaged by using heavy equipment in the stand. Winter logging is one good way to protect the roots with snow and frozen ground conditions. In places where bulldozers have been used to push over aspen trees to stimulate suckers, the damage to the root system reduced the suckering. Girdling of aspen to kill the mature trees has not been effective in stimulating good suckering and it reduces the value of the tree for cavity excavation.

The best time to treat an aspen clone is when the trees are dormant and the energy reserves (carbohydrates) are in the roots. The worst time to treat it seems to be in the spring when the energy is shifted to producing new leaves and the roots may be depleted. If a stand is forced to sucker repeatedly, because the first suckers were destroyed by browsing or fire, the root reserves may also be depleted to the point where the root system dies out (Mueggler,1984). Using prescribed fire to burn aspen clones and stimulate sprouting, without cutting the trees, can be effective if the fire is hot enough to kill the trees. Even if the fire does not kill the trees, it may stimulate sucker production which can provide food for wildlife. If the mature trees survive, they will probably inhibit the suckers close to them from growing very well, but outlying suckers my grow into trees and increase the size of the clone.

Social Values

The social significance of aspen comes out any time you propose treating a stand. People love to see the trees change color in the fall. Aspen stands are popular places to put campgrounds because of the beauty and shade provided by the trees. Unfortunately, aspen do not survive well in campgrounds. Their shallow roots are easily damaged by soil compaction and the carving, nails and other damage done to the trees by campers leads to rot and disease problems.

I worked on a project where we assessed the historic value of aspen trees. We spent weeks photographing and transcribing the pictures and sayings carved in aspen bark by Spanish sheepherders early in the century. The trick to aspen carving is using a very thin, sharp blade, so that when the bark heals the wound, the lines do not become too thick. One tree I saw had a drawing of a sheepherder putting on his hat with the caption "herder goes to town" underneath. In another clone, herders had carved pictures of a house, complete with flowers in front and smoke in the chimneys. Other researchers on other sites have found pornographic art as well.

The difficult task is to convince people that we need to disturb the aspen stands they love, to be able to maintain the stand into the future. And time is running out. Much of the aspen we see in the west regenerated after the big fires in the 1880s through 1910. Since then, fire suppression has disrupted the periodic renewal of aspen clones—and our stands are old. A simple way to compare stands is that young stands have leaves and live branches on over half the bole of the tree. If the leaves are in the upper 1/3 of the tree, it is probably over 50 years old. Without fire, harvest, or other disturbances, we face losing not just the existing stand of aspen, but the clone itself that may be thousands of years old. We also lose the unique genetic material shared by that clone. Since seedling establishment from seeds has a low success rate,the distribution of aspen could decline rapidly in the next few decades.

Management is needed now, on a large scale, to regenerate these stands and reverse the conifer and sagebrush encroachment on the sites. The buildup of fuels, and the fire ladders created by young fir trees and sagebrush around aspen stands may lead to very hot, stand destructive fires in the future. It is not known how aspen will respond to the change in fire intensity since their shallow roots and sucker buds could potentially be damaged by very hot fires. Harvest of aspen, and prescribed fire may be the best tools for regenerating stands.

Aspen responded to frequent disturbances in its environment over the past 10,000 years by evolving adaptive strategies, such as root-suckering and interconnected root systems that gave it an advantage over other species. Now that the type, scale, and intensity of these disturbances have been altered, the adaptive strategies are breaking down.

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Elaine Zieroth, pictured below setting fires, has a Master's in Wildlife Biology and has worked for 15 years as a biologist for the USDA Forest Service and the USDI Bureau of Land Management. Currently, she is a Forest Service District Ranger in Idaho. Zieroth has been a Section Editor for Women in Natural Resources for many years.

In a northeastern stream on Madeira Island, Portugal, a total of 25 juvenile eels climbing over a recently created obstacle were observed during the three years (a total of 667 days) of the study.

JUVENILE EELS: A Pioneer Study On Obstacle Climbing

Helena Encarnacão

Stream with large boulders creating blockage. Eels climb right next to the waterfall.

Introduction

The eel, *Anguilla anguilla L.*, a catadromous species, spends most of its life in freshwater habitats like rivers and streams. Its lifecycle was a mystery until Schmidt explained his theory about the many aspects of eel life. We do know that larvae are hatched in the Sargassum Sea and change gradually to *leptocephala* that are dragged by the Gulf Stream to the European and Madeira island shelf. This journey can last 2.5 years. They then change into "glass eels" and begin the physiological changes that permit them to enter freshwater where they live until reaching sexual maturity. By the time they reach Madeira, the eels are 6-7 centimeters in length (Nunes, 1974).

Unlike rivers, the northern streams of Madeira pass through hilly ground and are often inaccessible to humans. This study examines how eels are able to go up the seemingly impassable streams and around obstacles. The stream in the study has ideal conditions for studying this problem because of thel meter rock obstacle in the stream and a nearly vertical muddy streambank. The borders of the stream are narrow and the water squeezes around the obstacle. The blockage was created during a flood that occurred October 29, 1993. This blockage interrupted the flow of the water and created a differential level in the flow. Unobtrusive observation allowed the scientist to understand how the eels solved the blockage problem by climbing the streambanks.

Study area

All research occurred on a stream named Massapêz on the northeastern part of Madeira Island, Portugal. Unlike the southern streams on the island, the northern streams have water all year. Most streams are characterized by straight channels with small pools where the greatest depth occurs—and by rapids with various degrees of bending. The banks commonly slope downward with abundant vegetation.

The Massapêz stream headwaters are at an altitude of 350 meters (approximately 1,000 feet above sea level) and the riverbed runs through a volcanic sand beach for about 21.9 kilometers to the ocean. Stream width varies a lot from 30 cm. to 3 meters. This stream is very sinuous with inaccessible areas and steep banks. Blackberries (*Rubus* sp.) are the most abundant streamside vegetation. In the spring a green filamentous algae grows on the streambed and at the end of the summer and autumn a less filamentous brown algae replaces the green algae.

There are no other fish living in the stream. Other life includes small invertebrates like *Limnaea* sp., *Planorbis* and *Amnicola* (molluscs), small crustacean, insects and arachnids (spiders). Around the streamside are many rats. Other animals living close to the stream are presented in Table 1.

Common name	Scientific name
Birds	
Grey wagtail	*Motacilla cinerea schmitzi*
Blackcap	*Sylvia atricapilla obscura*
Starling	*Turdus merula cabrerae*
Robin	*Erithacus rubecula microrhynchus*
Barn owl	*Tyto alba*
Buzzard	*Buteo buteo harterti*
Duck*	*Anas* sp.
Sparrowhawk	*Accipiter nisus granti*
Mammals	
Rat	*Rattus* sp.
Dog*	fam. *Canidae*
Cat*	fam. *Felidae*
Bat	fam. *Molossidae/Vespertilonidae*

* domestic animals.

Table 1. Animals living close to the stream

The first rainfall begins between September and October after a summer dry period and lasts until April-May. There can be random dry, hot winters. Frequently the stream water is earth colored after a rain.

Ecosystem Health

The site of the current study is 500 meters upstream from the mouth of a river, and eels reaching this point are required to do some climbing to arrive at the site. The rainfall regime of the northern part of Madeira Island, Portugal creates ideal conditions for eels. There is no industrial emission of toxic waste or objects into the Massapêz stream. Bordering this stream there are family houses. An unquantified amount of domestic debris is dumped into the stream, for example, clothes and plastic are entangled on the blackberry branches. Large debris stays a long time on the stream bed or on the border of the stream, stagnating the water. Other waste is organic: dead animals, drainwater, and enormous quantities of brush. Sometimes the water is clouded from sediments from cultivated ground and at times it has a foam on the surface.

The blackberries grow rapidly and are spreading over other plants like the tree, *Myrica faya* Ait. This situation seems to be worsening over time. The silver fern *Adiantum capillus veneris* L., once very abundant on the slopes, is becoming rare, and other specimens of fern disappeared from the streamside. This condition may be a result of abandoned agricultural fields next to the stream banks and the later invasion of resistant, fast growing plants.

Methodology

The blockage created an obstacle to juvenile eels and made it possible to easily view and count them on the 90 degree slope as they made their way around the obstacle. The presence of one or more juvenile eels climbing over the wet muddy slope, the hour, and their size, was recorded. In only four samples was the time it took the eel to make the ascent recorded. The combined depth of the stream and height of the banks at this point is greater than average but was not measured.

The survey occurred over three years, 1995, 1996, and 1997. Three observations per week were made during most of the year, with the exception of the summer months, Christmas, and Easter holidays. The hour of observation was random and occurred during daylight hours. During most of the year when the stream was monitored, no observation of juvenile eels was recorded. No technical measurements of eels were used in this study, other than observation and estimating their size. The observer maintained a distance of greater than or equal to two meters to prevent a reaction or a change in eel behavior. Table 2 summarizes the information related to eel presence by year, month, and number.The information was recorded in four categories: I=eel is initiating the ascent; C=eel is climbing away from the start; F=eel failed and fell down, and S=eel successfully made it to the end of the slope. The observations are noted in Table 3.

Results

During the 677 days in 1995-1997, on only 23 days were the juvenile eels observed ascending the left bank of the stream near the boulder and the waterfall. At that point, the height difference is nearly 1.4 meters from the bottom to the top of the slope and obstacle. Twenty five eels tried to ascend. Of these eels, seven, or 28 percent failed the attempt and eight or 32 percent were successful in going beyond the obstacle. The remaining 10 eels or 40 percent were either beginning the ascent or had not yet made it to the top of the slope.

During the 677 days of the study the eel frequency of travel upstream was higher in October. This phenomenon was observed from June to November and no ascents were observed in the winter months .

Brush and debris in the stream.

	1995	n° observed eels	1996	n° of observed eels	1997	n° observed eels	total (sample)	total (eels)
Jan.	17	0	13	0	17	0	47	0
Feb.	16	0	14	0	14	0	44	0
Mar.	16	0	20	0	22	0	58	0
Apr.	18	0	20	0	14	0	52	0
May	14	0	20	0	17	0	51	0
Jun.	16	0	21	2	11	0	48	2
Jul.	22	0	23	5	20	0	65	5
Aug.	26	0	28	0	29	3	83	3
Sep.	22	1	24	1	17	1	63	3
Oct.	17	2	22	6	14	1	53	9
Nov.	20	0	18	1	14	2	52	3
Dec.	21	0	19	0	21	0	61	0
total	225	2	242	14	210	7	677	25

Table 2. Number of days per month in which observations were made at the stream and number of eels observed each month.

sample n°	year	month	hour(h.min.)	length (cm)	notes
1	1995	Sep.	18.00	10	C
2	1995	Oct.	15.35	10	F
3	1995	Oct.	15.30	10	C
4	1996	Jun.	11.15	10	C
5	1996	Jun.	21.00	10	S
6	1996	Jul.	9.55	13	I
7	1996	Jul.	16.00	unknown	S
8	1996	Jul.	16.15	12	I
9	1996	Jul.	15.10	13	F
10	1996	Jul.	15.10	8	F
11	1996	Sep.	17.30	unknown	C
12	1996	Oct.	15.40	10	S
13	1996	Oct.	17.57	8	F
14	1996	Oct.	16.10	8	S
15	1996	Oct.	17.15	8	C
16	1996	Oct.	15.45	8	F
17	1996	Oct.	16.27	8	F
18	1996	Nov.	11.20	8	S
19	1997	Aug.	16.25	7	C
20	1997	Aug.	18.25	10	C
21	1997	Aug.	18.35	10	S
22	1997	Sep.	18.25	10	C
23	1997	Oct.	16.00	10	S
24	1997	Nov.	15.05	10	F
25	1997	Nov.	15.05	7	S

Table 3. Record of juvenile eels going up obstacle for a period of 3 years. The eel length is approximate.
Notes on the eels: I=initiates ascent; F=fails and falls; C=climbing past start; and S=successful to top.

Because eel climbing frequencies vary by month, ascent success could depend on monthly characteristics such as the weather, the greater or lesser sunlight incidence, and the activity of predators. Analyzing this, it will be noted that the success of climbing is not significant by month (X2 = 22, d.f. = 15, not significant). A higher sample size corresponds to the most frequent failed ascents. October is the best represented month of observations and unsuccessful eels on the slope (see Figure 1).

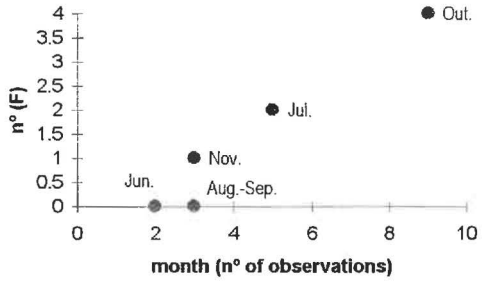

Figure 1. Comparison between monthly observations and number of eels that failed n degree (F) the ascent of the obstacle (r=0.96)

The hour was recorded only for the eel observations (N=25). The time the eels ascended was rounded up or down to the closest hour. The largest group ascended at 1600 hours or at 4 pm (Figure 2).

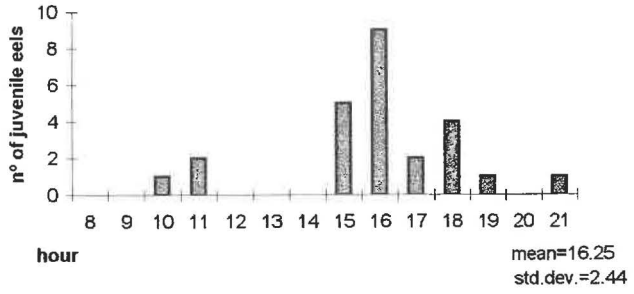

Figure 2. Hour when juvenile eels are climbing obstacles (N=25).

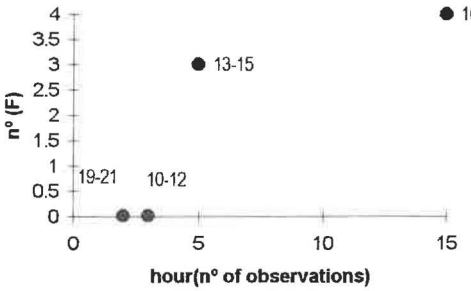

Figure 3. Comparison between hour and number of eels that failed at each hour interval (marked at each point of the graph) (N=25, r=0.84).

Reasons for the success and or failure of the eels ascent was examined. The hour of higher observations is the same for the highest F or failed behavior (Figure 3). However, eel length (N=23), r=0.38) appears to be correlated with successful ascents. Juvenile eels over 8 centimeters seem to have much more ascent success than eels with 7-8 centimeters. For 14 observations of eels with more than 8 cm. length, only two failed and for eight observations of eels with equal or less than 8 cm., the number of the ones who failed is double or four. The success of the eel's climbing doesn't appear to have anything to do with the hour (X 2=13.7, df=9, n.s.).

The successful ascent is due to the way an eel uses it's body, similar to that of a snake. The eel bends the anterior part of the body first and then bends the posterior part advancing forward to the anterior bend. The eels leave the water and climb along the bank, near the rock blocking the channel. The velocity of the climbing was measured in four samples (see Table 4). The eels averaged a pace of between 1.8 and 2 minutes per 10 centimeters. Eels were not constantly moving during the ascent and often rest several minutes during the ascent.

Obstacle(cm)	Time	Length (cm)	Month/Year
40	30 min	8	Oct./96
50	15 min	7	Nov./97
50	17 min	10	Out./97
100	14 min	8	Nov./96

Table 4 Velocity of eels climbing

Discussion

These results were obtained by *in situ* observation. The formation of the obstacle, a rock in the stream, was the principal reason for the discovery that young eels climb. However, it is unknown how many do it and what ecological importance this vigorous behavior has on juvenile eels. As the measurements of eel lengths are approximate, there is no accurate evidence about which particular sized eel climbs best. To quantify exactly the eel size, it would be necessary to catch them. Not interfering was necessary to obtain authentic behavior records of movements.

The presence of juvenile eels climbing may or may not be indicative of their abundance. However, for three years during which 667 days were sampled, only 25 juvenile eels were observed climbing on 23 separate days—which is equivalent to three percent of the days sampled. This very low percentage could simply reflect low numbers of juvenile eels attempting to climb past the blockage in the stream; the real population and/or size of the eels living in the stream is still unknown. In terms of behavior, only once did two eels attempt to climb the slope at the site at the same time. Also, one juvenile eel failed the first time, tried two more times, but failed. One could speculate that this tenacious behavior is or may be extremely important for the success of eels when climbing a longer stretch of obstacles.

Juvenile eel body color is similar to its environment. This coloration may confuse potential predators. There were no observed eel predators at work. However, the head of a young eel on the shore of the stream and some bones were seen, but there were no other traces. Ducks and birds of prey may be the predators.

The larger number of juvenile eels in October coincides with their coming to the Portuguese coast (Costa and Franca, 1985). The results other researchers have obtained on the Mondego estuary in Portugal demonstrate that catadromous migration occurs all year (Jorge and Sobral, 1989). Since this study represents the eel climbing upstream over an obstacle and not merely eel migration in a large open waterbody, the annual abundance and cycles may be different and or independent of one another (Weber, 1985). Weber notes that during the day, the elvers stay on the river bottom and Creutzberg (1961) suggests that during the day, the individuals don't go to the surface. This behavior is not the case of the Madeiran stream in the study. The

scaling phenomenon records young eels swimming actively during the day.The active behavior of climbing waterfalls demonstrates that elvers don't stay on the bottom. Since a river is different from a stream, perhaps eels develop survival strategies for each habitat.

Eels lose weight and length along the catadromous migration (Heldt and Heldt, 1929; Menzies, 1936; Finiger, 1976; Charlon and Blanc, 1982; and Yahyaqui et. al., 1983). This fact could affect the ascension of the individuals. On the Minho river this size reduction was observed from February-March (Jorge and Sobral, 1989). Why eels don't ascend in the winter and spring is unknown, but it may be that during these periods, eel weight, length, and food ingestion affects the activity. Jorge and Sobral noted that larger eels were found upstream and smaller eels downstream in the Mondego river. The observation site is 500 meters upstream from the mouth and eels reaching this point are required to do some climbing to arrive at the site.

Eels chose the afternoon to climb though it is difficult to make any conclusions as to why, since weather conditions and light incident on the slope was not recorded. More research on a number of these aspects is needed.

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Helen Encarnacão, pictured in the stream, works at the Portuguese Society for the Study of Birds on Madeira Island, Portugal. Her degree is in biology from the University of Madeira. Her research interests include the accidental capture of sea turtles in the Madeira based fishery, and she does scientific illustration.

EELS: Undervalued Resource

Sheila Helgath

Helena Encarnacão's article on eels introduces a natural resource that is undervalued in North America except, perhaps, by Eskimo and Asian Americans. In the Alaskan villages along the Yukon and Kuskokwim rivers, in the late fall, usually October, one hears cries of "the eels are coming" or "the eels are at the next village!" As the eels migrate up these great rivers, village after village springs into action, (provided that the rivers are frozen over). The villagers take a two by four piece of lumber, pound nails into it, cut a hole in the ice, and wait for the ball of migrating eels to arrive. Then they stick the board down into the water, allowing the eels to wrap themselves around it. They pull out vast quantities of eels which are then stacked like firewood in frozen rows and used as dogfood for their numerous sled dog teams. Eels are an important link, therefore, in the chain of subsistence activities. Eels also migrate into the interior of Alaska and overwinter in mudflats where European Alaskans find them and use them as bait for other species.

Eels also utilize Asian rivers where they are considered a valuable food species by both Koreans and Japanese. If you have ever eaten *unagi* in a Japanese sushi restaurant you have eaten smoked eel. Eel is a special gift item in the culture, often given in the spring as a symbol of fertility. As a result there is great demand for eels in Japan and a form of aquaculture is practiced by capturing wild young eels and raising them in pens. Japanese investors years ago proposed raising eels in pens in Hawaii which provoked a controversy about importing animals into the island. Koreans also utilize the skin for wallet and handbag leather.

A Korean firm proposed a commercial fishery for the Alaskan eel. I researched eels while working for the Alaska Legislature after Eskimo legislators asked me to do an analysis. The project was rejected in favor of subsistence use.

In Europe, eels are considered a delicacy and are kept live in the markets until they are sold; the flesh tends to break down quite rapidly, making large commercial enterprises difficult. European eels, however, are a different species from those found in the Pacific.

There has been a lot of international interest in eels. For one thing, eels have a simple nervous system and they have been used extensively for nerve research. But there is interest mainly because it is one of the most highly valued, and therefore expensive, seafoods in the world.

News & Notes

Australians Stay *With* Their Homes During Interface Fires

In January 1998, on the urban/rural interface of the city of Hobart, Tasmania, Australia, experienced one of its most potentially damaging bushfires. Over a 24-hour period, 1000 houses on the interface were directly threatened by a bushfire burning through drought-affected eucalypt forest under severe fire weather conditions. In accordance with Tasmania Fire Service policy, residents were advised through the media to remain *with* their homes during the fire. There were no deaths or serious injuries and only seven houses and a number of outbuildings were destroyed. Of the houses lost, six were unoccupied. Following the fire, investigations showed the majority of residents heeded the advice to stay and were successful in protecting themselves and their properties.

Most Australian fire services have advocated this approach for many years. It is supported by very conclusive research findings respecting the causes and circumstances surrounding the loss of lives and the destruction of buildings during a number of major bushfire events in Australia during the last 30 years. Where adequate fire protection measures have been implemented, able bodied people remaining with a house are able to extinguish small fires as they start. Houses also provide a safe haven from the sometimes very high levels of radiant heat which may occur.

Tasmania in the southeastern and southwestern corners is prone to bushfires. In 1967, in about five hours, fires in the south consumed 600,000 acres of forest and farmland, killed 62 people and tens of thousands of livestock, and destroyed 1300 homes. In 1983, another fire killed 76 and destroyed 2463 houses. In the wake of these fires, the Commonwealth Scientific and Industrial Research Organization and others undertook research. One of the principal researchers, Dr. Caird Ramsay, and his colleagues, found that the dominant mechanism of ignition of houses is airborne embers entering buildings or landing on vulnerable parts. Another minority of fires were caused by direct flame and radiant heat usually from vegetation burning in close proximity. Wind can breach the integrity of buildings (breaking windows, blowing off shingles) giving access to embers. During the time between the spot fire ignition and the rapid destruction phase, there is usually opportunity for successful intervention by vigilant people with simple firefighting tools such as a wet mop and buckets of water. Many houses burn down up to three hours after the fire front passes, but would not have if embers had been extinguished by residents.

Research also revealed radiant heat to be the most common cause of death. Caught in the open during an ill timed evacuation, people are extremely susceptible. Sheltering in buildings is the best protection.

Homeowners (with some important exceptions, such as the infirm, old, or owners of homes on very steep slopes) are now advised to stay. They should have been routinely grooming their interface landscapes to keep down understory and using non-flammable roofing, siding, and decking. If a fire approaches, they are advised to block downpipes and fill gutters with water, shut doors and windows, dress appropriately, and have basic firefighting tools at the ready. The stay-and-fight homeowners, surveyed in 1998 after a large fire and after the policy went into effect, said they would do it again, but complained that though they received radio information, it was not enough as the situation developed. Most of the homeowners who were engaged during the height of the fire were really frightened, but they behaved rationally, did not panic. Not evacuating reduced the panic and community anxiety, and injury and property damage were minimized.

J.B. Gledhill, *Wildfire*, June 1999

To Whom It May Concern

It is my pleasure to recommend Kurt Luchs for employment at your company. I have known Kurt for nearly six years, and I can honestly say that I have not known any other Kurt for nearly as long. Kurt was with our firm, Pendleton Tool & Die Co., for five and a half of those years. His employment with us ended amicably and by mutual agreement between both parties and the United States Seventh Circuit Court of Appeals. In fact, Kurt was so dedicated that he stopped coming in each morning only when his desk was removed and the locks were changed. Every once in awhile, I think I see his face behind a ventilation grille. Kurt's influence on everyone in our company was so extensive that there are still employees who won't start their cars without checking under the hood first.

Sincerely, Thomas R. Pendleton, President.

Kurt Luchs, *The New Yorker*, March 22, 1999

Why It Was More Than a Game

People keep saying what a milestone it is that Elizabeth Dole is a serious presidential candidate, and while I say, "You go, girl," her accomplishment never affects me the way the sight of Mia Hamm does. I start to talk about her, and I can't because I get a catch in my throat. So much that is wonderful about being a woman in 1999 is embodied in the U.S. women's soccer team: their sticking with it, their unassuming ways, their heart. The first time my daughter and I saw that captivating Nike commercial, the one in which four teammates—and the dentist's nurse—ask to have two fillings because one player has to, we burst out laughing and then blinked back tears.

When I was young, in the Dark Ages, I played field hockey with a stick that had duct tape around its base. The nun who coached us would pin up her long blue sleeves, hold an instruction manual in front of her and pray. We sewed numbers on old gym suits to make them look like uniforms, while the guys wore miracle-fabric football jerseys over molded plastic sufficient to protect them in the event of a nuclear attack. I look back to those days and wonder what the dads devoted to Little League and their sons' football were thinking. Didn't they feel slighted that their daughters weren't in on the fun, not to mention getting their characters built? I was a tomboy, and my father spent countless hours playing catch with me. But he never expected that there would be organized softball for girls. Of course, there was a part of him that overworried about my infrastructure. Girls have babies, after all. When my brother got a detached retina playing tackle, my parents didn't blanch. One day I came home with a bloody nose, and I thought my father was going to pass out. No one was used to seeing girls throwing, batting, kicking, and catapulting themselves around the place.

By the time my daughter was in grade school, Title IX had kicked in. Courtney had a bright gold mesh-and-Lycra uniform, shoes with cleats. Much of the time, it wasn't pretty; the kids all went where the ball was. They were sprinting, lunging, and kicking with abandon, just like the boys, delighted at how much fun it was to get covered in mud without any consequences. My parents came to the last game of the season—they were quantity-time grandparents and would have come to watch her sleep if I had let them. It is hard to think of a happier moment than watching my father cheer as his granddaughter went splat into the ground trying to block a goal. So thanks, Hamm and Scurry and Chastain and Foudy. Courtney and I will have two fillings.

Margaret Carlson, *Time*, July 19, 1999

Are you doing, or overseeing, an interesting piece of research? Women in Natural Resources welcomes research contributions for the Research in Progress column.

Describe the research or process,what is being done currently, the expected outcomes, and your (or the researcher's) part in it. For more information, contact Dr. Jessie Micales,at jmicales@facstaff.wisc.edu

Selling Themselves Cheap

Women earn significantly less than men for the same work in almost every position of every industry, including those that women dominate, such as nursing and secretarial work... Women take home a puny 68 cents for every dollar earned by men. This despite the fact that women now represent almost half of all managers and professionals and own nearly 40 percent of all U.S. businesses.

Experts say that women themselves must also fight for their own pay parity. The problem is that women sell themselves cheap—and companies know it. The vast majority of women at every employment level do not price their skills at market value. "Women look at what they used to earn as a benchmark, not at what the job should pay," says Carolyn Woo, dean at the University of Notre Dame's College of Business Administration. And as most headhunters say, women don't always gird themselves for negotiating sessions when the issue of compensation arises. More often than not, they take the first offer.

Susan Bianchi-Sand, executive director of the National Committee for Pay Equity in Washington, D.C., advises that to prepare for any upcoming job or promotion, women ought to benchmark the going rate by checking salary data from such sources as government and private web sites, trade journals, and human resources departments. Women also need to network more to find out what their skills are worth; they tend to be more reluctant than men to talk money; when they do compare notes, they often do it with female counterparts. As a result, women end up pricing themselves below the market and lose out year after year.

Joanna L. Krotz, *Working Woman*, July/ August 1999

The Ringling Brothers Barnum & Bailey Circus

In 1999, the production has been updated for the internet age with a $3 million lighting system and a new, 23 year old ringmaster, the first African American and the youngest ever, Jonathan Lee Iverson. The show's 200 plus animals—from poodles to ostriches to elephants—consume 16 tons of feed per week. Sixty-four attendants feed and clean up after them. A circus rule: no matter how well trained, an animal remains an animal, and food chain instincts are intact. In the parade, a tiger is supposed to follow an alpaca, but the big cat growls, smelling dinner, and they must be separated. A puma swipes at an acrobat's flag. Long vilified by animal-rights groups, circuses are beginning to fight back. "We've been too busy caring for our animals," says elephant master Catherine Hanneford. Ringling's new show defiantly pushes fauna to the fore. And ringmaster Iverson, in a musical number, defends the use of four-legged performers: *You can see we're wild about 'em/ What would the circus be without 'em?*

Bruce Feiler, *Life*, April, 1999

A Four-Car Garage?

The once humble garage has become the latest symbol of competitive affluence in American homeowning. In a generation, the average house size has grown by 50 percent. You can't find a *new* home with 1.5 baths anymore; it's 2.5 heading for 3. Then there's the kitchen—upscale and eat-in, of course, even though nobody wants to cook. Now the bloat's moving out the kitchen door and into the garage. In 1989, only 10 percent of American homes boasted three garage spaces or more. By 1998, the number was 16. Gopal Ahluwalia, research director at the National Association of Homebuilders, predicts a sharp rise in 1999 and 2000, especially for four-cars and up. Not all owners intend to own four cars, but will use the space to customize for storage, repair units, or breakaway space for teens.

Daniel Pedersen, *Newsweek*, June 21, 1999

Scary Stuff from John Le Carre

•Illegal narcotics now account for one-tenth of all world trade

•Americans spend $78 billion a year on their drug habits

•World production of cocaine doubled in the last 10 years

•World production of heroin tripled

•South America's military elite now make drugs, not war on drugs.

•Countries unable to grow their own crops offer chemical refineries and sophisticated forms of transportation as a means of getting a toehold in the business

•One container load of cocaine landing in a British port is worth a hundred million pounds. The harbormaster earns forty thousand pounds.

John Le Carre, *Single & Single, (Scribner*, 1999)

Some Sober Truths About Large Cities and Green Spaces: Tokyo As Example

The following is from an interview of Mori Minoru who is president and chief executive officer of the Mori Building Company, and leader of the Mori Building Group. His firm has construction projects in China underway; among them is the 94 story Shanghai World Financial Center, soon to be the tallest building in the world. Mori is also a member of the Economic Strategy Council which reports to Prime Minister Obuchi Keizo.

The 1998 real value of commercial land in Tokyo has fallen to about one-eighth to one-tenth its value (before the "bubble" burst in 1991). If stocks reflect the temperature of the nation, then land prices reflect the temperature of the cities. They shouldn't be too high, but neither is it healthy for the city to have them too low. The sharp drop in land prices is a stark indication of just how far Tokyo has been downgraded, of how little attraction it has for people in Japan and in other countries. In 1995, the Tokyo Stock Exchange boasted just 77 new listings (IPOs) by foreign companies compared to 247 on the New York Stock Exchange. In international conferences, Tokyo ranks fourth in Asia behind Singapore, Hong Kong, and Seoul (1997 data).

The 21st century will be an era of metropolitan nations, and as internationalization and computerization advance, people, goods, money, and information are going to move across borders to concentrate in the most attractive cities. Unless something is done, we can stop worrying about Tokyo becoming a global financial center; it will be little more than just another local market.

Tokyo is behind its rivals in other parts of the world on virtually every measure; per capita living area, office space, and infrastructure such as highways, parks, and green spaces. People expected and believed that land prices would go on rising forever and so they scrimped and saved to buy homes. But as a result, our residential areas sprawl endlessly out into the suburbs, and most of our population is subject to grueling commutes. This urban structure robs the residents of the time to enjoy cultural and intellectual stimulation. The people who live here have no space or time left over for themselves.

This is a natural consequence of the historical failures Tokyo has experienced in urban planning. Even during the modern era, we have had three chances to make fundamental changes in Tokyo's structure. The first was after the Great Kanto Earthquake in 1923, the second after our defeat in World War II in 1945, and the third at the time of the Tokyo Olympics in 1964. We missed all three of those opportunities. For the past 20 or so years, the national government has had a policy of "even development of the national land," and as part of this it has subjected buildings to limited usable FAR (floor area ratio) and use regulations that have impeded urban development. The government's aim was to prevent our population and industry from crowding into Tokyo. Now, even while Tokyo is losing population, the regulations remain in place.

Certainly there are a lot of people who think that Tokyo is too crowded and too big and the only solution is to decentralize. In reality, however, Tokyo is one of the most uneconomic and irrational cities in the world. It is horizontally congested and vertically vacant. People talk a lot about the demerits of centralization and concen-

tration, but Tokyo is a city that ought to take advantage of concentration and accumulation to make more efficient use of time and space.

The four central wards of Tokyo are roughly the same size as Manhattan, New York, and they both have roughly the same working population—three million. But compare their residential populations and it's a different story. About 1.5 million people live in Manhattan compared to just 500,000 living in central Tokyo. People say Manhattan is more livable. Now take a look at the usable FAR for private land in the two. The 23 wards of metropolitan Tokyo average 126 percent, a much lower figure than in Manhattan. If we were to boost ratios to Manhattan levels and build high rise buildings, we could fit all of the private buildings in metropolitan Tokyo on just 8.4 percent of the private land. Even if we were to give everyone double the floor space they currently enjoy, we would still use only 16.8 percent.

Historically Japanese are an agrarian people. Our ancestors bequeathed to us a tradition of "land worship" and "sun worship." What is more, our climate is hot and humid, our land is vulnerable to natural disasters, and we have traditionally built with wood. These factors have led us to disregard buildings and overemphasize land. National policies have tended to encourage the subdivision of our land, including house building support and house ownership promotion. Many people seem obsessed with the idea that they will be relatively poor if they do not own a house with land in the suburbs. Living in their own house is for many the biggest goal in their lives. Along with this, many people have an intractable aversion to joint ownership of land and high-rise buildings. But the point I want to make is that what we should be distributing to people is not land per se, but affluent housing spaces and rich environments.

The Urban New Deal Policy, included in the final report of the Economic Strategy Council has a goal of nurturing affluent urban life by doubling urban space and increasing free time. We have more than enough room to do it. But the purpose is not to build high-rise buildings for their own sake. If we proceed with integrated development under a master plan, we can secure required ratios of natural diffused light necessary for a happy life. High-rise residential buildings offer panoramic views, superb privacy, excellent ventilation, and as the Great Hanshin-Awaji Earthquake demonstrated, they are strongly resistant to earthquakes.

We could hold down the actual built area ratio to promote the greening of open spaces. We can bring greenery to rooftops, reclaimed land, and even to building walls which would contribute to the alleviation of the so-called heat-island phenomenon. The road network could be enhanced to eliminate traffic jams which would provide tremendous energy savings. When a city is sprawling, you waste enormous amounts of time and energy just moving around. Multifamily dwellings would save on air-conditioning expenses and reduce energy. Higher utilization would reduce the relative cost of land. We could extend depreciation periods to encourage the construction of durable buildings that will stand for one or two hundred years, which would enable the supply of affordable housing units. The average commute for people working in the four central wards is about two hours and 20 minutes round trip. Even cutting this in half would give people more time to spend freely with their families, in urban cultural and intellectual activities, and other choices. We could create a city in which most of what was needed for life was within walking distance.

In the course of acting on this plan to double space and free time, we would methodically develop the land that is collateralizing all those defaulted debts that are the Achilles' heel of Japan, and this would make land more liquid. If you have a plan and proceed methodically, you can change the structure of a city in 30 years. The drop in land prices and ultra-low interest rates are a boon for urban restructuring that we should not let slip through our fingers.

Nishimura Kunio, *Look Japan*, 12 March 1999.

The Desert Food Factory

Of the estimated 300,000 plant species worldwide, only a minute fraction serves as food, medicinal, or industrial sources. And most of these crops were domesticated thousands of years ago. The remainder comprise a vast, unexplored frontier bursting with possibility. Israel's scientists are now increasingly turning to the desert and semiarid areas in search of promising plants, such as cacti, for cultivation. The turn to the desert is a necessity as a short review of Israeli statistics reveals. Rainfall varies considerably: from 25mm per year in the Negev (southern desert) to 720mm in the north. Only about 17 percent of Israel's land is arable, compared, for example, to 32 percent in France. Another 40 percent is pasturage, while permanent crops account for only five percent. Three quarters of its water resources are used for agriculture. Although Israel started 40 years ago with a largely agricultural economy, R&D investments beginning in the 1960s promoted the rapid expansion of high-tech industries. Today, agricultural exports account for a mere 3.9 percent of Israel's total export market, compared to 30.3 percent in the 60s. Israeli imports comprise about 40 percent of Europe's off-season fruit and vegetable market and are second only to Holland in European flower sales. Today, 10 percent of Israel (excluding the Negev) is already built-up. Given Israel's high population growth rate and other trends, forecasts predict that this could rise to a staggering 50 percent by the year 2020, making Israel one of the most densely populated countries in the world.

Promising contenders for planting in the available desert include five different edible pitaya species (one of them a climbing cactus *hylocereus undatus*) from Central and South America, and the white sapote, hailing from Mexico. They also include the marula and cactus pear.

Anna Charny, *Shalom*, No. 1, 1999

Female Education in Africa

At the primary school level, all students study the same subjects so that girls' access to math and science is dependent on their rate of enrollment. At the secondary level however, far fewer girls than boys opt for those subjects and consequently fail to qualify for entry to Math/Pure Science based faculties at the tertiary level. And the performance of girls who do qualify is generally well below that of their male peers. There is a belief among many teachers, including some women, that girls are intellectually incapable of studying "difficult and task-oriented" subjects such as math and science. There is evidence that girls are actively discouraged by teachers, who do not expect good performance from the girls and do not wish to "struggle" with them, and that they are subject to severe harassment by their male fellow students. Parents have the belief that a girl who succeeds in SMT is somehow abnormal and a poor prospect for marriage. The girls themselves are negatively affected by these attitudes.

The issue of gender imbalance has become a topic for discussion at all national fora. All national policies have included gender specific considerations. However, even in countries with no discrimination in enrollment, female enrollment is lower than male. The partitioning of the sexes among fields of study, in particular the apparently universal under-representation of females in the natural sciences, engineering and agriculture, is so well defined empirically in every region of the world—industrial and developing countries alike—that it would seem virtually to constitute an "iron law" of education. What does it really mean? Specialization or discrimination—the truth lies somewhere in between, varying from country to country.

Connect, UNESCO International Science, Technology & Environmental Education Newsletter, Voll XXII, No. 3/4, 1998

The International Conference of the Society for Ecological Restoration will be held September 23-25, 1999 in San Francisco, California. The theme is Reweaving the World: Restoration, Community, Culture. For registration materials, call 608-262-9547, fax 608-265-8557, or email ser@vms2.macc.wisc.edu.

University of Arizona's Women and Scientific Literacy is working to bring science to women's studies and feminist critiques to the sciences. An ongoing colloquium series provides a forum to work through the past lack of common ground and even hostilities across these fields. Developed by the American Association of Colleges and Universities, and funded by the National Science Foundation. For more information visit http://w3.arizona.edu/~ws/newweb/wsl/coverpage.html.

Women of the West. In November 1998, the Women of the West Museum opened, launching new public programs for people of all ages. The programs for 1999 include a national initiative for women's history trails, a short student video about women of the West, lectures by scholars on the subject of western women, and continuing book discussion groups. The WOW website is at www.wowmuseim.org, a virtual museum with online exhibitions, book reviews, resources for educators, and a featured Woman of the Week. Contact them at 4001 Discovery Drive, Boulder, CO 80303, phone 303-541-1000, or fax 303-541-1042.

The 1999 Natural Areas Conference, will be held in Tucson, Arizona October 13-16, 1999. This year's theme is "Conservation Planning: From Sites to Systems." Ask for packet from : Natural Areas Conference , PO Box 5365, Tucson, Arizona 85703 or email confreg@twp.org. For more information visit www.twp.org.

The National Smokejumper Association is a non-profit organization with a newsletter and a five-year reunion cycle—the next in the year 2000. For membership information contact them at PO Box 4081, Missoula MT 59806-4081 (406-549-9938).

The American Association for University Women is offering **International Fellowships** for the 2000-2001 academic year. Must have a bachelor's and must have already applied to proposed institution. Deadline December 15, 1999. AAUW also has Home Country Project Grants which have the same deadline. In addition they are searching for panelists for the International Fellowships Awards Panel. A small stipend applies. For information, call 319-337-1716 X 60, or write AAUW Educational Foundation, Dept. 60, 2201 N. Dodge St., Iowa City IA 52243-4030.

The National Arbor Day Foundation is holding a seminar, Trees, People and the Law, in four different cities to acquaint arborists, park managers, public officials and others about "tree law" and how it applies to liability, statutory, and common law concepts. The cities are Lehi (Utah), Baton Rouge, Kansas City, and Morgantown (West Virginia). Call 402-474-5655 for dates, costs, and registration materials.

The University of Minnesota is hosting **Women's Live, Women's Voices, Women's Solutions: Shaping a National Agenda for Women in Higher Education,** a national teleconference, on March 27-29, 2000. To coordinate a satellite site at your institution, discuss fees, and find out about funding, get information from www.umn.edu/women/wihe/site_org/main.html: email wihe@tc.umn.edu.

What Have We Learned From Major Wildfire Disasters? is the theme of the International Association of Wildland Fire Wildland Fire Safety Summit November 2-5, 1999, in Sydney, Australia. The conference will review four case studies of large event fires. Presentations will also be made on other wildland fire safety issues with the foci of presentation, operations, and human factors. For details regarding abstract submission and registration please visit http://www.wildfiremagazine/safetysummit.shtml.

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The University of Oklahoma Press is offering a library discount on selected publications, audiocassettes, and compact discs of **Native American music**. For information and titles, visit http://www.ou.edu/oupress.

Women scholars with research interests in the higher education experience of women are invited to apply for a Washington-based American Association of University Women (AAUW) Educational Foundation **Research Scholar-in-Residence Award.** The research project must focus on the impact and consequences for women on either technology, in particular distance learning, in higher education or economic barriers limiting to higher education. For guidelines, first visit http://www.aauw.org then contact AAUW Educational Foundation, Research Scholar-in-Residence Award, 1111 Sixteenth Street, NW, Washington, DC 20036, phone 202-728-7602, or email the foundation @aauw.org.

The U.S. Army Corps of Engineers is the steward of12 million acres and they are looking for **volunteers to work at lakes and recreation sites.** See www.orn.usace.army.mil/volunteer for information.

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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