women in NATURAL RESOURCES

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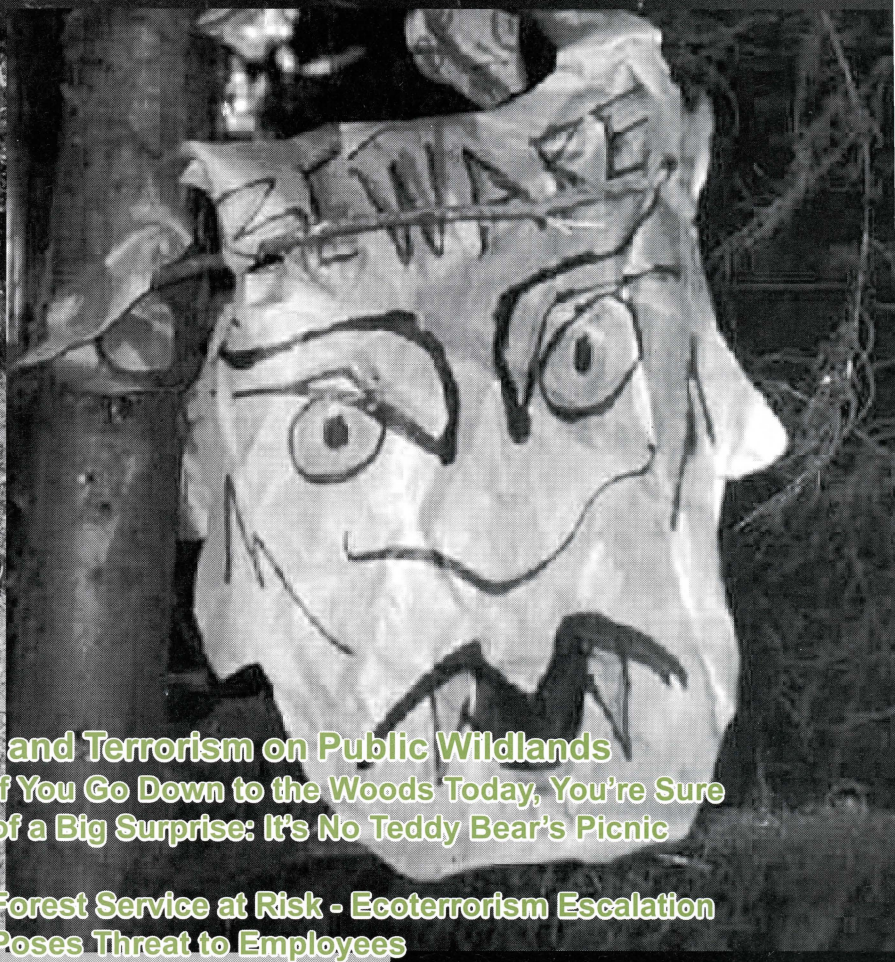
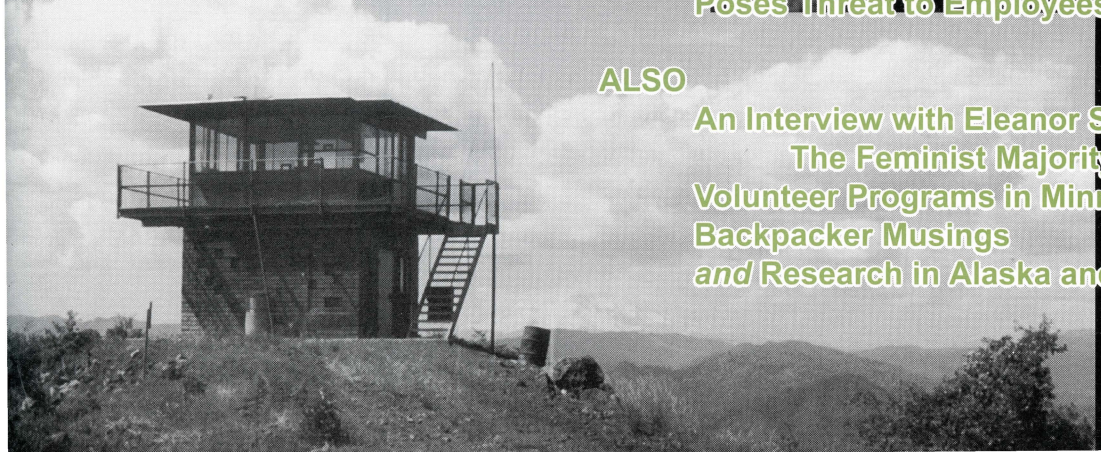


Crime and Terrorism on Public Wildlands
If You Go Down to the Woods Today, You're Sure of a Big Surprise: It's No Teddy Bear's Picnic

Forest Service at Risk - Ecoterrorism Escalation Poses Threat to Employees

ALSO

An Interview with Eleanor Smeal of The Feminist Majority
Volunteer Programs in Minnesota
Backpacker Musings
***and* Research in Alaska and Botswana**



Editorial

Sandra Martin

Crime Shatters Our Wildland Solitude

The appeal of working in the woods, or out on the range, or anywhere with a natural environment is powerfully influenced by the solitude of those places. The "wilderness experience" is a distinct part of the package that draws those of us who want to manage, steward, and protect natural resources. We love the natural beauty, the quiet, and the pristine qualities of the forests, prairies, wetlands, and deserts where we work, or for those of us more desk-bound than trail-bound, where we *long* to work. For the majority of people working with the environment, this love of the outdoors is a well-known experience.

And so, when our wilderness is violated, it is shocking. If often seems more terrible than if the intrusion occurs in suburbia or downtown. More and more these days, though, violation of the quietude occurs. Crime has come to the woods.

The escalation of crime on public wildlands is a relatively new phenomenon, even if law enforcement personnel have been part of the workforce of land management agencies for decades. The escalation is occuring in terms of both numbers of crimes, and the violence of these crimes. As the human population grows, cities expand outward, and the "distant forest" is no longer so far distant. In fact, many public forests, parks, and rangelands are now the "backyards" of sprawling urban centers, and are increasingly valued most highly not for the raw natural resources housed there, but for the recreational opportunities these lands provide to the burgeoning population.

And with the increase in recreating public comes an attendant increase in crime. The arrest sheet drawn up in Yosemite National Park on a holiday weekend can rival those generated in many small American cities, and the most violent crimes are no longer so rare an occurrence. As a colleague recently said to me, "Criminals like to recreate, too!" But wildlands are the scene of crimes unrelated to increased recreational use, as well. Illegal dumping of drug paraphenalia, garbage and debris, or even bodies is on the rise, as is the destruction of buildings and equipment. Of course, millions of acres of public lands witness no crime on the same busy holiday weekend that strains Yosemite Valley, and for that we can all be thankful.

Crime on public lands is beginning to receive serious attention and study, beyond that needed for response by law enforcement. We have the privilege of publishing one recent study by Joanne Tynon, Debra Chavez, and Christina Kakayonnis. The authors conducted surveys to determine what crimes were occurring on western National Forests, and how these crimes are being dealt with by managers and law enforcement agents.

Tynon, Chavez, and Kakayonnis list ecoterrorism as one form of crime disturbing the woods, and another article in this same issue examines ecoterrorism more closely. K.D. Leperi has recently completed a survey for the U.S. Forest Service of reports and other resources on ecoterrorism, and shares some of her findings in the article on page 18.

But as I mentioned above, the beauty and the solitude are still out there. Hallie Kendall writes about a recent backpacking trip into the Eagle Cap Wilderness in northeastern Oregon's Blue Mountains (see page 31). Kendall writes with wry humor, and illustrates startlingly beautiful scenes with her words. While reading Kendall's essay, I think you will remember your own small misadventures with hiking and camping, that in the end afforded you the opportunity to immerse yourself in the soul of the wild places that calls so strongly to those of us working in, and working for, natural resources.

WOMEN in NATURAL RESOURCES

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On the Cover:
Working in natural resources often finds us out in remote places, working alone or in small groups. Increasingly, this makes us more vulnerable to once-unthinkable crime in the wildlands.

Center photo: Mask outside EarthFirst! encampment. USDA Forest Service photograph.

FEATURES

Dean of the School of Forestry and Wood Products

Michigan Technological University seeks qualified applicants and nominees for the position of Dean of the School of Forestry and Wood Products. The Dean is the principal administrative officer for the School of Forestry and Wood Products, a unit presently comprised of 20 faculty and 44 research and support staff, and will function under the supervision of the Provost and Senior Vice President for Academic and Student Affairs for the University. The School is a strong research unit with two undergraduate degree programs: one in Forestry and one in Applied Ecology and Environmental Sciences. Graduate degrees offered include an M.S. in Forestry and two Ph.D. degrees: Forest Science, and Molecular Genetics and Biotechnology. The School maintains the Ford Forest, a 4000-plus-acre research forest. Faculty and students of the School seek an individual who has had success in building community and research partnerships. We also seek an individual who will be a true leader and mentor for a diverse group of faculty and staff who work well together as a functional academic unit. The Dean should have vision and continually strive to advance the mission of the School while maintaining the present collegial atmosphere among faculty, staff, and students.

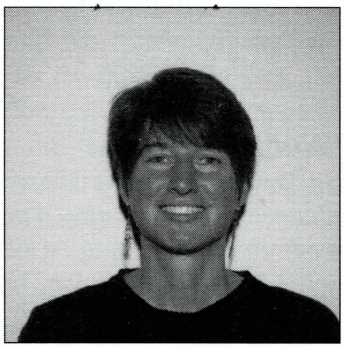
Qualified applicants must have a doctorate in forestry, ecology, wood science, environmental sciences, or an equivalent combination of education and experience to merit the rank of Professor with Tenure. Qualified applicants must also have teaching and research experience in addition to significant scholarship, and supervisory and leadership experience with the ability to build teams and inspire diverse groups. Qualified applicants should have excellent oral and written communication skills, and must have demonstrated fiscal responsibility and the ability to manage budgets. It is desirable the new Dean have a record of prior fundraising or advancement experience, and of developing policy in an academic setting.

Salary is commensurate with education and experience and includes a substantial benefits package. The University is located in a beautiful area of the United States, where both outdoor recreation and the forest products industry thrive. The School doubled in size this past October with the opening of new teaching and laboratory facilities; the new facilities also contain major state-of-the-art research instrumentation. Letters of application, curriculum vitae, and a vision statement should be sent to Michigan Technological University, Human Resources Office, 1400 Townsend Drive, Houghton, Michigan 49931. A complete job description is available at www.admin.mtu.edu/hro, by emailing jobs@mtu.edu, or by calling (906) 487-2280. Point of contact is Margaret R. Gale, Chair, Dean Search Committee (mrgale@mtu.edu or 906-487-2352). More detailed information on the School of Forestry and Wood Products is available on the School's web page (www.forestry.mtu.edu). Review of applications will begin on March 15, 2001 and will continue until the position is filled.

Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.

Correction

In Volume 21, Number 4 we published an article on marine resource management and the spirit realm in coastal Kenya, by Dr. Heidi Glaesel (photo below). The author's name was misspelled in this last issue of *Women in Natural Resources*. A brief report of Dr. Glaesel's current research follows.



My current research is a study of participatory, community-based marine management on the eastern shores of the United States from Maine to North Carolina. It examines fisheries management from the perspectives of local fishers, state fisheries managers, and scientists to better understand why incorporation of indigenous management activities that potentially protect marine resources into official management plans often fails. Areas addressed include differing perspectives on the utility and accuracy of fisheries information collected via observation, the value of trial-and-error experimentation, and the validity of catch data based on fish landings and sample trawls. Also addressed are different views on policies regarding fishing ground closures, licensing, boat buy-back programs, fisher retraining, quota systems, and marine protected areas.

It appears that shared goals of the continuation of viable fish stocks would be better met through additional reform of regional fisheries councils beyond what is mandated by the Sustainable Fisheries Act. These reforms include formal incentives for improved information sharing among local, state, and federal agencies, and formal incorporation of more genuinely participatory fisheries organizations into existing institutional structures.

I will be presenting a paper on this research at the annual Association of American Geographers conference, which will be held Feb. 27-March 3, 2001 in New York City (www.aag.org). *-Heidi Glaesel, Dec. 2000*

Positions Available
Daniel B. Warnell School of Forest Resouces
University of Georgia

Associate Dean for Research and Service

The Daniel B. Warnell School of Forest Resources at the University of Georgia invites applications for an Associate Dean for Research and Service to provide leadership in the development and implementation of the Schools research and service programs, including long-term strategies, new initiatives, acquisition and allocation of resources, and the integration of research, service and multidisciplinary programs with other University units and external cooperators. The successful candidate will have a Ph.D. in a forest resources discipline, demonstrated excellence in research and service, and at least five years of successful administrative experience. Applicants should submit a curriculum vitae, statement of interest, and names and contact information of three to five references. Applications received by March 15, 2001 are assured full consideration. Employment to begin July 1, 2001. **Send applications to: Dr. Bruce Bongarten, Daniel B. Warnell School of Forest Resources, University of Georgia, Athens, GA 30602. (706) 542-7247, bongarte@smokey.forestry.uga.edu**

Aquatic Toxicologist

The Daniel B. Warnell School of Forest Resources at the University of Georgia invites applications for a 12-month, tenure-track faculty member at the assistant professor level. The successful applicant will be experienced in aquatic biology, with preference for candidates for whom fish are the primary research organism. Committed to excellent teaching and advising. Experience in designing and conducting independent research and securing research funding is required. Strong oral and written communication skills. Applications should include a statement of teaching and research interests, a detailed curriculum vitae, including publications and research funding history, names and contact information for three references. Applications received by March 15, 2001 are assured full consideration. **Send applications to: Dr. Richard Winn, 458 Animal Science Complex, Warnell School of Forest Resources, University of Georgia, Athens, GA 30602. (706) 542-6227, rwinn@smokey.forestry.uga.edu**

Forest Genomics

The Daniel B. Warnell School of Forest Resources at the University of Georgia invites applications for a 12-month, tenure-track assistant professor in forest genomics to join a team of biotechnology researchers. Ph.D. and postdoctoral experience in an appropriate discipline required. Experienced in the use of genomic techniques, such as high through-put analysis of molecular markers or DNA microarrays. Applications should include a curriculum vitae, statement of research interests, letters of evaluation from three references, transcripts of college-level work and reprints of selected publications. Applications received by March 15, 2001 are assured full consideration. **Send applications to: Dr. Jeffrey Dean, Warnell School of Forest Resources, University of Georgia, Athens, GA 30602. (706) 542-1710, Email: jeffdean@uga.edu**

Forest Landscape Ecology

The Daniel B. Warnell School of Forest Resources at the University of Georgia invites applications for a 12-month, tenure-track assistant professor in forest landscape ecology. Ph.D. in landscape ecology required, with at least one degree in forestry or a closely related field. The candidate will develop an active, externally funded research program in landscape ecology focused on forests and related natural resources. Research emphasis will include spatial and temporal aspects of forest resource ecology and management and the integration of ecological, physical and societal processes as they impact forest resources. Applications should include a vitae, university transcripts, a sample of significant relevant publications (no more than five), and the names and contact information for three references. Applications received by March 15, 2001 are assured full consideration. **Send applications to: Dr. Ronald Hendrick, Daniel B. Warnell School of Forest Resources, University of Georgia, Athens, GA 30602. Telephone (706) 542-1385, E-mail: rhendric@arches.uga.edu**

Forest Landscape Planning and Harvest Scheduling

The Daniel B. Warnell School of Forest Resources at the University of Georgia invites applications for a 12-month, tenure-track faculty at the assistant or associate professor level (75% research, 25% teaching). Ph.D. required with at least one degree in forest resources. Advanced studies in quantitative management, operations research and forest operations planning required. Candidate will be expected to initiate a research program to investigate cost effective innovative systems for forest planning operations scheduling that meet spatial considerations at the stand, ownership and landscape level. Applications should include a curriculum vitae, statement of research interests, letters of evaluation from three references, transcripts of college-level work and reprints of selected publications. Applications received by March 15, 2001 are assured full consideration. **Send applications to: Dr. Dale Greene, Warnell School of Forest Resources, University of Georgia, Athens, GA 30602, greene@smokey.forestry.uga.edu**

Quantitative Forest Modeling

The Daniel B. Warnell School of Forest Resources at the University of Georgia invites applications for a 12-month, tenure-track faculty at the assistant or associate professor level in Quantitative Forest Modeling. Ph.D. required with at least one degree in forest resources. Advanced studies in quantitative aspects of forestry required, including, but not limited to, biometrics, statistics, growth and yield modeling, biological process modeling and/or forest management sciences. Successful candidate will share teaching responsibilities for undergraduate courses in biometrics, mensuration, forest management, quantitative decision sciences and/or growth modeling. Applications should include a curriculum vitae, statement of research interests, letters of evaluation from three references, transcripts of college-level work and reprints of selected publications. Applications received by March 15, 2001 are assured full consideration. **Send applications to: Dr. Richard F. Daniels, Warnell School of Forest Resources, University of Georgia, Athens, GA 30602, ddaniels@smokey.forestry.uga.edu**

Wildlife Extension Specialist

The Daniel B. Warnell School of Forest Resources University of Georgia invites applications for a 12-month, tenure-track assistant professor of wildlife (50% teaching, 50% extension). Ph.D. in wildlife or related field with expertise in applied wildlife management, and at least one degree from a management-oriented natural resources program. Strong interest in teaching and a demonstrated ability to communicate through a variety of media. Applications should include a curriculum vitae, statement of teaching and extension interests, names and contact information for three references, transcripts of college-level work, and copies of selected research and extension publications. Applications received by March 15, 2001 are assured full consideration. **Send applications to: Dr. Karl Miller, Daniel B. Warnell School of Forest Resources, University of Georgia, Athens, GA 30602. Email: kmiller@smokey.forestry.uga.edu**

The University of Georgia

The University of Georgia is a land grant institution composed of 13 schools and colleges including the Graduate School. Enrollment is 30,000 undergraduate, graduate and professional students. The Daniel B. Warnell School of Forest Resources is a professional school with 64 faculty, 250 upper division undergraduates and 130 graduate students. The School offers the bachelor of science degree with majors in forestry, wildlife, fisheries, and forest environmental resources. Graduate degrees include the master of forest resources, master of science, and doctor of philosophy. The School maintains an 800-acre research forest less than 10 minutes from campus and 25,000 acres of forest land across the state used for teaching, research, and service activities.

The University of Georgia is a unit of the University System of Georgia. The University of Georgia is an Equal Employment Opportunity/Affirmative Action Institution

Suppressed, Forced Out and Fired. How Successful Women Lose Their Jobs. Martha E. Reeves. Westport, CT: Quorum Books, 2000. Hard bound.

EVEolution. The Eight Truths of Marketing to Women. Faith Popcorn and Lys Marigold. New York: Hyperion Books, 2000. Hard bound.

Is the truth really out there? Is it a fixed point, a fact, or an attitude? Or, is it a product, issue, or ideology? Or does it lie somewhere among these? These two books made me wonder about the definition of "truth." I've experienced one kind of truth as a working woman, and I am dedicated to the goal that no one of my gender will have to experience the same.

Martha Reeves presents ten case studies of women who successfully worked in mid- and upper management positions before being fired, laid-off, or reorganized out of their jobs. Their industries include insurance and financial institutions, manufacturing, retail, and graphic arts and printing. Job titles of the women included Marketing and Finance Mangers, Director of Training, Director of Human Resources, and Total Quality Manager. Most of the companies are British, so the terminology used to describe the office and office politics are different than what we know here in America.

The author lays out her view of the accepted "good ole boy" system (in politically correct terminology, of course) and through interviews and diary excepts shows how each of these women challenged the system, and lost. The book describes women's subordination in the workplace (Chapter 2) and understanding this subordination (Chapter 3).

BOOKS REVIEWED by Jonne Hower

Tucked near the end is a chapter called "Patriarchy and Personality." These all read like an overview of an introductory Women's Studies course, and I didn't see new information here.

One chapter is devoted to profiles of these ten women. We learn that "Katherine...was encouraged by her parents to do well at school...," that "By the time Diane was 13, she had been to eight schools and learned how to play the game of just doing enough to get by...," and that "Caroline's mother left her father when Caroline was only 10 years old." While it is nice to know the "whole person," the author never connects early development with performance. I wonder if the same attention would be lavished on dissecting a male's early childhood?

As readers, we are left to draw our own conclusions. Here are mine. I recognized many of the strategies that brought these women down. I recognized them because I have lived through them myself. So, even though the setting is Britain today, the underlying concepts flow across the cultural divide, and they flow across the years. Recently, I have found myself telling younger colleagues how much work life has changed since I entered natural resources and often found myself as the sole representative of my gender in my office or unit. This book suggests, though, that things may not have changed all that much. As my mama always used to say: fore-warned is fore-armed. Younger readers, read this book and take note of what didn't work. Mature readers, read this book and know that our status quo lives on! Figuring out what *will* work to improve the professional situation for working women is up to each of us; the writer of this book provides no clues.

From the "BrainReserve TrendBank" on the first page of *EVEolution*, Popcorn writes:

> EVEolution: The way women think and behave is impacting business, causing a marketing shift away from a hierarchical model toward a relational one.

I loved the premise of this book and the research behind it, even though I felt assaulted by "creative spelling and capitalization," marketing jargon, simplistic ideas, and description of an urban lifestyle I see only on television or in the movies. Popcorn writes:

> EVEolution is about a cascade of changes...not just for marketing, but for the way your business is structured, financed, organized, and managed on a minute-to-minute basis.

The good news: Futurist, forecaster of business trends, and marketing strategist Popcorn has grounded her eight truths in solid ethics which is encapsulated in Chapter 8: "Everything Matters - You Can't Hide Behind Your Logo":

> Never try to deceive a woman. She has X-ray vision. Eventually, she'll see right through you. You might get away with it once. But it's never going to work twice. Remember Shakespeare's warning, 'Hell hath no fury like a woman scorned.' Once she's on to you, you've lost a customer forever. Which is a long time.

The bad news: That quote was written as three paragraphs! This whole book is written as though it would appear on the backs of cereal boxes or as jacket copy for a video.

I think the authors' research is some more of the good news. "Women buy or influence the purchase of 80% of all consumer goods...Women buy 50% of all cars; they influence 80% of all [car] sales...in families where both spouses work, wives out-earn their husbands in 22.7 % of those households." Women are an economic force. The authors don't explain why, though, women don't reap enough benefits from this power to earn equal pay.

More bad news: Recently, a new piece of jargon has entered the popular language, "24/7," meaning "24 hours a day, 7 days a week." Popcorn's references to her own life lead me to believe that is what her work life is like—and that she expects it to be like that for all her clients, too. If so, I guess I really am from a different generation! At the end of my workday, I want to dig in my garden, read a book, take a walk, or cook dinner. I want to do this without being connected to my work life.

Popcorn's book is grounded in the urban landscape. If you look at the demographics, most of America belongs to this urban landscape. However, my life and the lives of my colleagues are devoted to rural America and the management and stewardship of our public natural resources. For us, Popcorn's messages may not so readily apply. One application, though, is to take the ideas presented in this book and prepare communication plans that will ensure that women understand and support natural resource management. Each of Popcorn's eight truths can be used:

1. Connecting your female consumers to each other connects them to your brand.
2. If you're marketing to one of her lives, you're missing all the others.
3. If she has to ask, it's too late.
4. Market to her peripheral vision and she will see you in a whole new light.
5. Walk run, go to her, secure her loyalty forever.
6. This generation of women consumers will lead you to the next.
7. Co-parenting is the best way to raise a brand.
8. Everything matters-you can't hide behind your logo.

Even while presenting an opportunity, using Popcorn's marketing schemes generates concern for me. This same list of truths can be used to manipulate American citizens about their public resources. Sometimes It seems as though *everything* is for sale.

In the end, though, I feel the same about *EVEolution* as I do about *Suppressed, Forced Out and Fired*. Fore-warned is fore-armed.

Publications

Status and Trends of the Nation's Biological Resources. Vols. 1 and 2. M.J. Mac, P.A. Opler, C.E. Puckett Haecker, and P.D. Doran. Reston, VA: U.S. Department of the Interior, U.S. Geological Survey, 1998. The U.S. Geological Survey compiled this accessible evaluation of the condition of ecosystems in the United States. **Status and Trends** is organized into two parts; Part I examines seven of the natural and human-influenced factors that affect the condition and relationships among biological resources; Part II details the natural history and current status of 15 geographic or ecological regions within the United States.

The Door in the Dream: Conversations with Eminent Women in Science. Elga Wasserman. Washington, D.C.: Joseph Henry Press, 2000. The author uses her study of women elected to the National Academy of Sciences to underscore her persuasive arguments that as the doors of opportunity have opened to them, women have made impressive contributions throughout the natural sciences. Wasserman groups the women according to their birthdates (before 1920, the '20s, the '30s, and afterward). The author celebrates women who were not only able to contribute to science, but to excel. Realizing the continuing waste of talent in women who become discouraged at the discrimination they still encounter, and the lack of flexibility in institutions designed to fit the patterns of male life cycles, we can see that much remains to be done.

Forest and Wildlife Science in America: A History. Harold K. Steen, ed. Durham, NC: Forest History Society, 1999. This resource traces the history of science in forestry and wildlife management. It shows the role science has played in the formation of natural resource policy during the last 100 years.

Cont. on page 24

If You Go Down to the Woods Today, You're Sure of a Big Surprise: It's No Teddy Bear's Picnic

Joanne F. Tynon, Ph.D.

Deborah J. Chavez, Ph.D.

Christina Kakoyannis

If you go down to the woods today
You're sure of a big surprise
If you go down to the woods today
You'd better go in disguise

Beneath the trees where nobody sees
They'll hide and seek as long as they please
'Cause that's the way the Teddy Bears have their picnic

If you go down to the woods today
You'd better not go alone
It's lovely down in the woods today
But safer to stay at home

For ev'ry bear that ever there was
Will gather there for certain, because
Today's the day the Teddy Bears have their picnic.[1]

Introduction

Crime has been the subject of much study, including statistics by type of crime, cities where crime is most likely to occur, impacts to victims, and characteristics of criminals. Despite the fact that federal land managers are compelled to be alert to incidents ranging from methamphetamine manufacture to more violent crimes like arson and homicide, crime that occurs in a leisure setting on federally managed lands has received scant research attention. A good deal of recent media attention has focused on the safety of the recreating public, yet we have no leisure setting model for crime and enforcement (Pendleton, 2000). Scarcity of peer-reviewed research makes it difficult to determine whether crime on federal public lands is really a growing problem or if it is relatively random and merely sensationalized by the media.

The number of serious crimes nationwide has been declining for nearly eight years (Sniffen, 1999) and yet the USDA Forest Service (FS) reported an escalation in violent encounters, especially against FS employees (Driessen et al. 2000). Even so, there is surprisingly little in the literature regarding trends in criminal activity on public lands over this same time period. Because we currently do not have an adequate understanding of the nature and extent of crimes on public lands and how they may affect visitor and employee safety, we may find ourselves unprepared to manage for conflicts. This paper examines these issues and addresses whether "the woods" are a safe place to be.

[1]Excerpted from *Teddy Bears' Picnic,* (1932, B. Feldman & Company, London)

Background

What we know about the extent of criminal activities on public lands

Research on crime and violence on public lands is limited. Historically, research on criminal behavior on public lands focused on vandalism (Christensen and Clark, 1978), which includes graffiti and target shooting. In an article on criminal acts on forest lands, Munson (1995) noted many types of crimes, including the dumping of garbage and toxic chemicals, vandalism, marijuana cultivation, and timber thefts. In 1991 alone, National Park Service (NPS) rangers across the U.S. dealt with 17 homicides, 214 aggravated assaults, 632 burglaries, 3,897 larcenies, 185 motor vehicle thefts, 114 arsons, 1,321 weapons offenses, 501 sex offenses, 1,878 drug violations, and thousands more minor assaults and disorderly activities (Berkowitz, 1995). Although noting that many crimes were underreported, Fletcher (1984) found that the most frequent violations during a five-month summer season at a typical Texas lake site were disturbing the peace, injury, and theft, though sexual assault and holdups occurred as well. In the FS, Driessen et al. (2000) reported that employees are subject to "verbal threats, abuse, and harassment" (p. 2) more often than physical attacks, although FS workers have been "victimized by violence and threats of violence" (p. 2).

Interviews with federal law enforcement officers at national forest and national park sites found that officers have noticed an increasing amount of forest and park crime in recent years (Pendleton, 1996). These officers' perceptions were found to be consistent with documented crime statistics from this study, which identified a 19% increase in national park crime and a 100% increase in national forest crime from 1989 to 1992.

Domestic terrorism, which is defined as "the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives," has also occurred on public lands (FBI, 1995). Usually carried out by extremist groups, domestic terrorism includes threats and criminal damage against federal government personnel and property—such as the bombing of a FS district office in the Toiyabe National Forest (United Press International, 1995). Ecoterrorism, a specific type of domestic terrorism, includes acts of sabotage to mining or logging equipment, criminal trespass, and arson. Ecoterrorists were responsible for the highly publicized arson of the Vail ski resort on FS land in October 1999 in response to its planned expansion into a portion of wilderness. Another example of ecoterrorism is

Example of a militia/Supremacist sign found on a National Forest.

USDA Forest Service photograph

the act of tree spiking, in which long metal spikes are driven into trees that shatter and can cause severe injury when they come into contact with a logger's chain saw (Eagan, 1996).

Although many criminal activities occurring on public lands are similar to those found in urban areas, some crimes, such as tree theft and poaching of both wildlife and plants, are unique to rural forests and parks (Pendleton, 1997). One study of the NPS found that during 1990-1991, 99 different species of plants were illegally collected, some with remarkably high market value. Although the reports of illegal poaching are already significant, the NPS estimates that only one out of every thirty cases of poaching gets detected (Berkowitz, 1995).

What we know about the effects on visitor and employee safety

Increasing visitation, coupled with increasing criminal activities on federal public lands, poses a management problem for visitor safety. Illegal dumps of garbage, tires, and hazardous waste (including waste from drug labs) have been frequently found on Bureau of Land Management (BLM) and FS land. The clean up of these dumps can be costly, and many dumps continue to remain on public lands because agencies often do not have the funds necessary to remove the contamination. Illegal drug plantations have also been found in remote areas of public lands in those states where growing conditions are favorable. Besides supplying illegal drugs, marijuana growers pose a threat to both public visitors and federal employees. Growers are often heavily armed and their marijuana plantations can be booby-trapped with guns or other devices to prevent access (Munson, 1995).

Not only do crimes threaten visitor safety, but they also threaten federal employees working on these same public lands. Pendleton (1996) found that law enforcement officers (LEOs) and rangers encounter weapons on a routine basis in their daily rounds. A report by the Public Employees for Environmental Responsibility (PEER) found that threats, violence, and vandalism towards FS and BLM personnel and facilities have been increasing since the group first began recording these types of incidents in 1995 (Anon., 1999). The PEER report noted that most of the problems occurred in western states where the majority of public lands are located. In 1998, 100 incidents of violence or intimidation toward FS or BLM employees were reported (*ibid*). This was more than double the 1995 figures, and many additional incidents are believed to go unreported (Berkowitz, 1995).

The increase in criminal violations on public lands, coupled with a perceived lack of enforcement of federal laws, may be contributing to a more dangerous situation for federal employees on public lands. Federal law enforcement officers may face hazards, particularly in western states where government authority has traditionally been challenged (Pendleton, 1996). Recently, a Nevada FS supervisor resigned in protest over what she saw as an increasing "anti-federal fervor" that places federal employees at risk (Associated Press, 1999b). The bombing of a FS ranger's office (*ibid*) demonstrates that these concerns are warranted. Furthermore, a law enforcement officer in Nevada complained in frustration that federal prosecutors had not prosecuted 21 felonies and 52 misdemeanors given to them by the FS (Sonner, 1999).

Purpose of the Study

We decided it was time to find out if crime and violence are real concerns on western FS lands, or merely the result of a few highly publicized incidents. In this first phase of a projected multiphase study, we wanted to determine what crimes were occurring on western National Forests, and how they were being dealt with by managers and law enforcement agents. Further, we needed to begin to ask the questions that would help us develop a large-scale survey instrument for use on a national level. While we are interested in the impact that crime and violence have on recreation management, our ultimate goal is to determine how crime and violence affect recreationists' decision making and participation patterns (or, what people choose to do, where they decide to go or not go, and why).

Dumping of trash is fairly common on National Forests that were surveyed.

USDA Forest Service photograph

Methods

The research design we used is case study research (Crabtree and Miller, 1992; Hamel et al., 1993; Yin, 1993). Case study methods are appropriate when one wants to: (1) broadly define topics, (2) investigate phenomena within context, particularly when the boundaries between phenomena and context are difficult to separate, and (3) use multiple sources of evidence (Yin, 1993).

In the summer and fall of 1998, we conducted face-to-face interviews with personnel at eight FS sites in the western United States (Rubin and Rubin, 1995; Kvale, 1996; Seidman, 1998). This technique facilitates the constant feedback and probing necessary to understand perceptions

of crime and crime impacts. We also believe this technique is more successful than survey methods—especially at the exploratory stages of research—at eliciting responses from reticent or reluctant interview subjects. We concur with those who promote the continued use of qualitative methods, in general, as a way to make sense of experiences (Howe, 1985, 1991; Gunter, 1987; Henderson, 1991; Hultsman and Anderson, 1991; Kelly, 1991; Bogdan and Biklen, 1992; Glesne and Peshkin, 1992).

Part of an EarthFirst! encampment.
USDA Forest Service photograph

The interview team consisted of Chavez and Tynon, each taking a turn at conducting the interviews while the other wrote notes and ran the tape recorder. We used scripted conversations to ensure consistency in our interviews. While the actual number of interviewees varied per site, we typically met with two to four people at a time. We interviewed LEOs, administrators, and others. We frequently concluded our visit with a site tour of criminal hot spots, which we found invaluable for putting criminal activity in perspective. When LEOs accompanied us, these trips provided us an additional contact opportunity.

Sample

Our sample included eight sites: two each from FS Region 3 (Arizona and New Mexico), Region 4 (Idaho, Nevada, and Wyoming), Region 5 (California), and Region 6 (Oregon and Washington). We identified half of the sites as urban proximate, or urban interface, forests. The FS defines urban forests as wildland within an hour's drive of a million or more people. Half of our interviews were conducted at a FS Ranger District (RD) and half were conducted at a Supervisor's Office (SO). Because the sample is not random, the results are not generalizable; that is, they do not apply to FS areas not in this study. The primary interview subjects were LEOs, special agents, and investigators. Secondary interview subjects included administrative staff who directly supervise the work of LEOs, and others, such as outdoor recreation planners and public affairs specialists, who had knowledge of criminal activities. Conventional research protocols regarding confidentiality and privacy were followed carefully.

Analysis

A subcontracted court reporter began transcribing the interview tapes immediately after each interview. Court reporters use specialty shorthand equipment and software and, therefore, they can accomplish transcriptions in less time, and with fewer errors, than transcribers who go from tape to word processors.

We used standard qualitative methods to analyze the narrative data. In qualitative inquiry the purpose is to capture and understand the perspective of individuals without predetermining their perspective through prior selection of questionnaire categories (Patton, 1987, 1990; Bogdan and Biklen, 1992). Qualitative researchers focus on narrative rather than numerical data and on the meanings that emerge from analyzing the narrative data (Patton, 1990; Tesch, 1990; Henderson, 1991). While qualitative research can be used for verification, it is more often oriented toward the discovery or exploration of ideas and concepts (Stainback and Stainback, 1988; Strauss and Corbin, 1990; Henderson, 1991; Kelly, 1991; Glesne and Peshkin, 1992). Typically, qualitative analysis is not guided by hypotheses before data collection is undertaken, but begins inductively with questions about individual

experiences in order to build toward general patterns (Patton, 1987, 1990; Strauss and Corbin, 1990; Henderson, 1991; Bogdan and Biklen, 1992). We analyzed the transcriptions and our notes for content, preserving a faithful rendering of terminology. We extracted major themes or categories (Patton, 1987; Stainback and Stainback, 1988; Strauss and Corbin, 1990; Tesch, 1990) from the narrative responses made by FS interviewees, and verified our findings with the people interviewed. Finally, we did not analyze the interviews for quantitative measures of the frequency of criminal activities; instead, we examined the respondents' perceptions as to the relative extent and impact these activities have had on their forest site.

Findings

We began with a tentative list of crimes based on FS incident reports and media reports (see for example: Associated Press, 1998a, 1998b, 1999a; Loux, 1996; Foster, 1997; Murphy, 1997; Sullivan, 1997). We soon found that much more was occurring on these western National Forests than we originally thought. At the conclusion of our analysis, we found crimes fell into five categories:

1. *Urban-associated crime*, identified by FS interviewees as crimes not typically associated with forest settings, such arson, body dumping, domestic violence, drive-by shooting, gang activity, murder, rape/sexual assault, indiscriminant or deliberate shooting that endangers employees or other visitors, suicides, thefts);
2. *Assaults* (criminal damage, threats against personnel, threats against property);
3. *Drug activity* (marijuana cultivation, armed defense of crops, booby traps, methamphetamine manufacture and waste);
4. *Takeover or violence perpetrated by members of extremist or nontraditional groups* (EarthFirst!, militias/ supremacy groups, motorcycle groups, property rights groups, satanic cults, survivalists, white power groups, wise use groups); and an
5. *Other* category (armed defense of forest products, dumping of chemicals, dumping of household waste and landscape materials, homeless people taking up residency in the forest, and trespass by undocumented immigrants).

Urban-associated crimes like arson (e.g. torching of stolen vehicles), domestic violence, and thefts (e.g.

Table 1. Occurrence of Urban-associated Crime on Eight Selected National Forest Sites as Reported by USFS Interviewees

USFS Region	3	3	4	4	5	5	6	6
SO or RD[1]	RD	RD	SO	RD	SO	SO	SO	RD
Urban/Rural Forest	U	R	R	U	U	U	R	R
Urban-associated Crime Type								
arson	x	x	x	x	x	x	x	x
domestic violence	x	x	x	x	x	x	x	x
thefts	x	x	x	x	x	x	x	x
body dumping	x	x	x	x	x	x	x	
gang activity	x	x	x	x	x	x	x	
shooting[2]	x	x	x	x		x	x	x
suicides	x	x	x	x	x	x	x	
murder	x	x	x	x		x	x	
rape/sexual assault	x	x		x		x	x	
drive-by shooting			x			x	x	x

[1] SO: Supervisor's Office; RD: Ranger District

[2] indiscriminant or deliberate shooting that endangers others

Table 2. Occurrence of Assaults on Eight Selected National Forest Sites as Reported by USFS Interviewees

USFS Region	3	3	4	4	5	5	6	6
SO or RD[1]	RD	RD	SO	RD	SO	SO	SO	RD
Urban/Rural Forest	U	R	R	U	U	U	R	R
Assaults								
criminal damage	x	x	x	x	x	x	x	x
personnel threat	x		x	x		x	x	x
threats against property		x				x	x	x

[1] SO: Supervisor's Office; RD: Ranger District

personal belongings) occurred in all eight of the locations we investigated (Table 1). Body (or body parts) dumping, gang activity, suicides, and indiscriminant or deliberate shooting that endangers others occurred at seven of the eight sites we studied. At one forest site, we were told that "everyone here has a weapon," that "everyone carries a sidearm or a rifle or a shotgun in their vehicle." Murders were a problem at six locations, while rapes and sexual assaults have been reported at five sites. At half of the locations we heard reports of drive-by shooting incidents, and three of those four reports came from rural forests. So, these problems aren't limited to urban interface (or, as one officer put it, "in-your-face") forests. In fact, in all but one interview, we heard about the effects of what respondents termed "urban spillover." One law enforcement officer said, "We're doing city law enforcement, not natural resources law enforcement."

In the assault category we included personal assault as well as criminal property damage. Criminal damage occurred at all eight of the sites we visited (Table 2), and ranged from the usual acts of vandalism (like damage to signs, posts, and other government property) to bombs. Threats to personnel (at six sites) included those made by militia members to kill any law enforcement officer who shows up during their training activities on the National Forest, to stalking, to the very real kidnap and assault of a seasonal Forest Service employee. Interviewees at four sites reported criminal property threats.

Drug activity occurred at all eight sites (Table 3, page 12). Originally, our drug category included only marijuana cultivation (found to occur at all of our study sites), armed defense of marijuana crops, and booby traps. We heard from FS interviewees that many marijuana gardens are difficult to find and are most often located accidentally by recreationists, usually by hunters. While fewer plots are booby-trapped these days than in the past, we were told they are more likely to be guarded by someone armed with an automatic weapon (reported at four sites). In the Southwest, some gardens are even watered via sophisticated drip irrigation systems. We added methamphetamine (commonly known as "meth") manufacture, meth labs, and meth chemical dumps (reported at seven of the eight sites) to our drug category when we discovered that clandestine meth labs and meth lab wastes are an increasing hazard on National Forests, as they are elsewhere throughout this country. Meth labs and meth waste materials are particularly difficult to deal with because the paraphernalia can resemble ordinary household garbage (gallon plastic jugs, garbage bags, and five-gallon buckets), yet it's contaminated with highly toxic chemical waste, requiring cleanup workers to don protective suits and respirators.

FS interviewees reported a variety of what they called "nontraditional" users engaging in criminal acts on national forests. Interviewees identified and ascribed responsibility for problems to members of EarthFirst!, militias/supremacy groups, motorcycle groups, property rights groups, satanic cults, survivalists, white power groups, and wise use groups (Table 4, page 12). Satanic cults were mentioned at each of the eight sites, although cultists were rarely found in the act. Most of evidence left behind was in the form of pentagrams, animal skulls, and other bones. Six sites reported problems with white power groups, Earth First!, wise use groups, motorcycle groups, and survivalists. We heard reports of problems at five sites with members of militias/supremacy groups, and property rights groups. It's important to note that while FS interviewees did not incriminate all the members of these groups, they told us that often the mere presence of

Table 3. Occurrence of Drug Activities on Eight Selected National Forest Sites as Reported by USFS Interviewees

USFS Region	3	3	4	4	5	5	6	6
SO or RD[1]	RD	RD	SO	RD	SO	SO	SO	RD
Urban/Rural Forest	U	R	R	U	U	U	R	R
Drug Activity								
marijuana cultivation	x	x	x	x	x	x	x	x
meth labs	x		x	x	x	x	x	x
meth chemical dumps	x		x	x	x	x	x	x
armed crop defense	x		x		x	x		

[1]SO: Supervisor's Office; RD: Ranger District

some of these group members could make other forest visitors uneasy. One LEO remarked, "We've had places that we have absolutely lost, and we have taken back" (by gating and having a strong law enforcement presence). "When I talk about taking them back, I mean giving them back to legitimate users and taking them from people who would ruin the experience."

The last category, "other," includes crimes that don't fit into the other four categories: armed defense of mushroom areas and other areas where prime forest products (like beargrass) are harvested; illegal landfills of household waste, landscape materials, and burned out cars; homeless "homesteads;" and activities associated with smuggling undocumented immigrants into the United

Table 4. Occurrence of Crime or Violence Perpetrated by Members of Extremist or Nontraditional User Groups on Eight Selected National Forest Sites as Reported by USFS Interviewees

USFS Region	3	3	4	4	5	5	6	6
SO or RD[1]	RD	RD	SO	RD	SO	SO	SO	RD
Urban/Rural Forest	U	R	R	U	U	U	R	R
Group Types								
satanic cults	x	x	x	x	x	x	x	x
Earth First!	x	x	x			x	x	x
wise use	x	x	x		x		x	x
motorcycle groups	x	x	x	x		x	x	
survivalists	x	x		x	x	x	x	
white power groups	x	x	x	x		x	x	
militias/supremacists			x	x		x	x	x
property rights	x	x	x				x	x

[1] SO: Supervisor's Office; RD: Ranger District

States. FS employees at all eight sites experienced problems with dumping of household and/or landscape material and with homeless people. Seven sites had problems with industrial chemical dumping. The problems associated with the trespass of undocumented immigrants (at five of the sites) include user-created trails, trash left behind, pack animals left behind, and human waste. In the Southwest, decades-old smugglers' routes continue to be used and some are five or more feet deep from heavy use. FS interviewees at only two sites mentioned problems associated with the armed defense of forest product areas.

Implications

Urban vs. Rural Sites

While some documented crimes such as poaching and tree theft are specific to public lands in rural locations (Weisheit et al., 1994), a key finding from our study is that urban-associated crime is no stranger to National Forests in the western United States. Although many of our National Forest study sites are near large urban populations, we found, unexpectedly, that rural forests also suffer from what interviewees termed "urban spillover" effects. Urban-associated crimes and crimes that fell into the other category (e.g. armed defense of forest products, chemical dumping, dumping of household waste and landscape materials, homeless residency, and undocumented immigrant trespass) occurred in both urban proximate and rural forest study sites. In fact, FS interviewees at all eight sites said they had faced these problems, although they reported a higher prevalence of these crimes in urban proximate areas. We found some differences in the assault category—more occurred in urban interface areas. And, in urban areas we found more affirmative responses to our queries about drug activities. FS interviewees in rural areas appeared to have more problems with members of extremist, or nontraditional user groups.

Impacts to Recreationists

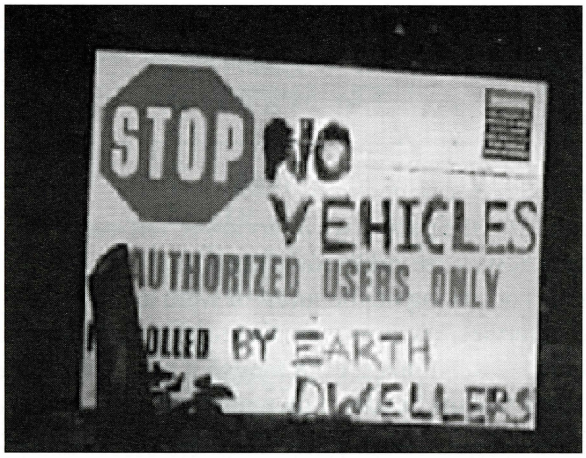
Many of the people we interviewed felt that recreationists were either completely unaware of criminal activities occurring on the forest or were unaffected. Some interviewees, however, did feel that there was some impact to recreationists, even though it might be minimal. We heard that the "average recreationist doesn't have a clue" and "recreation impacts are short term." Many of those we interviewed noted that few criminal incidents were announced to the public, often because they are such common occurrences. Especially in urban proximate areas, they told us "it's an urban environment so people aren't surprised." A few of the people we spoke to felt there was some personal characteristic that determined a recreationist's reaction to criminal elements in the forests: "it doesn't bother the users because it's what they're used to," or, "if they live in (the) city, then they are used to gunshots and they won't call us." FS interviewees thought the public should be more concerned than they appeared to be. They were surprised that "very violent crimes don't seem to bother the recreationists. It might clear a parking lot but the next day people will be out there again."

Impacts to Management

Most of those interviewed perceived an increase of criminal activity on FS lands and remarked on the subsequent costs to management in terms of personnel and other resources, and the low funding levels available to deal

Weapons confiscated during a raid at a recreation site.

USDA Forest Service photograph



Sign found outside an EarthFirst! encampment.
USDA Forest Service photograph

with these problems. Especially costly are chemical dump cleanups, and fixing and replacing signs and facilities. Most impacts, we were told, can be traced to gang activity, criminal damage, threats against personnel, meth manufacture, and Earth First! LEOs stressed repeatedly that, "we're not doing natural resources law enforcement, we're doing city law enforcement." Over and over again, we heard, "this isn't a traditional FS" site. Not only have National Forests "become the open space for the metropolitan area," they are the backyards for so many people, urban and rural alike. "There's so many things out there it's hard for people to understand," one LEO said. "We're doing triage law enforcement." This represents an inexorable, yet major, shift in law enforcement efforts on public lands. We estimated that, on average, each FS law enforcement officer in our study is patrolling 378,000 acres alone, with backup often an hour or more away. Given the vast territories that LEOs patrol, it's no wonder that getting a police dog is a high priority for many.

Communication

In the course of our investigation, we learned that many crimes are not reported to the recreating public. We also discovered that many crimes are not known to FS personnel outside of the LEOs. However, at some sites, respondents said criminal activities are so prevalent that they are no longer mentioned at meetings, and one supervisor told us that they might learn of a murder or a body being dumped two to three days after the fact. We were told that employees become callous to reports of crime and violence, that "so much goes on at the Forest that the staff are desensitized." In some of the interviews, it was clear to us that good communication existed between LEOs and other FS personnel; in others, communication was lacking or absent. We believe that where crime and violence are concerned, poor communication is a problem that needs to be addressed, since it may have serious consequences for employee and visitor safety.

Discussion

Public uses of outdoor natural areas, like National Forests in the United States, have been undergoing change. The most apparent changes have been increasing levels of use and nontraditional user groups (Baas et al., 1993; Chavez, 1998; Dwyer, 1994; Hospodarsky and Lee, 1993). In part, these changes are due to societal shifts, such as increasing populations and shifts toward urbanization. Changes found in outdoor natural areas (*ibid*) may have quite important impacts for outdoor enthusiasts and land managers. Results from this study show that crime and acts of violence are occurring on public lands. One federal LEO credits the crimes on National Forests to changes in society that lead to intolerance and insensitivity. Couple this with National Forest facilities at maximum capacity and you have a powder keg, he told us.

Media reports reinforce the conclusion that crime and violent acts continue to plague public land employees and visitors. The more dramatic reports include the coverage of the three murdered visitors to Yosemite National Park in 1999 (Rogers et al., 1999), the cover story in *Outside* magazine which characterized the Angeles National Forest as the most dangerous forest in the nation (Sullivan, 1997), and the Wall Street Journal's most recent report asking, "How Safe is that National Park?" (Gubernick, 2000). In March of this year, the BLM reported on a double homicide when a backcountry recreationist found a burned out vehicle with the remains of two people inside. Initial findings indicated that both victims, who had been reported missing earlier in the month, had possibly been murdered elsewhere and then transported to public land administered by BLM in the Silverbell Mountains of Arizona (Anon., 2000). While the media are likely portraying a sensationalized picture of the safety of the public on forest lands as a whole, it is also true that these crimes and other acts of violence have made the work of public land managers and law enforcement officers more hazardous, and that they jeopardize the safety of all who visit public lands or work there. It's certainly no teddy bears' picnic out there anymore.

Limitations and Recommendations for Future Research

This study is a preliminary examination of criminal activities on public lands, and while the results cannot be generalized to other forest sites, it is clear that our findings raise serious questions that require additional research. First, we think much more research needs to be conducted on the extent of the problem of criminal activities on public lands. Future research should include

recreation management. This effort should involve a nationwide, multi-agency study (FS, BLM, NPS, etc.) to compare results across agencies and across regions of the country. Several of those we interviewed referenced other agencies faced with similar difficulties. For example, one interviewee said, "The Bureau of Land Management gets many more bodies dumped and many more stolen cars are found there because they are closer to the city." Second, we think that communication issues should be addressed through additional research of both the communication and knowledge levels of the general recreating public and that of natural resource agency personnel. Third, we suggest that additional research on natural resources impact be conducted. Finally, we believe that impacts to recreationists need to be examined in detail. Future research needs to examine public opinions on the extent of crime on forest lands—and the factors that influence these opinions—so we can better understand how public perceptions influence the decision-making and participation patterns of recreationists.

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NEWS & NOTES

Oregon's Fire Lookouts Still Play Important Part in Detecting Wildland Blazes

Fire lookouts have been standing guard over the nation's landscape for more than 90 years. Thousands used to dot the western terrain, while today, only a handful are still operational. Together, Oregon Department of Forestry (ODF) and the state's three forest protective associations staff about 30 lookouts each summer. Even the increased use of airplanes and high-tech gadgets hasn't totally extinguished the need for someone perched on a hilltop to spot that first small puff of smoke.

For the past 14 summers, Ken and Colleen Struck have been perched atop Soda Mountain (6,091 ft elevation) 13 miles southeast of Ashland, Oregon. Close to the California border, the pair reports fires to ODF and the California Department of Forestry. Ken said that while some folks might consider the job of a lookout boring, he finds they have plenty to keep them busy, including numerous drop-in guests.

"We average about two visitors per day. They hike or drive in. They come from everywhere, including one person who was from Paraguay. On one Sunday we had 21 people sign the guest book," he said. The Strucks are at Soda Mountain from mid-June through mid-October, hauling their belongings up and down the rough mountain road. While they have electricity and propane, they don't bring a television, just books and a radio.

The first Soda Mountain Lookout was constructed in 1933. The current 10-foot wooden tower was built in 1962. Soda Mountain is listed on the National Historic Lookout Register, which is a private initiative sponsored by the American Resource Group. -Diana Enright, *ForestLog*, Nov.-Dec. 2000

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FOREST SERVICE AT RISK

Ecoterrorism Escalation Poses Threat to Employees

K.D. Leperi

For over a year, I analyzed and evaluated agency files, reports, and press as I interviewed Forest Service law enforcement officials and special agents, activists, authors, academia, media, and Congressional staffers. Based on this extensive review, I recommend that the Forest Service provide for a limited national eco-response capability of interdisciplinary experts along with a dedicated Ecoterrorism Coordinator. The National Coordinator role will ensure consistency and decisiveness in policy application while providing a key focal point for inter-agency and intra-agency data-sharing and decision coordination. I also strongly suggest that the Service implement target hardening for executives and employees who are most at risk to the ecoterrorism threat.

Forest Service at Risk

Forest Service employees are at risk as a result of escalating crime, violence and terrorism on public lands. As one officer stated, "We have militia, civil disobedience, domestic disputes, dead bodies, people problems, pipe bombs, arson, and gangs on national forest lands." To ignore this trend is to potentially endanger Forest Service personnel by threatening or compromising their safety and security. While this assessment is not meant to be alarmist, it is intended to be a wake-up call for policy and decision-makers to take action and institute preventative measures to curb the dangerous trend of violence.

After spending the last year identifying, interviewing, reviewing, and analyzing ecoterrorism, both from a microcosm (Forest Service) and a macrocosm (global) perspective, a discernible pattern emerges that clearly suggests certain categories of Forest Service employees are at risk. They are at risk as potential symbolic targets, targets of convenience, or as random victims of circumstance by radical groups from both the left and the right wing who pursue their objectives with a frenzied fervor.

Factors contributing to an increasingly volatile situation include the decrease in the amount of wildland area as a result of population growth, the encroachment of urban-wildland interface, environmental degradation as a result of increased recreational uses, and competing interests regarding resource utilization and management. One Forest Service official characterized the current situation as a powder keg waiting for someone to light a match. Added to this equation is a sense of urgency on the part of many ideologues, an apocalyptic conviction in pursuing their beliefs, and a heightened frustration level over perceived political process failures. This is our present reality.

The occurrence of a major ecoterrorist incident within the next five years is no longer simply a possibility; it is probable. In the short-term, the key will be to manage hostilities; in the long-term the key will be to develop natural resource management policies that conserve and sustain populations both in the present and the future. For the present, the challenge and focus for the Forest Service will be to

Fig. 1 Environmental Spectrum

Left-Wing		Right-Wing	
Groups/Issues	Descriptors	Descriptors	Groups/Issues
Environmental Movement	Revolutionary	Reactionary	Wise-use Movement
	Change	Tradition	Survivalists
Animal-Rights	Interdependence	Independence	Militia
Deep Ecology	Nature	People	Anarchists
Anti-Biotechnology	Biocentric	Anthropocentric	Hate Groups
Organic	Preservation	Conservation	Religious Fanaticism
Old Growth	Urban	Rural	States Rights
Endangered & Threatened Species	Coalition	Sovereignty	County Supremacy
Biodiversity	Egalitarian	Authoritarian	Extractive Rights
Habitat Preservation	Regulatory	Free Enterprise	Recreation
Roadless Initiative	Public Externalities	Private Property	Roads & Access

Forest Service will be to develop consistent policies for dealing with extreme activists while keeping employees out of harm's way.

What is Ecoterrorism?

"The weapon which most readily conquers reason: terror and violence," is attributed to Adolf Hitler (American Heritage Dictionary 1992). An act of terrorism, as defined by the American Heritage Dictionary, is the unlawful use or threatened use of force or violence by a person or an organized group against people or property with the intention of intimidating or coercing societies or governments, often for ideological or political reasons.

Ecoterrorism is a special type of terrorism, but defining it can be problematic. Since the primary focus of this report is on the safety and security of Forest Service employees while dealing with acts of extremism, it is necessary to approach ecoterrorism pragmatically. This reality-based approach captures the precarious predicament of Forest Service employees, who carry out legislatively enacted programs amidst a changing and volatile public mandate.

Despite conventional wisdom attributing ecological terrorism only to left-wing "tree-sitters," "monkey-wrenchers," and "animal lovers," it also consists of right-wing terror radiating from the "anti-environmentalists." This loosely coordinated movement of vested interests fiercely resists public resource regulation while advocating unbridled free enterprise. The entire environmental spectrum of potential eco-terrorists encompasses fringe actors and groups from the polar extremes who knowingly utilize terror to achieve their political objectives regarding the management of public lands and resources (see Figure 1 above).

Competing jurisdictions define terrorism according to their functional mandates, resulting in a myriad narrow foci that may preclude systemic solutions. The Department of Defense defines terrorism in the framework of alternative or "asymmetrical conflict" while the FBI views terrorism as acts of criminal violence, not confronting the full political implications of the phenomena. The FBI conveniently divides terrorism into international and domestic categories, with domestic terrorism under their jurisdiction. And ecoterrorism, along with violent anti-abortion and animal-rights incidents, is further classified as "single-issue" terrorism. As recently as 1998, the FBI Director admitted that eco-and animal rights terrorism was not an issue, not a priority, and not on the agency's "radar screen," in a speech made to the European press where he addressed a group of people involved in animal and resource-based industries. (See the box on page 20 for a more complete listing of Ecoterrorism Milestones.) Several Forest Service officials expressed concern that the FBI still does not regard acts of ecoterrorism with the priority or resources needed to resolve cases expeditiously.

Ecoterrorism Enablers

Contemporary society gives shape to several unique factors that enable terrorism as a preferred choice of extremists. The prevailing moral paradigm ratio-

ECOTERRORISM AND THE FOREST SERVICE

A Sampling of Incidents

ITEM: The Sagebrush Rebellion, a reactionary Western land revolt of the late 70's and early 80's, openly challenges the Forest Service right to title and resource management of public lands. Through numerous court filings, protestors interested in protecting extractive rights and managing natural resources as a commodity, assert county and state supremacy over public lands. The courts eventually reaffirm the powers of the federal government.

ITEM: On May 4, 1980, about a 100 protestors confront a 14-person Forest Service crew spraying 2-4-D herbicide on brush near Takilma, Oregon. The protestors are spitting and throwing rocks and garbage. Some are armed with knives and clubs. The local district ranger signs a paper under duress promising not to spray herbicide in the area for one year.

ITEM: On October 29, 1996, The U.S. Forest Service Ranger District Office at Oakridge, Oregon is torched, causing $9 million of damage. The Animal Liberation Front (ALF) and the Earth Liberation Front (ELF) claim joint responsibility.

ITEM: In October 1998, ELF takes credit for Vail's $12 million burn on Forest Service land, destroying four buildings and four ski lifts. The alleged motive is to protect the habitat of lynx.

ITEM: April 1, 2000 debuts the group "Genetic Jokers" who proceed to trash six vehicles belonging to the U.S. Forest Service and spray graffiti, jam locks and coat windows with etching cream at the USFS North Central Forest Experiment Station Research Building on the St. Paul Campus.

ITEM: On July 4, 2000, about 500 protestors, collectively known as the "Shovel Brigade," lay claim to a remote dirt road in defiance of the U.S. Forest Service. Over 5,000 demonstrators were originally expected. The demonstration was the latest skirmish in a battle between Washington officials and locals upset with federal land policy.

nalizes violent behavior as a necessary "means-to-an-end" to support ideology. This rationalization enables the perpetrator of terrorism to carry out acts of violence through a process known as "moral disengagement." Terrorists may also exhibit traits of dehumanization, attribution of blame, diffusion of responsibility, and self-deception. This self-deception may help explain why most perpetrators of terror do not see themselves as "terrorists." Rather, through their own eyes, they view their actions as righteous, if not heroic.

Extremists use these "enablers" in a calculated effort to shift power and control to their favor. These enablers include linkages, force multipliers, technology, media attention, globalization, turbulence, and adaptability.

Linkages. Direct action and radical protesting is a trend that is gaining international momentum through diverse coalitions and linkage of various broad-based political and social issues. Issues such as biodiversity, global justice, world trade, human labor, and the environment link individuals together through an emphasis on interdependencies, interconnectiveness, and visions of a better "future state."

Force Multipliers. A force multiplier is simply a state where projected power appears to be greater than the actual numbers involved. Thus, a force multiplier significantly increases the potential of a terrorist group. "Terrorists routinely use force multipliers," according to Jonathan White, author of *Terrorism* (Wadsworth Pub. Co., 1998: 17), "because it adds to their aura." Force multipliers include technology, media, transnational support, and "ghosting" –a technique where individuals may have multiple memberships in various related causes, thus giving the perception that dissident numbers are greater and more widely spread than they actually are. A variation of this technique is when a core group changes its name for each incidence of violence, a technique increasingly used in ecoterrorism attacks involving biotechnology, genetically modified organisms, and experimental facilities.

Technology. Terrorists are better organized and more sophisticated now than in the past in large part due to affordable technology and the communication power of the world wide web. Cellular technology and the Internet facilitate communications among distributed cells, permitting them to unite when opportunities arise and giving them the flexibility to disperse when tactically convenient. Through encrypted email, the Internet provides a safe haven for anony-

mous individuals to coalesce around ideology or single issues. This results in loosely knit organizations that are tightly wired, benefiting from the efficiencies of technology while remaining essentially anonymous to law enforcement officials.

Media Attention. Terrorism can escalate the political agenda of extremists by using the media to publicize their message and gain public support while exposing the failure of the government to decisively protect its citizens. This eventually leads to the question as to whether the media exacerbates violence by rewarding sensationalism with headlines or in the alternative, whether terrorists are manipulating the media in order to communicate their radical platforms to the public. The media continues to contend that they are simply doing their job by providing news to the public.

The tendency for the press to focus on radical behaviors oftentimes has the unaware public imputing those same behaviors to more moderate protestor elements, and the line of distinction between legal activism and illegal terrorism becomes a little blurrier in the process. The public may also perceive that terrorism is more widespread than it really is, based on the amount of media coverage it receives. The dilemma is that as violence becomes more commonplace and media reports of it more frequent, terrorists needing publicity to inspire fear seek ever more unusual events that capture and hold the public attention. Essentially, the bar is raised. Whether terrorists are manipulative or effective in using media as their mouthpiece is an issue for debate. Media coverage can easily backfire for the terrorist, and rather than curry empathy, may incur the rage of the public when the level of hostilities and atrocities revile the public sense.

Globalization. Environmental issues transcend political boundaries, and are really transnational issues. The globalization of environmental issues serves to link people across political, social, cultural, and religious boundaries, while providing additional organizational capacity for critical mass and duration. Globalization of these issues focuses on the interdependencies of environmental policy with world trade, global justice, and the human condition. The world then becomes the stage.

Turbulence. Recent research on complex systems in physics and biology has revealed that systems do <u>not</u> tend to gravitate toward chaotic behavior, but rather towards an area of complexity between chaos and order—an area known as turbulence or described as being "complexity on the edge of chaos" (Bak and Chen, 1991; Kauffman, 1991; Langton et al., 1992). The world of today consists of complex systems, complex interactions, and unending change interspersed with periods of stability. It is this state of turbulence that provides targets of opportunity for diverse coalitions to merge around contemporary issues. Flexibility and adaptability are essential characteristics for ensuring survival through chaotic conditions and tempestuous times. By taking advantage of this situation, extremists can help define initial conditions during times of turbulence, and thus change the future direction of society in the process. A trait of chaotic systems is to exhibit a sensitive dependence on initial conditions. Nicholas Rashevsky, in his book *Looking at History Through Mathematics* (MIT Press, 1968), noted this same phenomenon, "...a change in the behavior of a single individual, no matter how small, may precipitate in an unstable social configuration a process that leads to a finite and sometimes radical change." Later, Edward Lorenz would recognize this while running computer simulations on a set of three nonlinear equations. Lorenz concluded that the sensitivity to initial conditions "...implies that two states differing by imperceptible amounts may eventually evolve into two considerably different states (Lorenz 1963).

Adaptability. The defense community defines terrorism as "asymmetrical conflict." This is an inherent acknowledgement of the lopsided balance in power along with the irregular use of force between the government and the terrorist group. However, conflicts follow unpredictable courses regardless of power distribution, and what is considered to be a strength can easily be exploited as a weakness by the opposing force. The ability to adapt to prevailing conditions is paramount to survival. Adaptability places a premium on innovation. Adaptability also bears witness to Newton's law of physics—that for every action there is an opposite and equal reaction. The corollary to this suggests that for every technical innovation that provides a dominant advantage, a countervailing response eventually shifts the advantage to the opposing force. Adaptability becomes the enabler.

Why Violence?

We all have a tendency to label as "terrorism" any violent act of which we do not approve. This is not accurate, as violence is a tool utilized by groups other than terrorists. When violence is used, it is often within the context of retaliation or vindictiveness rather than motivated by ideological strategy or necessity. For terrorists, violence may be consciously or unconsciously chosen for other reasons. These include violence as an attractor, the search for legitimacy, immediate results, and the downward spiral effect.

Violence as an attractor. Sensationalism can have a seductive appeal that bestows moments of fame and glory, even though they may prove to be illusory as well as delusionary. Like a magnet, then, violence becomes both the connector and the attractor. Since terrorist recruitment successes draw heavily from runaways, throwaways, orphans, displaced individuals, and disenfranchised youth, the allure of the spotlight as a crutch for fragile self-images can be overpowering and addictive.

Search for legitimacy. A terrorist's use of violence as a tool must be self-justified. Unlike the soldier or police officer, however, the terrorist confronts a special problem where their use of violence is considered illegitimate by society. Since all humans seek a basic connection to other humans and a validation of their self-worth, the need for legitimacy (for approval by society) is vital to the human psyche. When legitimacy is not forthcoming, individuals seek alternative ways to validate their existence, which can include the use of violence to bring attention and, the terrorist expects, approval. The paradox, then, is one where terrorists seek to legitimize their cause through social approval, using media coverage to evoke public empathy and support. However, this can backfire if the public finds the acts of terror horrifying to a point of repulsion. The terrorist is then back to the original state of alienation, of societal exclusion.

Immediate results. Violence is seen as an expedient that enables terrorists, those without access to the powers of the state, to get what they want in the present rather than some future point. Consequently, they are able to see the immediate results of their actions, adding both simplicity and predictability into an otherwise complex arena. This imparts a sense of control over their destiny that may be lacking in other elements of their lives.

Downward Spiral Effect. The spiral effect is a situation where extremists are increasingly seduced by violence as a strategy and tactic, and soon preclude other options from their repertoire, focusing on violence as the sole solution. Much like a contagion, terrorism begets terrorism and violence breeds more violence through behavioral reinforcement and by the difficulty of changing the existing momentum.

Contemporary protest movements are increasingly global in nature, evolving toward broad-based coalitions linking a variety of political and social issues across national boundaries. Rapid growth in numbers of transnational social movements and organizations is occurring in the areas of human rights, environment, women's rights, peace, and development. As environmental issues become transnational in character, any distinction to differentiate terroristic activities on the basis of domestic and international categories becomes capricious and irrelevant. Ecoterrorism is, more and more, a transnational issue. As a result of this emerging transnational character, controversial issues such as genetically modified organisms, biogenetics, and experimental research are taking the world stage even as they are proving to be early warning flags for areas of potential violence. These issues may well herald increasingly desperate tactics by groups unable to compromise their radical views.

Recommendations for Containing Ecoterrorism

While the reality is that there is no way to totally eliminate terrorism save for repression by the political state, there are certainly recommendations that, if implemented, can minimize the impact of violent ecoterrorist actions against public property and people. We can provide for the safety and security of Forest Service employees, equip law enforcement officials with new tools in dealing with aggressive activism, and heighten Forest Service sensitivity and awareness to counterterrorism measures.

Eight recommendations targeted for the U.S. Department of Agriculture and the Forest Service are listed below.

1. Establish a **USDA Blue Ribbon Panel** for determining vital interests and identifying the general ecoterrorist threat in all Department agencies, and categorize these by issue, agency, region, and facility type.

The highest priority should be given to people and issues involving experimental research labs, animal rights, biogenetics, and genetically modified organisms. This risk analysis will be the foundation for developing an action plan.

2. Designate an **Eco-terrorism National Coordinator**. This individual should be a liaison at the national level for intra-agency coordination and ensure consistency in policy approach for all regions. The National Coordinator should also explore the possibility of interagency cooperation and response teams that could include representatives from other land management agencies.

3. Develop a limited **national eco-response capability with funding at Headquarters** to address crisis and long-term protestor issues. This interdisciplinary team should include expert(s) in the field of terrorism, law enforcement, communications, and community collaboration. Priority focus and funding should incorporate known "Eco Hot-Spots" and "Eco Hot-Button Issues" (see box at right).

4. Encourage **bipartisan Congressional hearings** on ecoterrorist incidents involving federal lands and/or against Service employees that include threats from extreme-right as well as extreme-left radicals. Focus of hearings should be on protecting federal employees against increasing hostilities and not on "nature" versus "people" issues.

5. Develop a **community outreach and community collaboration model** to listen to "alternative" voices regarding resource management and the environment. The ongoing forum and dialogue should be structured to be as inclusive as possible while focusing on constructive options.

6. Design, develop and conduct **ecoterrorism awareness and counterterrorism training** for all Forest Service employees.

7. Implement immediate **target hardening for employees** that are most at risk. Target hardening focuses on protecting potential targets through a combination of heightened sensitivity, adding physical security measures, and monitoring or limiting access in high-risk situation. Add security measures to potential facility targets.

8. Ensure that **crisis counseling** is immediately available for victims of ecoterrorism and provide for post-traumatic stress disorder (PTSD) counseling for individuals suffering from prolonged effects when deemed necessary. Data shows that terrorism has a long-term and highly traumatic effect on its victims.

In a broader sense, ecoterrorism reflects unresolved societal issues about the management of public lands and natural resources. Some see this as a basic issue of democracy; an issue of whether land will be managed for select interests or for the many. Until these causes are addressed, the propensity for activism and reactionism to escalate to terrorism remains a distinct possibility for those at the fringe. According to Bron Taylor, author of *Ecological Resistance Movements* (State Univ. of New York Press, 1995: 344), "The apparent escalation of a violent dimension to these conflicts. . .is likely to continue because the conditions leading to ecological radicalism and reactionary violence show no signs of abating."

In the final analysis, Forest Service employees remain vulnerable to ecoterrorist threat. As the clash between communities of place and communities of interest collides, Forest Service personnel oftentimes find themselves caught in the middle even as they implement and enforce

Eco Hot-Spots

Pacific Northwest
Cove-Mallard, Idaho
Warner Creek, Oregon
Gallatin, Montana
Vail, Colorado
Shawnee National Forest, Illinois
Rhinelander, Wisconsin
Eagle Creek Timber Sale
White Mountains National Forest, New Hampshire
Catron, Elko & Nye County, Nevada
Biotechnology Research Labs & Experimental Facilities

Eco Hot-Button Issues

Roadless Initiative/Road Management
Threatened and Endangered Species
County Supremacy & State's Rights
Recreation Fee Demo or "Pay to Play"
Special Use Permit
Multiple-Use Recreation & Environmental Degradation
Biotechnology and Experimental Research

public land policy. Nonetheless, the threat can be met through bipartisan resolve, consistent Forest Service policies, counterterrorism measures, focused training, and heightened levels of awareness practiced by all Forest Service employees. Long-term effectiveness will require intergovernmental cooperation and better data-sharing by land management and security agencies. For solutions, public policy-makers would do best to probe the underlying causes of ecoterrorism and develop inclusive processes that neither marginalize nor disenfranchise those with differing views from mainstream society.

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K.D. (Karin) Leperi's analysis for this article combines her military intelligence background in terrorism with the fusion of several conceptual models that borrow from interdisciplinary fields. The theoretical underpinnings include chaos and complexity theory, fractals, Neuro-Linguistic Programming, and depth psychology based on the Enneagram – a personality typology that captures inner motivations as well as external behavioral characteristics for both functional and dysfunctional individuals. Currently on loan to the Forest Service, Leperi was recently certified for the Senior Executive Service.

Publications

Continued from page 5

America's Ancient Forests: From the Ice Age to the Age of Discovery. Thomas Bonnicksen. New York: John Wiley & Sons, Inc., 2000. Bonnicksen examines the ecological history of old-growth forests in the United States from prehistoric times through the nineteenth century. The book also includes chapters on such topics as aboriginal hunting practices, plant harvesting, changes in forest cover and forest composition, climate change, and fire ecology.

George Perkins Marsh: Prophet of Conservation. David Lowenthal. Seattle: University of Washington Press, 2000. Best known for his seminal 1864 book *Man and Nature*, George Perkins Marsh is considered by many to be America's first conservationist, and an impetus for the conservation movements of the later nineteenth century. This book focuses on the development of Marsh's conservation philosophy through his career as a lawyer, congressman, and diplomat.

Hope is the Thing with Feathers: A Personal Chronicle of Vanished Birds. Christopher Cokinos. New York: Putnam, 2000. The longing to connect with birds in some way is the subject of this book, written by a poet at Kansas State University. Cokinos may lack an ornithological background, but makes up for it with compelling, investigative writing. He follows the demise of the Carolina parakeet, ivory-billed woodpecker, heath hen, passenger pigeon, Labrador duck, and great auk. Cokinos traveled to the swamps, prairies, forest, and zoos to visit the last known habitats of these six species, all now extinct. He enlivens his chronicles with his eloquently stated personal thoughts and explorations. As species after species becomes threatened these days, Cokinos helps us to avoid utter despair with his engrossing book.

Birds of the Northwestern National Parks. A Birder's Perspective. Roland H. Wauer. Austin: University of Texas Press, 2000. This guide introduces the most common birds in seven Northwestern parks, and the most probable places to see them. The author explains the identification and behavior of the birds park visitors are likely to see. He also includes a review of each park's bird life, and a list of key species.

2001 Conservation Directory. National Wildlife Federation. New York: The Lyons Press, 2001. The 46th edition of this Directory contains over 3,000 updated listings, providing detailed information on environmental groups active in the U.S., Canada, and around the globe. The directory provides contact information and descriptions of federal and state agencies, non-governmental organizations, and university programs. It lists federally protected areas, state environmental education coordinators, and sources of environmentally focused audio-visual materials and periodicals. The Directory costs $70 (shipping and handling included). To order, contact Robin Assa, The Lyons Press, 800-836-0510 ext. 24, or Robinatlp@aol.com.

Journalist Florence George Graves interviewed Eleanor Smeal for *The Women's Review of Books*, a publication of the Center for Research on Women of Wellesley College. This interview was published in Vol. XVII, Nos. 10-11, July 2000 issue of the *Review*, and is reprinted here with permission of the author.

An Agenda for the 21st Century

Eleanor Smeal outlines the visionary proposals of the National Women's Equality Act

Although during this election season it seems you rarely hear candidates address what women really want, Eleanor Smeal, president of The Feminist Majority, is determined to see women's equality "back on the nation's agenda." Early in 2001, not long after Texas Governor George Bush takes the presidential oath of office, the National Women's Equality Act for the 21st Century will be introduced into Congress.

Of course Smeal believes much is at stake for women in the next election, but no matter who is elected, she says, women still will not have full political, legal, economic, social, and educational equality. Although committed long-term to the passage of the Equal Rights Amendment (ERA), thwarted by three states in 1982, Smeal and a bipartisan network of leaders from more than a hundred organizations representing more than six million women have decided on an interim strategy. They are proposing omnibus legislation that specifically addresses inequality in education, employment, Social Security, and pensions, health care, access to media, the justice system, and family care responsibilities.

This legislative blueprint was first introduced to the public in 1998 at the 150th anniversary of the first women's rights convention in the history of the United State (and the world) in Seneca Falls. Of course, women have come a long way since then. But, Smeal says, although feminists have "pushed the door open, it is only partially open—principally for those at the top. We would like to push it all the way open."

She is wise in the ways of Washington but also visionary; pragmatic but also radical (she wants literal equal representation for women in Congress, including two male and two female senators from every state). Co-founder of The Feminist Majority in 1987 after serving three terms as president of the National Organization for Women, she has been at the vanguard of almost every important women's rights battle during the past three decades. She is as committed to the joys of motherhood ("children are priceless," life would be "more difficult" without them and "I wouldn't give up my relationship with my kids for anything") as she is to a woman's right to choose whether and when she will become a mother. And Smeal is just as passionate about her cause as Elizabeth Cady Stanton and Lucretia Mott, her Seneca Falls foremothers.

Florence George Graves: What is at stake for women in this presidential election?

Eleanor Smeal: A great deal. One of the most obvious is the composition of the Supreme Court. I think the Supreme Court should be *the* prominent issue of this election. The next president is going to determine the direction of the Court for probably a quarter of a century. Reproductive rights are hanging by a vote or two. But it's more than abortion.

We're worried about the Violence Against Women Act. The opponents of women's rights are attacking affirmative action quite vigorously. We've lost affirmative action for public employment and contracting and education in California and in Washington State, and they're trying to get it on the ballot in Florida. All of these things will eventually be adjudicated again and again in the Supreme Court.

But it's also the Congress if we are going to move forward again. We have been in a holding pattern, except for a very few measures. We did get the Violence Against Women Act and the Freedom of Access to Clinic Entrance Act passed in 1994, and the Family and Medical Leave Act in 1993.

FGG: Which was a huge victory.

ES: But that leave is unpaid, and it still doesn't cover enough people. We need a Congress that is more pro-women's rights. We can't even get the United Nations Convention for the Elimination of All Forms of Discrimination Against Women—an international treaty—passed. It's now been passed by all but six countries. All of the industrialized and modern countries have passed it except us. We're left in the company of Kuwait and Saudi Arabia. Why is it sitting there? Be-

cause Jesse Helms controls the Senate Foreign Relations Committee. So we have to get forward movement in the House and Senate and the presidency.

But I think there is something more at stake. In the next election we're setting the stage for redistricting in 2002 on the basis of the census. We went from five percent to ten percent of the members of Congress in 1992. If in 2002 we are to go from ten percent to twenty percent, we've got to do well in the state office elections. Redistricting—which is never the neutral process it is supposed to be—is done by the state legislatures and the governors. And the way the districts are drawn—whether the voters in the district tend to be friendly to progressive candidates, for example—ultimately helps determine who is or who is not elected. So we need to elect more pro-women candidates at the state level. And usually, if you do well at the national level, you tend to do better at the state level.

FGG: What are you afraid will happen if you don't have the majorities that you need in Congress and in state legislatures?

ES: First, we don't want to go backwards. We want to hold the line to maintain the gains, but we also want to go forward. We've got to reduce these terrible anti-choice majorities not only at the congressional level but also at the state level, because they're reducing access to family planning and birth control and abortion. We also face attempts to push back affirmative action both legislatively and through ballot initiative.

If we could move forward again, I would like Congress to pass the Woman's Equality Act, which would make progress for older women in Social Security and Medicare. I would like to see care credits instituted, so that women are not penalized for time they take off from the work force to care for their children or for sick or elderly family members. Right now, Social Security benefits are computed on the basis of a forty-year work lifetime in which you're allowed to drop off the five lowest years. Women typically have many more than five years of zeros, and those zeros are averaged in to determine their benefits. So most women are left to collect on their husband's benefits as a dependent, whether they worked outside the home or not. As a result, the average benefits for women are 66 percent of men's.

The system literally penalizes women economically for doing what society says is the right thing. That's why you have so many elderly women at and below the poverty line. I'm worried that the problem of the rapidly depleting Social Security trust fund will be solved on the backs of women. Some of the things political leaders are saying are "reforms" disproportionately harm women.

FGG: Leaders of both parties?

ES: Oh yes. That's why this is such a difficult struggle. Gore actually introduced the concept of care credit. He called it something else, but he introduced the concept of giving women credit for years spent taking care of children. We think it should also include the women who have taken care of the elderly and the sick. The typical woman today spends more time taking care of the elderly and sick than of children. I've seen it computed as sixteen years of childcare and seventeen years of elderly and sick care. And with people living longer—the graying of the population—it's the luck of the draw to have a parent, or in-law, for that matter, who is infirm for quite a long time.

FGG: How do you propose to change it?

ES: Right now the typical female worker is paying a higher percentage of her total income to Social Security than a male worker. You pay Social Security taxes only on the first $68,400 of income. Because of historic discrimination, the average woman doesn't make that much. And the people who disproportionately make more than the cap are men. We say lift the cap, which would bring in quite a bit of money. And we're also saying invest some of the Social Security money differently, which would increase income. This is now a rip-off. The policymakers know that these little rules they installed treat women differently and negatively.

FGG: Why would they want to do that?

ES: Because they're trying to satisfy the male constituency, whom they view as their real constituency. And I think they also think we're suckers. For years they have been able to cheat us and say they were doing nice by us. Give us a Mother's Day card, and cheat us the rest of the year. I think they think that women don't represent an organized constituency, and so they ignore us. They talk over our heads. They talk about Social Security as if the beneficiaries are all the same, and they constantly ignore the fact that women are the majority of the beneficiaries and as a group are treated worse than men are.

FGG: And how are women discriminated against in terms of Medicare?

ES: It's quite staggering in many ways. I look at Medicare and Medicaid as a whole. We think of Medicaid as a poverty program, but two-thirds of the Medicaid beneficiaries are in nursing homes. Many were middle-class people who couldn't pay for nursing home care, which has become astronomically expensive. And something like 75 percent of those in nursing homes are women. Women take care of the sick men at home, and too often men leave us in nursing homes.

FGG: But in fairness, we also live longer, don't we?

ES: Not that much longer. If you take a woman's life cycle from birth to death and a man's life cycle from birth to death, they say women live seven years longer. But if you look at the difference after age 60 or 65, there is only a three or four year difference. Insurance companies want you to believe that women live nine years longer so they can charge higher premiums. And the difference probably has not a damn thing to do with stress, by the way—it has more to do with the habits of men. People keep on saying, "oh, they work so hard and they're stressed out." No, they drink and smoke more. Of course, we don't want to leave anybody behind, men or women, but we don't want "reform" programs that will penalize women either.

One of the biggest problems with Medicare is that it pays for the crises more than it does the nursing care. In fact, it pays very miserably for nursing. And who tend to be the nurses? Women. Who tend to be the surgeons? Men. So that's one problem. But there's a second problem. Since Medicare doesn't usually pay for home nursing, when a woman is pushed out of a hospital two days after major surgery, her chances of having nursing care are much less than the males who are usually cared for by a spouse or another female relative. So the fact that Medicare doesn't pay for nursing care really hurts women in two major ways.

FGG: How would you change Medicare?

ES: I would increase the availability of nursing and hospital stays. Throwing people out in the street after they have had major surgery is inhumane. And we've got to change our notion of medicine. It isn't just take a few pills, cut somebody up, x-ray them, radiate them and all of that. Medicare should start acknowledging—as many doctors do—that nursing is extremely important. I think we've minimized it for far too long.

Medicare also needs to help pay for prescription drugs for very low-income people. We need to think of older women as a large poverty or low-income class. Prior to 1965—before Medicare was established—the average elderly person spent 15 percent of their income on medical expenses. Now with Medicare they still do, and that's mounting.

FGG: Does the Women's Equality Act also address educational opportunities?

ES: The act would have a clause saying you cannot discriminate on the basis of sex in publicly funded education. You notice I didn't use the word "federal," because state and local levels as well as federal would be covered. Title IX is the federal law that says you cannot discriminate on the basis of sex in federally funded educational programs. One of our biggest successes of these last 30 years has been the increase in education of women, especially at the college and professional levels. We started in 1970 with three percent of the law school students and eight percent of the medical students. And now women are in the 40th percentile. That's a big, big improvement thanks to Title IX. But there are many educational programs that Title IX does not reach.

Also, we can never forget that the Republican leadership has introduced legislation to curb Title IX. They call it their anti-affirmative action measures but let there be no mistake about it, they want to essentially gut Title IX, and if they had a strong enough majority, I believe they would move to do so.

FGG: What else would the Women's Equality Act do?

ES: It would toughen employment regulations. For example, under Title VII and subsequent civil rights legislation passed in 1991, women can now get damages (in addition to back pay) when they sue and win for sex discrimination under federal law. But our damages are capped: a person can't get much more than $300,000 in damages for sex discrimination. Under race and ethnic discrimination, people can get back pay *and* uncapped punitive and remedial damages, which can total millions of dollars.

FGG: I have found that most people still do not understand that women and minorities have been treated very differently under the law. Most people simply don't know that until 1991—and only because the Senate decided to throw women a bone because they felt such guilt over the way Anita Hill was treated during the Clarence Thomas hearings—women could not get *any* punitive or compensatory damage awards for sex discrimination in federal courts. They could receive only back pay, which obviously limits women's incentive to sue. The situation is still grossly inequitable because of the cap.

ES: Especially considering how expensive a court case is. A typical Title VII case could take eight to ten years. That and the cap on damages make it very hard to get lawyers to take these cases. So we want to remove the cap on punitive and compensatory damages.

FGG: I interviewed Senator Joseph Biden (D-Delaware), the ranking Democrat on the Senate Judiciary Committee in 1992, and I asked him how the Congress could justify treating women so grossly differently from minorities. He said that there is no good explanation. It is sexism, pure and simple.

ES: And this is billions of dollars of discrimination that women are being cheated out of.

FGG: When you were lobbying for equal treatment, how did policy makers justify treating women differently from minorities?

ES: Oh, numbers. Numbers. There are so many of us. It costs too much.

FGG: Costs business too much?

ES: Exactly.

FGG: That was the argument?

ES: The major argument. Yeah, it costs too much. It's one of the major arguments made against women's opportunities. In the back rooms, in small meetings with people who are making decisions, the most typical reason given is they can't afford it because there are too many women. "Who is going to pay for it?" they ask. And so we answer, "Well, why should women pay for it? What you're saying is that it's too expensive, so each woman bears the burden, and we get ripped off." That is how this society works. And they laugh or they smirk. But they're sitting there with the power, and we're sitting there as beggars for half the human race. That's what it's been like for 30 years of my life.

That's also why I think we must make an issue out of the unequal representation of women in Washington. We cannot accept 12 percent of Congress. We have no committee chairs. We have no majorities on any committee. And we're begging people who—it's more than that they don't care—the Republicans are really mean-spirited about it. And we shouldn't tolerate it. I think those of us who want serious reform must call into question the legitimacy of a United States Senate that has not one African American—not one—and only nine women. Is this a democratic body?

FGG: And they will say that no one is stopping you from running.

ES: It's a rigged game.

FGG: Why?

ES: Because the two parties have divided up the turf. They are totally male-dominated structures, and it's all based on who can buy a seat. This is not democracy. This is an oligarchy. This is a House of Lords, and I think we should call it that. When it costs $30 million to run for a Senate seat, we should not for a minute think Jesse Helms is popular. He's not popular. He's bought that seat, and we should keep reminding people of that. We need radical solutions. I want two male and two female senators.

FGG: From each state?

ES: Exactly. So we would have two hundred senators. Why not? Then see the legislation that comes out of the Senate. It would be a whole different game. And I know that takes a Constitutional amendment! But it does not take a Constitutional amendment to double the House of Representative—870 instead of 435. It just takes an act of Congress. Congress hasn't changed the formula for the number of representatives in the House since about 1913. They've added a few states, but the formula has been essentially the same. But we've got how many more millions of people? When I was a kid in the 1950s, there were about 150 million Americans. Now there are 260 to 270 million. That means an individual's vote has lost power. The strength of everyone's vote decreased by about 40 percent. And this crap that if you have fewer people it's more efficient is just that—it's crap. I don't think we should accept rules that will leave women out of power for the next two hundred years. It's just not reasonable.

FGG: And they will say, "Women are earning big salaries. They have a huge percentage of the wealth in this country. Why don't they use that clout? Why are you complaining?"

ES: We're earning 74 percent of what men are, but that's a rigged figure. If you put all the housewives in the computation, women would be back to earning about 50 to 55 percent. In no way do women have the economic clout that males do. That's all mythology.

But more importantly, we know the rules of the game have been constructed to keep our number down. If the rules are stacked against you, you should say, hey, wait a minute, I want to change these rules. Everyone is talking about campaign finance reform, but nobody is talking about how to stimulate more competition.

One election reform I want to introduce is the concept of a candidate guaranteed loan program, analogous to the guaranteed student loan program. I began to think about that program as a model for getting more women candidates. I spent five years of my life, literally, from 1987 to 1992, recruiting women to run. Before that, I always thought that the major reason a woman didn't run was because of all the money she had to raise. That's one of the reasons, but it's not the major one. The major reason is that they couldn't figure out where to get the seed money to start their campaign, and then how to run a campaign and also pay their own mortgage or rent. It takes about one year to get elected, and most women are in jobs that don't pay them if they don't work, whereas an awful lot of the men are in jobs like law partnerships that allow them to take leave and still get full pay. We need to change the campaign laws so candidates can take a salary from the money they raise, and it should be the same salary as is paid by the job the candidate is seeking.

A "guaranteed candidate loan program" would give people who qualify to run their "first stake," so they can start hiring people and begin raising money. You want educated people? Give them a break. We want good candidates? Give them a break. That would *tremendously* change things for women—and some men, too.

The Minnesota Department of Natural Resources Volunteer Program

Renée Vail

For the past 12 years, I have been the Director of the Minnesota Department of Natural Resources (DNR) Volunteer Programs. In October, I was presented with the 2000 Minnesota Association of Volunteer Directors' Excellence in Volunteer Program Development and Management Award at the Association's annual meeting (the author holds a plaque honoring her award in the photo above). This award is given to a member that has demonstrated outstanding skills, dedication, professionalism, and commitment to the field of volunteerism.

A native of Wisconsin, I received a Bachelor of Science degree in Agricultural Education and Horticulture from the University of Wisconsin - River Falls. My volunteer administration work began in 1982 as a County Extension Agent with the University of Wisconsin Cooperative Extension Service in rural northeastern Wisconsin. Moving to Minnesota in 1986, I continued my agricultural work with the Minnesota Extension Service for two years before being hired by the DNR to develop a volunteer program for the agency. My agricultural interests shifted to natural resource issues as I designed the policies and procedures for the Minnesota DNR's first department-wide volunteer program.

Working with DNR staff across the state, I manage a statewide plan that utilizes volunteers in support of department objectives. The program also enhances the capacity of staff to work more effectively with citizen volunteers on resource issues within their community by providing the link between volunteers in these communities and the DNR. Volunteers are recruited through a variety of avenues. The most notable is the publication of a quarterly newsletter, titled "DNR Volunteer Opportunities," mailed out to over 4,000 interested individuals, colleges, universities, conservation organizations, and corporate retiree programs. This same newsletter is posted on the Minnesota DNR's website at www.dnr.state.mn.us and receives an average of 500 hits per month.

Staff training in volunteer management issues is also an important component in building a strong volunteer program. Part of my job is providing training for DNR staff, and I also present workshops on volunteer management to other public agencies and nonprofit organizations. These have included presentations at the Wildfire Prevention Education Institute in Ontario, Canada, in October 1998 and at the 8th European Workshop on Volunteer Action held in Madrid, Spain, in October 1999. I've also provided information to government agencies in other states on how to set up their own volunteer program.

In setting up any volunteer program, there are six basic steps to follow. These are:

1) *Identify projects and a potential pool of volunteers.* This means identifying the problems/issues that need to be addressed and who is most affected by them. In most cases volunteer projects are designed to meet the community's needs and the agency's role in these issues. A target audience of potential volunteers is also identified for recruitment. Besides individuals, clubs or organizations may become partners on volunteer projects. Policies, procedures, applications, and agreement forms are all developed to meet the identified type of work.

2) *Selection and screening of volunteers.* Volunteer skills, availability, and motivational needs are considered in matching people to appropriate volunteer positions. Clear job descriptions are needed to facilitate this match. Acceptance as well as rejection of volunteers must be considered.

3) *Orientation and training of volunteers.* In large organizations, such as the DNR, Volunteer Programs provides field staff with volunteer management training and they in turn conduct the actual volunteer training on site for their particular project.

4) *Utilizing volunteers—putting them into action.* This is where volunteer administration plays the biggest role in guiding staff in risk management, liability, and union issues for those agencies with organized labor. Workers' Compensation and other legal issues may also be covered here.

5) *Recognition of volunteers.* Respect and a variety of recognition that is meaningful to the volunteers are vitally important in volunteer retention.

6) *Evaluation of the volunteer projects.* Time, cost, and effectiveness of using volunteers are all included in the evaluation. Questions to be covered include: How much staff time was involved in using volunteers? Were good community relations built through the project? Did the volunteer work meet the objectives and goals for the project? Can the project be easily repeated? What changes are needed to make things run more smoothly next time?

Minnesota DNR volunteers conducting a Prairie Seed Collection project on a Scientific and Natural Area.

The Minnesota DNR Volunteer Program was originally established as an activity with funding from the Legislative Commission on Minnesota Resources (LCMR) in 1983. It was converted to the state's general fund and became a permanently funded program of the DNR in 1985. When I took over the program in 1988, I began the task of changing the program from primarily coordinating a few volunteer events each year to developing policies and procedures to assist staff in recruiting and handling large numbers of volunteers. After a department-wide assessment of volunteer needs, a new application and agreement form were developed. I then worked closely with computer consultants to design a database program that would allow me to enter data on interested volunteers and do searches by skill, interest, and location when doing recruitment for a division in a certain part of the state. Technology has advanced so much from those early years. More user-friendly database systems and the Internet have helped a great deal in the recruitment and referral of volunteers.

Over the last seven years (since statistics have been recorded), the Minnesota DNR Volunteer Program has grown from 19,114 volunteers involved in natural resource work in 1993 to over 32,000 volunteers in 1999. Volunteer hours have increased from 267,745 to approximately 434,500 hours per year during this same time period. This type of volunteer activity represents a value of $6.2M in additional labor for the DNR. Citizens participate in volunteer activities such as river clean ups, loon monitoring, wildlife surveys, trail brushing, white pine bud capping, and prairie restoration to name just a few. Some of the most common volunteer positions include being a Lake Level Reader, Campground Host, Fire Warden, Firearms Safety Instructor, and Scientific and Natural Area Site Steward.

A prime example of how invaluable volunteers are to the DNR is the Scientific and Natural Areas (SNA) Program. Working to maintain and restore stretches of land with rare and endangered plant and/or animal communities, twenty volunteer site stewards regularly monitor various SNAs, marking down on report forms where signs are down, where exotics have spread, and where the occasional rare plant is discovered. With 133 sites and only ten paid employees, the site stewards are crucial in managing these resources. Add to this more than 800 volunteers who cut sumac and buckthorn, pull knapweed, gather prairie seeds (see photo above), and collect acorns that are sent to a nursery to grow seedlings for replanting, and you have a major volunteer work force.

In researching the impact of volunteerism and citizen participation in the state, the 1999 Minnesota State Survey (conducted by the University of Minnesota Center for Survey Research), found that the number of Minnesotans 18 years of age and older who volunteered was 10% higher than the national average of 56%. The age group that volunteered the most in Minnesota was 35 - 44 year olds (76%). Although women were found to volunteer at a higher rate than men do (77% vs. 60%), Minnesota DNR Volunteer Programs actually has a larger proportion of men than women volunteers.

I am honored to receive one of the Minnesota Association of Volunteer Director's highest awards. This award helps bring attention to all the good work people are doing concerning environmental issues in our state. Volunteers should no longer be thought of as stereotypical women or mothers at home that help with social issues in their community. A great deal of the DNR's volunteers are working women and men who have a real interest and love for the outdoors.

Vail enjoys cross-country skiing, golfing, traveling, and horseback riding. Her riding interests range from trail rides to dressage. She and her family make their home in White Bear Lake, Minnesota.

Musings of a Woman Among Men
in the Eagle Cap Wilderness

Hallie Kendall

When we returned from hiking the Wallowas, I found myself feeling very quiet. I didn't want to be on the computer or the phone for the first couple of days back, or even have the radio on. There were 16 messages on the machine, and I decided that entirely too many people have our phone number. Even Geordie doesn't want to call people back. You can tell, because he talks too loud, and he doesn't put a lot of effort into the descriptive arts—more or less the same thing that I do when I want to get off the phone.

Photos can not do justice to the Eagle Cap Wilderness. It was a bit of a drive from our home in Portland, Oregon, but coming through the Columbia River gorge was as scenic a drive as one could hope for and easily made up for the car ride. The hike itself made up for much more than that.

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A deer greets us within 50 feet of the trailhead, freezing into place at the sight of us, and then bounding away uphill into the woods. A waterfall cascades down this first uphill grind, the roaring water temporarily cutting off conversation. Besides the deer, we meet marmots, chipmunks, and the tracks of bigger cats; lynx, probably. Fortunately, the cats are shy and don't show more than little paw prints and occasional scat for us. Lots of trout live in the lakes, though later none of them will allow themselves to be caught on the night we finally were prepared to fry them up for dinner.

By the time we're ready to stop for a rest break, the terrain has already changed. The trail is a winding forest track through one glacier-carved valley after another, filled with tiny purple wildflowers and red and orange Indian paintbrush, and grasses I don't recognize that are turning a brilliant red-orange for fall like sweetgum leaves in the Willamette Valley at home. Most are still flattened from the last week's snow. Fast moving creeks and tiny streams cut across the trail. At this altitude, it's a little chilly when we stop moving, and the bright warm sun is especially welcome.

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It snowed on us the second night. My best friend Geordie and some of his buddies from REI had planned this hike as our Fall outing, and the way Doug plans hikes (and I love the guy), the second day is always the Death March. I'm thinking that he plans it this way so that you have one day to work up to it, and then the rest of the hike to recover, chanting to yourself, "At least it's not as bad as that !@*& second day." I was exhausted when we made camp that night. Every time I do it, I

feel that I've never been so happy to take a pack off. Even so, none of us were expecting snow on top of exhaustion—and in my case, on top of a careless choice of footwear.

The rain started right after dinner, and Geordie and I climbed into the tent to read and recline. When I woke up from "reading," it was dark outside the tent and the rain sounded icy. It was sleeting.

It should be easy from inside my nice cozy tent to ignore the icy rain and go back to sleep—I'm thrashed from the nine miles of hiking, the 9,500 foot pass, and then setting up camp without sitting down, in addition to not sleeping the last two nights. Instead, I'm listening to sleet hitting the rain fly and thinking, "I am fatally stupid for wearing Birkenstocks on this hike." Actually, I

carried Birks on this hike—I started out barefoot as usual, thinking anything that my feet can't handle I'll have the Birks for. The shoes I'd brought seemed too heavy to carry and I'd left them behind in the truck. So here we are, having hit 9,572' elevation on the day's hike, sleet's coming down the middle of the night, and my backup footwear are three-year-old open sandals.

I'm listening to the sleet, and not sleeping because I'm so worried about slogging out of there in two feet of snow in sandals, and not making it out alive. It sounds silly, "not making it out alive," from my comfy spot in front of the computer right now, but at the time it was not. The wild is all around you, the weather is all around you; the sounds of crunching twigs and brush could be your camp mates, some deer, nocturnal rodents, or bear. I came in on foot, and by foot I'll have to make it out. I'm starting to wonder, "how many toes will have to be amputated to save my feet? I'm such an idiot..." and in the middle of thinking this, it gets quiet. The quiet is falling snow.

Being on a hike does nothing to slow your natural processes. Shuffling across a warm carpeted floor to the loo in the middle of the night can be accomplished half-asleep; in the woods, in a low tent, it's a major production—struggling out of the bag, groping around for the headlamp, tracking down the toilet paper and the Terrible Trowel, putting shoes on, unzipping the tent, and then zipping it right back up again at the protest of your tent mate to the blast of cold air. I'm lying there wishing I didn't have to go, wishing I didn't have to get out of my cozy bag, knowing I have to, and really hating the idea.

I get up. The snow is deepest right around the tent, where it's also sliding off the rain fly, and I'm looking at at least an inch of snow and worrying all the more for seeing it there in real life and not just in my imagination. The stars are bright and big and close. I'm relieved to see that the sky's mostly clear. The snow that's still falling is mostly blowing down from the trees.

With my headlamp off, the moon is bright and cold, and almost full. The snow on the mountains around us is luminescent, a scenic nightlight. Our camp is situated next to the lake, in a thin grove of evergreen trees. Under the moon's pale whitewash, the tents blend almost seamlessly into the landscape. The surrounding trees' shadows in the snow are a dark, lurking blue, carving scars into the snow-blanketed meadow. The surface of the lake is rippled to a frosty finish in the chill wind. Near the trailhead, a sign observed our passage into the wilderness area, but it is here in the snowy moonlit quiet that it becomes clear we are only visitors.

The void of civilization is a loud sort of quiet. The dead concrete and machinery that are my companions in daily life are gone, and I feel myself side by side with the life that usually surrounds me only intellectually. The gauzy covering of snow on this meadow is a gentle reminder from our Mother to me of the fates that await the careless and the disrespectful. Don't forget this one, she says— My messages are not always so gently worded.

Just standing here is a sort of thanksgiving, and I offer a wordless prayer of gratitude for the moment. I also observe that this thin blanket of snow on the ground is just enough for decoration, and nobody ever had to cancel a hike on account of prettiness. I leave the lamp off as I find my way back to the tent. Assurances aside, I go back to bed, but I don't sleep easily.

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When we wake up in the morning it's even clearer, and the sun will melt the snow down pretty handily by 10 a.m. or so to about a quarter inch. As usual, it's not as bad as I imagined. I can tell none of this yet from inside the tent however, and I hear the boys milling around with their coffee or poison of choice. My mood has swung back in favor of worried pessimism from the lack of rest. I'm not at all sure that more snow didn't arrive after my nightly constitutional, and Geordie is already up and puttering around with the frozen water filter. I'm afraid to ask about the snow, and I don't hear enough editorial commentary on it to guess, so I announce my wakefulness with my usual subtlety.

"I am fatally stupid for wearing Birkenstocks," I declare in my best croaky morning voice, eliciting sounds of sympathetically appreciative realization from the millers-about. Might as well save them the observation. It does make me feel a little better just to say it. Geordie gives up on his tinkering with the filter and asks me to thaw it in my bag for him. After a short dose of body heat, it makes a slukking sound and pours water all over me. Brother—someone here's the smart one and someone here is the purty one; and I must be the purty one, 'cause who couldn't see that coming? He apologizes as I hand it back to him, and having given up trying to be warm in the humid tent, I emerge from its tiny shelter like a moth from a crysallis. Blinking around at the snow in the light, it's now not even enough to cover the toes of my sandals. "I am an Oregonian, and I fear the Snow," I confess, feeling a little foolish standing in half a centimeter of the stuff. For me, snow is good only in small, manageable quantities because snow equals cold, and I hate being cold. In the Willamette Valley, snow is something you have to drive to see, not a thing that comes to you. I also hate wearing a lot of clothing for the restriction of movement this usually implies. Looking around, I realize a more realistic worry is the melting of the snow, which could turn the trail into an icy, unnavigable slush. Geordie, my hero and a Vermonter, continues to reassure me. "This is nothing," he says, handing me a water bottle filled with hot tea. "You'll be fine." His hugs are also much appreciated; I feel like such a weenie.

It turns out that the water filter, which was frozen outside the night before, still isn't unthawed enough to work. The hose is clear, but the mechanism still has ice clogging it. Mr. Resourceful Vermonter goes about scooping up snow to melt for breakfast. The stove, which he left out last night and turned upside down, was snow covered. The cooking surface was dry and warm from the contact with the ground. He puts the black filter unit on a sunny rock to thaw some more. I marvel at the genius of all of it, and ponder our role reversal. At home, he is always asking me where things are, how stuff works, and depending on my experience to problem-solve. Out here, I'm barely competent, and he's doing all the thinking and most of the work. I'm happy to trade places.

The gravelly granite trail is actually the first thing to clear. Milling around camp, discussing our plan and drinking tea, I walk around in the boys' tracks as much as possible to keep the snow off my toes. My feet are plenty warm; it's my hands that freeze. I keep having to get them wet—to wash up breakfast dishes, to help shake snow off the tent and the rain fly, and to help the others do the same with theirs. I feel, keenly, the advantage of working as a pair, and as a group. The bright sun feels so brave and friendly that it's hard to remember the sting of vulnerability I was feeling in the moonlit wilderness hours ago.

We put everything out to dry on big rocks on the sunny side of the meadow and look around for indications of the developing weather. Someone's got a weather radio, but they can only get the report for San Francisco; it's going to be really nice down there, apparently. Meanwhile, Geordie's applying his sailor's eye to the skies above and not coming up with an optimistic forecast. Myself, I'm looking at these thin, wispy clouds that are raking the tops of the mountains all around us and comparing them in my mind to the Mt. Everest disaster book: ". . . harmless looking clouds in the sky on May 10th, seen right before the storm that killed 12 people and took the toes of countless others. . ." I tell Mike this, and he looks at them and thinks the same. It's his birthday, and he's 52. He's done a lot of hiking, seen a lot of storm clouds. "Some birthday, eh Mike?" I hollered into his still tent, earlier. We sang to him as he crept out on arthritic joints.

So I'm not the only one who's worried. This shouldn't relieve me, but it does. "I remembered this morning why I don't do winter hiking anymore," Doug says, gesturing with his ear to the icy rain fly on his tent. We mill around the map in caucus. We decide to tack about 6 miles on to our 2 mile trek that day, so we are poised a reasonable distance (11 miles) from the trailhead in case we get stormed on and need to bail out. Which means the longer we stand around, the less time we'll have to make camp before dark.

I always seem to get panicky just before we hit the trail. I get butterflies, and this "I'm gonna die" feeling. On this particular morning, I add to that, "Will my overconfidence (about the necessity of footwear) finally allow Nature to select against me?" After about the first quarter mile, these feelings wear off as I burn the excess adrenaline. Today is no different. By the time we get started, I have to take my socks off, my extra layer off, and I'm down to shorts and a t-shirt. It feels about 50 degrees, but the wind chill is enough at

Glacier Lake, Eagle Cap Wilderness, Oregon.

this altitude to keep the snow off the trail frozen, and to cool us in the initial uphill grind. On the fourth switchback, as I'm starting to feel cooked, Geordie says, "You're not worried anymore, though, right?" Me: (panting) "...Oh, yeah! Hey, cool."

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We make it to Glacier Lake (our original destination for the day) handily by lunch, and it's beautiful. This is the most scenic lake in Oregon, in the opinion of many, and I can see why. Tiny little volcanic islands clustered just off the left bank look as though they're built to 3/4 scale—the fir are the size of those on a slightly overgrown Christmas tree farm. I imagine camping on one of these islands. That is, if I could get to them without freezing solid as a supermarket turkey. The water is beautiful and clear because it's liquid ice. The water pouring out of the lake and over the saddle down to the valley we just hiked out of crashes down the rocks with a hint of a crackling sound, reminiscent of distant breaking glass. The mountains around it are snow-capped, and more so than yesterday, with last night's fall not melting up high. The breeze is chilly and we all throw on hats and jacket shells during lunch to keep from getting chilled in our own sweat. Geordie's starving as usual, and we choose high protein snacks for lunch, sitting down on a broad flat rock to picnic and soak up the view, and some sun. It isn't warm sun, like we've been spoiled with at home all summer, yet it is more welcome. We have another pass to hit pretty soon, so we don't dawdle. I expect it to be brutally windy like the last one, and keep my shell on. Instead, it's beautiful. We soak up the view briefly, and start down the other side, thanking Glacier Lake for the view and making wishful plans to return for a longer stay next time.

The terrain keeps changing; it seems like every time we go over a pass, that we are on a different planet. This one has thick underbrush, scattered with tiny noble fir. We're back down to around 6,500 feet. The trail wanders around like a lost dog—it winds and switches back on itself, but not in such a way that you can see the trail above or below you.

Moccasin Lake is the next stop. We don't stay long, because of the time and the threat of storm, but our brief affair is unforgettable. Nestled in the meadow of a glacier valley, this place is as cozy as a living room. With the sun overhead and the welcoming forest surrounding, I'm wishing this was our camp for the night. Volcanic basalt floes slither right up to water and drop off with a square edge. A few levels of plateaus are visible below the surface, making shallow grand staircases to the bottom. As distant as the bottom is, the water is so clear it is easy to see it when the wind dies down and the mirror surface of the lake returns. Fish hide under the scattered metamorphic boulders below. When they venture to the top to dine on the water bugs, they're snack food for the diving birds above. Clear water is a tough place to be a fish.

The hike away from the lake is just as beautiful. The sun has braved out the day so far, but it's been breezy and not too warm. Geordie and I decide to push hard and fast to camp. We find the rest of the guys ahead of us at a granite-paved camping place next to Douglas Lake. Vast slabs of this granite pour right up close to the water, then drop down 20 feet or so into a narrow swath of scrub pine forest at the water's edge. There's enough topsoil on parts of the granite slabs to stake tents, and Geordie picks an impossibly tiny spot hidden from the wind on which to pitch it while I fire up the stove.

These granite slabs jut up from the tent site to make a nice countertop. It's still pretty early, maybe 4 pm at the latest, and I skip down to the water to draw a pot for bathing, a stove-fuel burning luxury Geordie assures me we can afford. The wind has died down, and it's at least 50 degrees out. On the sunny

rocks, it seems warmer, and I pick a spot enclosed on at least two sides so the boys can pretend they don't see me. They're all milling about, discussing camp sites and enjoying the view, and I'm not the only one who spoke loudly and lustily on the hike of bathing at camp, but after I take my clothes off, they slowly and casually scatter themselves from view. Sometimes you just can't pretend to be one of the Guys.

The wind stays low for my whole bath. I soak up the hot water, pouring it over myself with the washcloth and scrubbing slowly, savoring the peppermint smell of the soap and the steam of the water a gauzy curtain between myself and the lake. The water washes hot over my sticky, sweaty skin, then cooling quickly, it drizzles over the granite slabs and is soaked up in the fir needle drifts. It's only a two quart cooking pot, but it's more than enough. I hear the wind picking up in the trees across the lake and reach for the towel. I'm dry and warm when the wind reaches me.

Dinner could be a fish fry depending on the luck of the fishermen among us, but Geordie and I can't wait. We make up alfredo pasta and vegetables and curry potatoes while the guys fish. As usual, it's the greatest food I've ever tasted. I offer to wash the dishes while Geordie pumps rinse water; when he hasn't returned, I leave them for him to rinse and go after firewood. We've all been too exhausted to stay up for a fire so far, but it's Mike's birthday, and it seems wrong to go to bed early when there's so much to celebrate. I haul every dry chunk of wood in the surrounding quarter mile, from twigs the size of a number two pencil to saw logs they can't take at the mill. "We're gonna have a BONFIRE," I yawp, by way of a warning. The unflappable Doug raises an eyebrow. I had earned the title "Queen of Campfire" on previous trips with him, and he warns Jonathan to move his tent back from the fire pit.

As I'm hauling wood, Mike calls me over to observe his latest toy, the Roll-R-Roaster. They're these great marshmallow roasting forks with thumb-level turning mechanisms. They collapse for packing like radio antennae. My enthusiasm for the fire pours over to the roasters, and I loudly declare them party-worthy, then enlist Geordie's help to drag in a great log I found that I can't heft alone. The guys who aren't fishing set their camps and contemplate dinner. By the time the sun's disappearing, I can feel a sunburn on my face, and a slight chill in the air. I guess that the wind will pick up as the sun drops and the temperature destabilizes, and that clouds will roll in overnight.

I'm warm and clean from bathing and the sun, and tingly from hauling firewood. The boys light the fire prematurely while I'm away scouting for wood, and then yell for me to come and fix it. Clearly, it's time for some unprovoked theatrics. Let the evening show begin.

"Did you light that fire?? MY fire??" I demand, looking round at guilty faces.

"Yeah, can you keep it going? It's kind of. . .smudgy. . ."

"Well, that's 'cause you started it all wrong! I wasn't ready! It wasn't a teepee! You need a teepee!" They shuffle their feet.

"Look," I said, bringing my fingers to my temples for emphasis, "You have to THINK like a fire," and go about salvaging the flame. A minute later, as it roars to life, Mike comes over with his Roll-R-Roasters and two bags of marshmallows, doing a mock-salaam to the Goddess of the Fire. He's heartily amused. Doug brings him a card signed from everyone at REI, with some Ho-Hos as a birthday cake. We all cheer. The marshmallow roasting and Mike's alien encounter stories, along with references to the Fire Goddess, go on well into the night, but even so the firewood is still plentiful when we decide to turn in. The Guys vote to extinguish what remains of the fire with a group demonstration of their "firehoses"—an event for which I quickly exit stage left. As a cloud of the resulting smoke drifts over the lake, I loudly accuse them of scaring off all the fish. Sometimes, you just can't be one of the Guys.

The sky has remained clear, and the stargazing has been fantastic. We hope for good weather tomorrow, for day hikes and fishing.

****

The next morning, just as we're waking up and it's getting light, it's starting to rain. Having held off all night, the sky is now solid overcast, and there's dissension in the ranks. Doug hates the rain. I've been prepared to go, and Geordie's even willing to cut it short. Ron's had blisters the whole time from his lousy stiff boots, and now they're infected. He's prepared to wait at the truck overnight for us if we want to stay, but he has to hike out before his feet are no more than bloody stumps. We've been joking during the hikes that the circling turkey vultures are waiting for him to drop so they can move in. Mike is abstaining from the vote, but looks ready to go. Jonathan and Greg want to stay, but they're outnumbered five to two. We decide to stick together, hand out radios at the front and back of the line, and get moving. We've tried to pack up between rain showers, but loading up the wet tent is pure water weight. Our packs get heavier by the hour as we slog through the dripping evergreens, soaking up more water, and the downhill grind is worse in some ways than hauling ourselves over the passes. My calf muscles get overworked, and I can't go without my shoes because of the constant wet. The gravel under my waterlogged skin, grinding to stop at each step, would tear up my feet.

In the upper elevations, the trail is still navigable, but as we go lower, the wear from horsepackers is more and more evident. The last four miles are a sheer hell, a creek of horse manure and mud up to our ankles. I curse the horsepackers loudly and often, but there's no one to hear me. Geordie has given up keeping his hiking shoes dry, and eventually I do the same. My feet are warm from the activity, and waterproof pants and shell help in keeping my core temperature stable. Even so, the constant sliding and wading are wearing on me. I can't appreciate the view anymore, even as we follow the Wallowa river down through the steep, sweet, fresh-washed forest to the trailhead.

As we approach the last of our hike, Geordie looks at the map and can't tell if we have to backtrack or not. There's a junction right near the end that is impossible to read. We start off in the wrong direction, but turn back almost immediately when we see our trail is leading back into the forest. Doug's carved arrow in the trail, pointing the way out, was half washed out from the rain. I find the remains of it on our second look and we head down. We can see Wallowa Lake from the trail. We feel so close to the end of our journey, but the map is telling us—we think—that we're a ways off yet.

The end is near, but we're too tired and annoyed from our hours in the rain to notice it. "That's not our parking lot," I'm thinking. "We're not there yet. This is all wrong." But Ron, Doug, and Mike are there in the car at the trailhead, where they've been waiting for an hour and a half. We're the second group to roll in, and Greg and Jonathan pull in last, about thirty minutes behind us.

We change out of wet clothes in the park bathrooms and gather under the tailgate of the truck celebrating with some beer, while Jonathan and Greg get themselves together. We drive into the nearest town, LaGrande, for our end-of-the-trail dinner. Pizza has never sounded so good. The pans are clean when we leave the tables forty minutes later and split up for the drive home. I sleep on Geordie's shoulder half the way; he sleeps on me for the other half.

My dreams are a strange wash of home and forest. Images of the hike flow through my consciousness in the days following, and I catch myself—too often—gazing out the window at a tree blowing in the rain, or daydreaming about the snow and the struggle up the pass. I don't realize at the time that I am planning my next escape from the city.

Hallie Kendall works odd jobs to support her writing habit and haphazardly tends her garden and chickens in her colorfully painted home in Portland, Oregon. She can be contacted with offers for lucrative writing contracts through the Editor.

NEWS & NOTES, cont. from page 17

"Rosie the Riveter" Honored

Hundreds of people who worked in Richmond, California's Kaiser Shipyards during World War II gathered at Marina Bay, part of the former shipyard site, on October 14, 2000 to dedicate the Rosie the Riveter Memorial. Designed by artist Susan Schwartzenberg and landscape architect Cheryl Barton, the memorial includes a 441-foot walkway (the length of a Liberty Ship), panels with photographs and quotes from women workers, and a lookout platform at the water's edge. Thousands of women worked alongside men to build supply ships and other ordnance for the armed forces.

In October, President Clinton signed legislation creating the Rosie the Riveter/Home Front National Historic Park, which will include the memorial, other sites at Marina Bay, and other historical resources in Richmond. The park and memorial are the first to give national recognition to the women, minorities, and other home-front workers who played a significant role in the war effort and, in so doing, contributed substantially to the transformation of the American workplace.

—*California Coast & Ocean*, Autumn 2000

gURLs Just Wanna Have Fun

While technology remains a male domain, cyberfeminists are contesting the territory—including cyberspace, technical fields, the academic arena, and the technoculture of everyday life. In her pioneering 1999 book *Zeros + Ones,* Sadie Plant, founder of the Cybernetic Culture Unit at Britain's University of Warwick, recasts the history of women and machines—from looms and telephones to typewriters and computers—as a symbiotic evolution. Cyberfeminist scholar Faith Wilding of Carlow College in Pittsburgh says, "A lot of what women choose to do has to do with training, expectations, and the mentorship they get. If they get educated in a heavily male tech culture, then the expectation usually is that the women will do the social part of it and the housekeeping."

On the movement's front lines, cyberartists, techies, and Net activists rally on-line and off. The first Webgrrls (webgrrls.com) get-together in New York in 1995 spawned a networking group with nearly 100 chapters in 17 countries. Australia's GeekGirl e-zine (geekgirl.com.au) features "hot flushes" from its worldwide community of wired women. As the Internet reinvents the world economy, so is it reshaping feminism.

—Elizabeth Roberts, *Working Woman*, Dec./Jan. 2001

Continued on page 47

Digging in the Dirt:
The Dynamics of Bioturbation on a Floodplain in the Moremi Game Reserve

Kristin Reed

"The alluvial sands and Kalahari-type sand patches are sought out by burrowing animals, and from the air their burrows are seen to be limited entirely in conformity with the sandy areas."

—K.L. Tinley *An Ecological Reconnaissance of the Moremi Wildlife Reserve*

Introduction

Bioturbation can be described as the displacement of soil or shifting of soil layers due to the activities of animals or insects (Schaefer 1983). Such forms of displacement may include, but are not limited to: the dome-shaped mounds of soil pushed to the surface by a mole rat, the crumbling dunes of clumped sand constructed by harvester ants, the one-meter-wide tunnels dug by aardvarks, the grouped burrows of a springhare colony, the three-centimeter-in-diameter pits guarded by ant lions awaiting their prey, the towering fortresses and tubular grass casings constructed by termites, and even the scratched-earth evidence of an elephant enjoying a dust bath (Liebenberg 1980, Walker 1996).

In 1998, I sought to investigate the correlation between bioturbation and habitat within the context of a seasonal floodplain ecosystem in Moremi Game Reserve in the Okavango Delta region of northern Botswana. My study focused on both the nature of the bioturbation itself (i.e. diameter and density) as well as the nature of the habitat in which the bioturbation was found (i.e. soil and vegetation types).

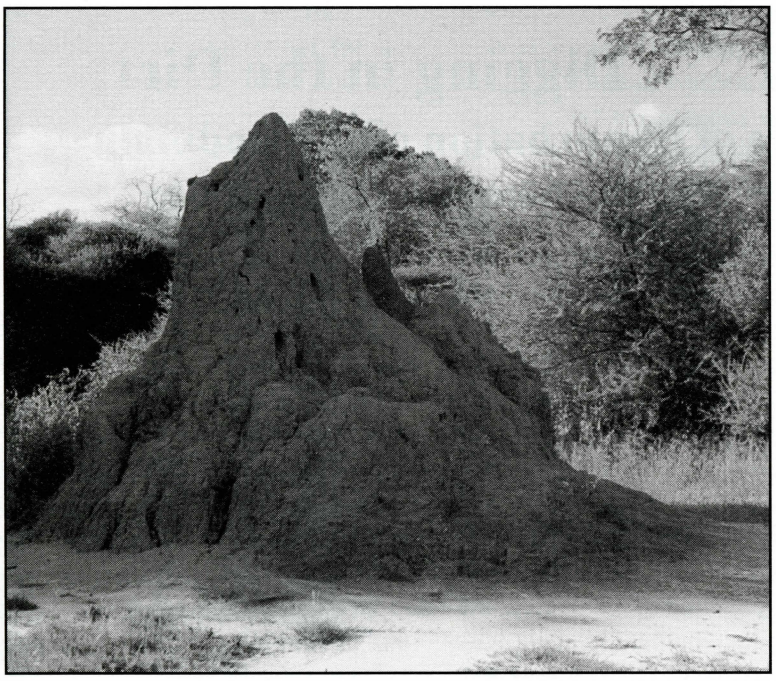
As K.L. Tinley noted in his 1973 air-survey of Moremi Game Reserve, quoted above, burrowing animals seem to have a preference for Kalahari sands and alluvial soils. Indeed, the soils of seasonal floodplains are comprised mainly of Kalahari sands and alluvial soils, but within these areas, which specific habitats exhibit the greatest prevalence of bioturbation?

Bioturbation has received little direct attention from the scientific community and few studies have investigated this phenomenon. Despite Tinley's recognition of bioturbation on the floodplains of Moremi, no research has been published on the subject from this region.

Studies of any ecosystem include examination of the nutrient cycle, water infiltration, and soil aeration. These processes are greatly affected by bioturbation. The nutrients within a soil profile often lie in the greatest quantity on the surface, in the form of detritus or humus (Walker 1975). These nutrients must be brought into the lower soil layers in order to be utilized by plants or micro-organisms (Hillel 1971). Burrowing animals shift soil layers in the act of digging, which helps cycle nutrients. Soil invertebrates distribute organic materials through discharged wastes (Dindal 1990).

Plants rely on the penetration of water through soil layers where their roots can take up water. Open structures or cavities, such as tunnels or holes, allow for the passage of water directly to the plants' root systems, even in capped soils. Thus, bioturbation facilitates water infiltration of generally lesser-penetrated areas (Hillel 1971). Termites perform the key function of recycling dead organic material into valuable mineral resources for plants and micro-organisms, while opening tunnels to water infiltration.

Bioturbation also aids in the process of soil aeration, the gaseous exchange between soil air and the atmosphere necessary to the process of plant respiration. Soils denied aeration, as are the soils of the seasonal floodplain while under flooding, suffer decreased oxygen concentration and increased carbon dioxide concentration. If this situation is extended, chemical reduction occurs, possibly producing methane, nitrous oxide, hydrogen sulfide and other gases poisonous to plants (Kohnke 1968). Thus, bioturbation is helpful in restoring plant aeration by cycling soils and increasing points of gaseous exchange by way of tunnels and burrows, and it is essential to restoring the health of the plant community after a period of intensely restricted aeration during the flood season.



Major evidence of bioturbation: a termite mound.

Study Site

Within the Okavango Delta region of northern Botswana lies a 4871 km^2 protected area known as Moremi Game Reserve (Roodt 1996). The network of perennial swamps, seasonal swamps, and dryland within the reserve receives an average rainfall of 457 mm and records a mean temperature of 18 deg. C annually (Tinley 1973). At the southern end of Chief's Island, a dryland within the reserve, lies a floodplain adjacent to the Boro River, where staff at the University of Botswana's Okavango Research Centre conduct research on floodplain ecology. The soils of this area are comprised mainly of fine-particle alluvial soils in the areas of central flooding, while increasingly larger sandveld particles form the soil in the surrounding areas of partial flooding and marginal floodplain woodland (Roodt 1996).

This study began 18 April 1998 and ended 8 May 1998. Spring is the dry season in this region, and the Boro River had dried up completely, with no surface water remaining on the floodplain. This study was conducted within a 1.5 km^2 area of the floodplain and surrounding woodland

I analyzed the occurrence of bioturbation in six habitat zones, delineated by the Braun-Blanquet school of classification (Kent 1992):

1. *Cyperus articulatus - Schoenoplectus corymbosus*. The sedges dominating this zone are characteristic of a seasonal or permanent swamp (Ellery 1997). These species are highly unpalatable and, therefore, ungrazed. Thick, matted roots form a strong network in the alluvial soils which compose an upper soil layer (< 10 cm) above fine sands. The soil surface contains a high litter content due to the brittle nature of the sedges after desiccation in the dry period. Within the lower part of the floodplain, this zone was the final area from which the floodwaters receded. Thus, the sites of high animal concentration in this zone (e.g. hippo pools) suffered vegetation trampling and a high amount of soil compaction.

2. *Paspalidium obtusifolium - Panicum repens*. These two climax species are creeping grasses, tending to grow around the fringes of the *Cyperus articulatus - Schoenoplectus corymbosus* zone spreading a thin net of roots just below the soil surface and protecting fine alluvial soils from erosion (Bonyongo 1998). Due to these species' high palatability, areas of this habitat in the study site have been heavily grazed and exposed to wind and hooves, thereby rendering much of the bioturbation here (especially old evidence) indistinguishable. Also within close range of the *Paspalidium obtusifolium- Panicum repens* zone are species such as: *Alternanthera sessilis*, *Vernonia amygdalina*, and *Persicaria senegalensis* (Bonyongo 1998).

3. *Eragrostis lappula - Setaria sphacelata*. The species dominating this zone are moderately palatable climax species, often growing in tufts within the sandy soils. It is not unusual for the mean tuft distance within this zone to exceed 10 cm. Again, this invites the destructive forces of wind which serve to destroy evidence of bioturbation. Other common species in this area include *Aristida stipoides* and *Sorghastrum friesii*, especially on the borders of the *Imperata cylindrica - Setaria sphacelata* and woodland zones.

4. *Imperata cylindrica - Setaria sphacelata*. The siliceous leaves of *Imperata cylindrica* tend to inhibit grazing in this zone, resulting in thick stands of this grass in the lower floodplain. However, in the higher floodplain, these grasses appear to have partially died, leaving only a sparse layer of ground cover. Any evidence of bioturbation is much more easily seen in this thinned version of *Imperata cylindrica*.

5. *Vetiveria nigritana - Setaria sphacelata*. The unpalatable, impenetrable patches of *Vetiveria nigritana* on the floodplain are thick, ungrazed and, unruly. Growing on organic-rich sand and heavier soils, these grasses offer excellent cover for burrowing animals and insects, but detection of any bioturbation in the area is nearly impossible.

6. Woodland. The species dominating the marginal floodplain woodland area are mainly trees

with grasses growing along the fringes. The tree species most commonly found are: *Croton megalobotrys, Hyphaene petersiana, Combretum imberbe, Acacia nigrescens, Acacia hebeclada, Acacia erioloba, Linchocarpus capassa, Acacia tortilis,* and *Kigelia africana*. Prevalent grass species include: *Digitaria debilis, Aristida stipoides, Sorghastrum friesii, Cymbopogon excavatus, Schmidtia pappophoroides,* and *Hyperthelia dissoluta* (Bonyongo 1998). Fine, rich soils predominate with a moderate litter content. Due to the lack of dense ground cover in many areas of this zone, bioturbation is readily seen.

Methods

The study site was divided into three sections (low floodplain, mid-floodplain, and high floodplain) to investigate potential differences in bioturbation levels between these areas. Bioturbation was expected to be affected by time since recession of floodwaters (the waters having receded from the high floodplain first). Randomly chosen transects of the floodplain were laid out with a measuring tape from the eastern woodland to the western woodland. The transect was bisected and the midpoint marked as "0 m." A compass line was then determined from north to south, and this line was marked at 20 m intervals, and sampling transects were laid out perpendicularly at each interval point. East-west transects were sampled at each meter, as measured by pacing. At each sample point, a one-meter line perpendicular to the transect line was studied for evidence of bioturbation. If any such evidence was present, the diameter and the distance from the transect line were measured. It is important to note that the bioturbation must have remained intact in order to have been recorded (*i.e.* distinguishable from surrounding soils.) Vegetation type (dominant species) was also recorded along each transect line.

Percentage of the floodplain in each of the six habitat zones was determined by calculating the percentage of the transects in each habitat zone. The relative amount of bioturbation recorded in each habitat zone, within each floodplain region (ie. low, mid and high floodplain), was calculated by dividing the number of bioturbation sites in a given habitat by the total number of sites recorded.

Results

Figure 1 (page 40) illustrates the distribution of habitat zones in each section of the floodplain. While *Cyperus articulatus - Schoenoplectus corymbosus* (CS) covers the most area in the low floodplain at 32.9%, *Paspalidium obtusifolium - Panicum repens* (PP) increases in the upper reaches of the floodplain (from 18.8% in the low floodplain). Relative cover of *Eragrostis lappula - Setaria sphacelata* (ES) is approximately the same between floodplain areas (20.7% - 23%). The *Imperata cylindrica - Setaria sphacelata* zone (IS) ranged from 7.3% to 10% of the total area from the low floodplain to the high floodplain. *Vetiveria nigritana- Setaria sphacelata* (VS) is all but absent in the low floodplain (0.4%), but was found to comprise 7% of the high floodplain. Woodland (WL) accounted for between 14.9% and 19.9% of the floodplain areas.

Figure 2 (page 41) illustrates the relative amount of bioturbation found in each habitat zone, by floodplain region. Bioturbation in the *Cyperus articulatus - Schoenoplectus corymbosus* zone (CS) was highest in the low floodplain, and lowest in the high floodplain. Bioturbation in the *Paspalidium obtusifolium- Panicum repens* zone (PP) increased sharply from 16.1% in the low floodplain to 40.1% in the mid-floodplain, and 33.7% in the high floodplain. Bioturbation in the woodland remained relatively constant, between 5.9% and 7.8% of the all bioturbation recorded.

Figure 3 (page 42) illustrates bioturbation density found in each habitat zone, by floodplain region. The highest density of bioturbation activity occurred in the low floodplain zone in all habitat types except for *Vetiveria nigritana- Setaria sphacelata* and woodland areas.

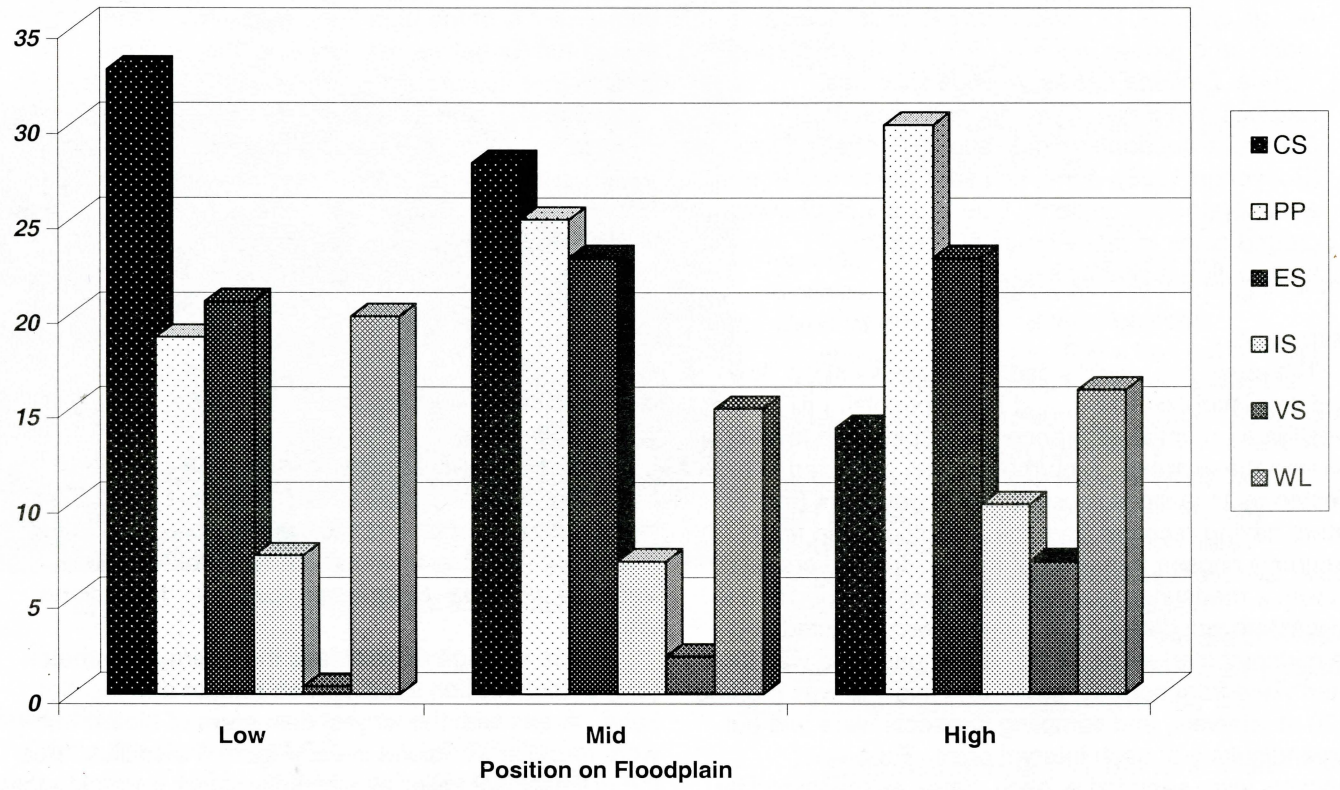
Figure 4 (page 42) displays the average diameter (cm) of bioturbation sites in each habitat and location zone. Areas with the largest diameters of bioturbation were found in woodland sites. Figure 4 also illustrates the dramatically lower average diameters found in other habitat types.

Discussion

The highest densities of bioturbation were found in the low floodplain, peaking in the *Cyperus articulatus - Schoenoplectus corymbosus* zone. This, presumably, has a great deal to do with the nature of the bioturbation

Minor evidence of bioturbation: termites building dirt tubes around grass stalks.

Fig. 1. Percentage of Floodplain Area by Habitat Type and Position



taking place in this select habitat. Mole rats and termites mainly perform the bioturbation in the *Cyperus articulatus - Schoenoplectus corymbosus* habitat. Mole rats tend to push up mounds of dirt from below the soil surface while tunnelling underground. This action produces a number of uniform mounds in a contiguous area (Stuart 1994). Similarly, termites will inundate an area, covering dead grasses with a layer of soil to protect themselves while foraging. While mole rats are likely attracted to the *Cyperus articulatus - Schoenoplectus corymbosus* because it has high forb content, termites utilize the plentiful amounts of moribund material. Furthermore, the nature of the *Cyperus articulatus - Schoenoplectus corymbosus* habitat, itself, does a great deal to protect evidence of bioturbation. The tall, siliceous stalks of sedge inhibit easy movement of animals and wind, thereby preserving any bioturbation.

Why should the low section of the floodplain exhibit such a high proportion of bioturbation in relation to the mid and high floodplain? Given that the recession of floodwaters and drying of the floodplain commences in the high floodplain, it follows that this area would be exploited by burrowing animals and insects first. In fact, as soon as the water table has dropped, which enables digging (otherwise the hole would fill with water), it is assumed that bioturbation begins. Thus, the mid and high floodplain sections probably contain just as much bioturbation, if not more, and just as high a density of bioturbation, if not greater, than the low floodplain. However, at the time of my study, the duration of exposure to wind and trampling had been longer on the mid and high floodplain. Therefore, the evidence of bioturbation was neither readily seen, nor distinguishable.

The final point of discussion revolves around the average diameter of sites of bioturbation and the information it can yield with regard to revealing which animals are present in given habitats. As the average diameter of evidences of bioturbation remain relatively constant between the low, mid, and high floodplain sections of *Cyperus articulatus - Schoenoplectus corymbosus*, *Paspalidium obtusifolium - Panicum repens*, and *Eragrostis lappula - Setaria sphacelata*, it may be assumed that the same insects or animals are displacing the soil in these areas. This is quite likely due to the fact that these insects and animals may slowly move in as the flood recedes from the high floodplain to the low floodplain, working from the outside fringes of the *Eragrostis lappula - Setaria sphacelata*, to the border of *Paspalidium obtusifolium- Panicum repens*, and, finally, delving into the *Cyperus articulatus - Schoenoplectus corymbosus* habitat. As these areas slowly dry following the recession of the floods, seeds may be left buried in the soft alluvial soils and grasses desiccate in the heat of the sun. This immediately attracts rodents and termites.

The *Imperata cylindrica - Setaria sphacelata* and *Vetiveria nigritana - Setaria sphacelata* zones in the mid and high floodplain, respectively, may have higher average diameters due to the greater presence of large burrows such as aardvark holes or springhare colonies in these areas. This is due to the soils of the area having been thoroughly dried for some time and the former presence of pioneering termites in the area, thereby attracting the larger animals that feed on them. In the woodland, massive termite mounds on the forest edges skew the average diameter of bioturbation upward in this habitat type.

Conclusions

Overall, the amount of bioturbaton recorded in specific habitat types was roughly proportional to the relative percentage of that habitat type. However, exceptions were found to this pattern. Factors such as exposure to grazing, trampling, wind, and flood recession may influence these patterns. Bioturbation is produced by a variety of species, and differences among the density and size of their burrows and other features would necessarily also influence my results. The habitat preference of larger burrowing animals such as springhare and aardvark was reflected in a higher average diameter in the outlying regions of *Imperata cylindrica - Setaria sphacelata* and *Vetiveria nigritana - Setaria sphacelata* in the mid and high floodplain while termite mounds were relegated to the woodland.

By classifying bioturbation according to habitat, a comparison of relative soil displacement can be drawn between areas. Perhaps with more detailed future studies, these results may then be used to understand the role of bioturbation with regard to the nutrient cycle, the process of water infiltration, and soil aeration in each habitat. This would allow for a more holistic understanding of the seasonal floodplain ecosystem.

Recommendations

Future studies on bioturbation should include research on these factors:

Long term patterns. Establish an ongoing study that monitors bioturbation throughout an entire flood cycle. Determine which areas are most heavily utilized. By mapping the area, mark which holes or mounds survive the floods and monitor the progression of bioturbation within the area. Chart the amount of soil turnover (in terms of volume) between flood recession and new flooding. Find the mean distance between evidences of bioturbation activity and seek to establish whether old sites are reused by other animals or insects burrowing or digging over time.

Fig. 2. Percentage of Bioturbation by Habitat Type and Position

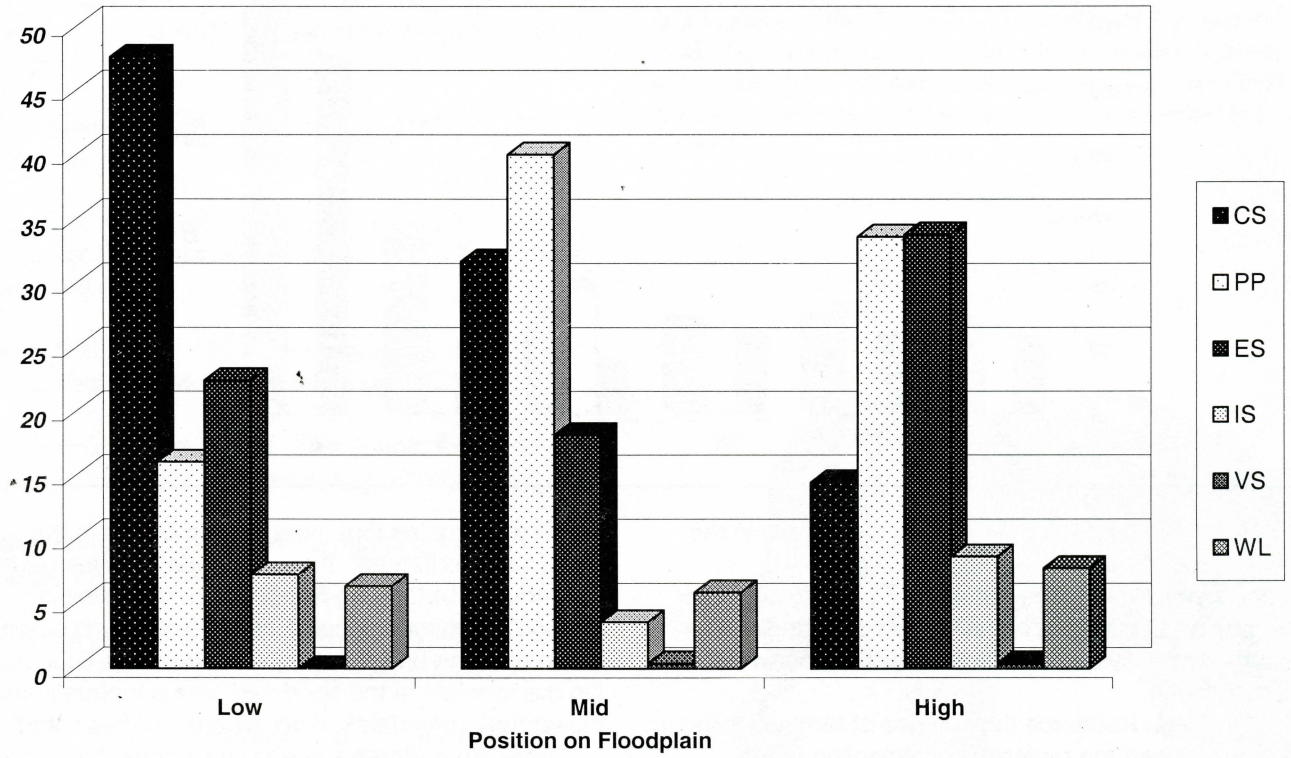


Fig. 3. Bioturbation Density According to Habitat and Location on the Floodplain (in bioturbation sites per meter)

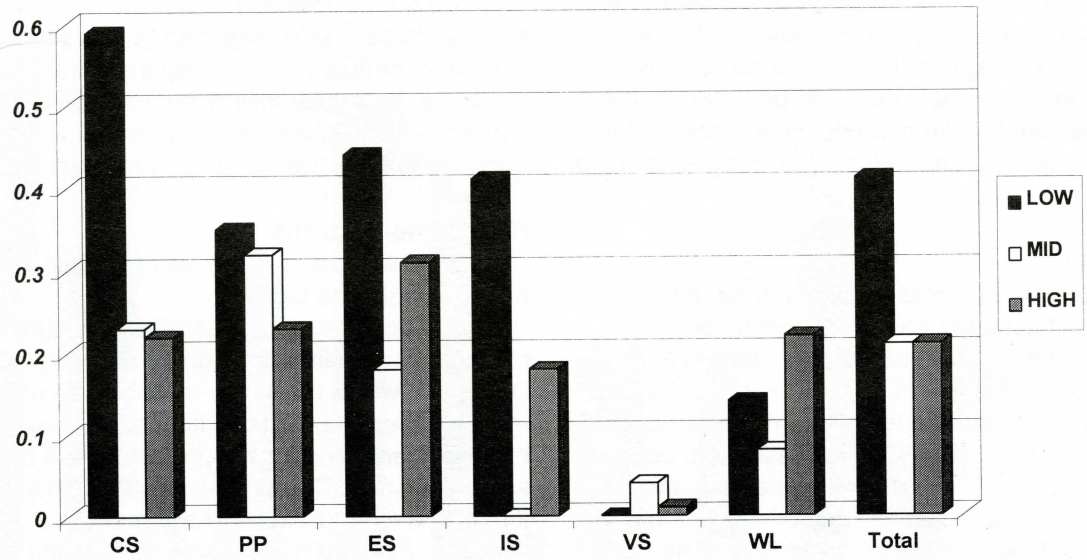
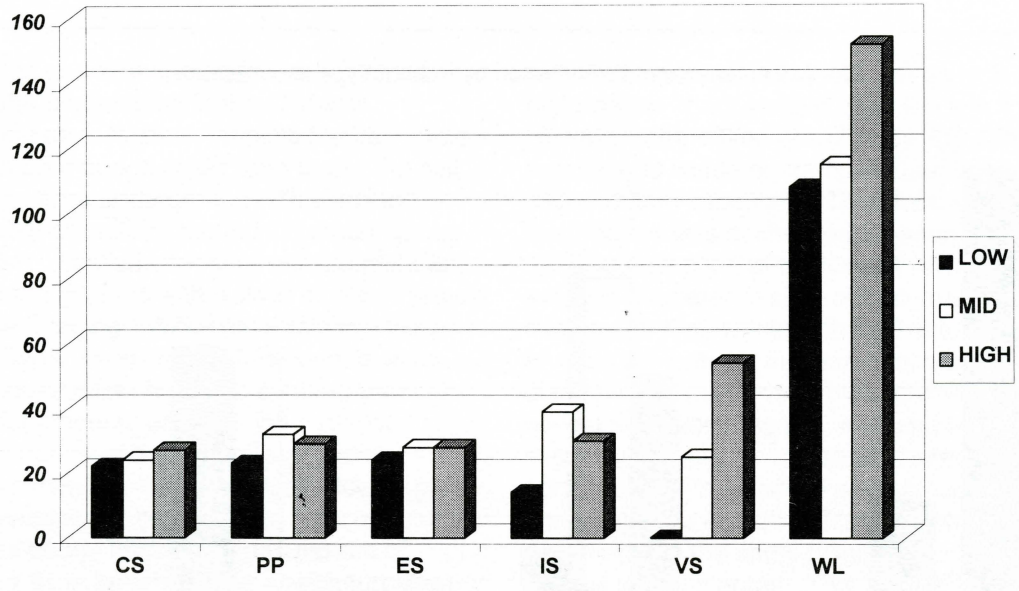


Fig. 4. Average Diameter According to Habitat and Location on the Floodplain (in centimeters)



Rodents. Determine which rodents burrow in the area, especially in the *Cyperus articulatus - Schoenoplectus corymbosus* habitat type. Study their foraging and burrowing behavior and chart their bioturbation activities over time after the floodwaters have receded.

Termites. Research the species of termites living in the area. Chart the pattern of colonization of the floodplain after the recession of floodwaters. Are these the same termites that inhabit the mounds in the marginal woodlands? If so, do these termites return to the mounds before the floods arrive the following season? Between flooding times, how much biomass do these termites bring underground from the floodplain? Do the termites in the floodplain use a fungus comb to digest their materials? If so, where is this located?

Soil. An in-depth soil analysis should be conducted in order to investigate the correlation, if any, between soil

particle size and the amount of bioturbation in the area. Measure the amount of soil aeration and evaluate these figures in relation to the proportion of bioturbation present within range of the testing site.

Acknowledgements

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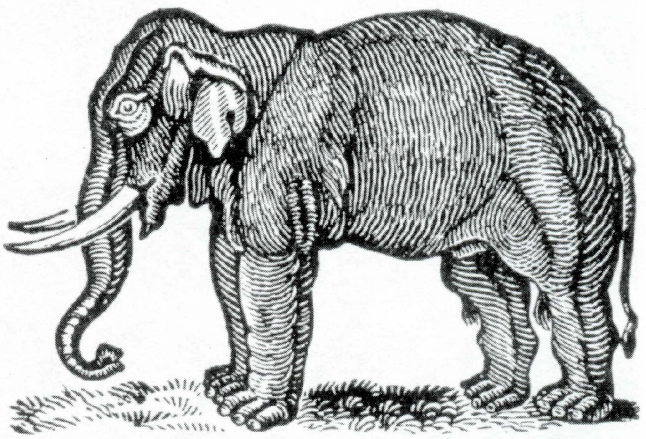
A local woman teaches the author (left) how to weave a palm mat.

Kristin M. Reed graduated from Georgetown University in May 1999 with a Bachelor of Science degree in Foreign Service. Her major fields of study, Science and Technology in International Affairs and African Studies, enabled her to perform this research project in Botswana as a student of the School for International Training in 1998. Ms. Reed has settled in San Francisco, is presently working for WildAid, and hopes to begin her Ph.D. studies in Environmental Policy and Management in the Fall of 2001.



Research in Progress

Forest Habitat Enhancement for Wildlife: *Exxon Valdez* Oil Spill Restoration Project

Susan E. Kesti

Susan Kesti worked recently on finishing the installation of a forest habitat enhancement project on Montague Island in Prince William Sound, Alaska. This effort was made in response to the 1989 *Exxon Valdez* oil spill and is an attempt to explore ways of restoring habitat of those species found injured by the spill. The species of interest include bald eagle, river otter, harlequin duck, and marbled murrelet. Since many species injured by the *Exxon Valdez* oil spill depend on mature or complex forest habitat, Kesti and her colleagues on the Cordova National Forest decided to try to enhance young forest to better meet those species habitat requirements in the future. They were assisted in project design and planning by researchers at the U.S. Forest Service Forestry Sciences Laboratory in Juneau, Alaska.

The project area is located in a watershed where 176 acres of western hemlock- Sitka spruce forest was harvested during the period 1970-1973. The harvested areas naturally regenerated with densely spaced spruce and hemlock (over 2,200 trees per acre). Part of the area was thinned in 1988-89 to a 10 by 10 foot spacing, reducing the number of trees to 435 trees per acre. Presently, the young trees range from 16 to 35 years old, 1 to 13 inches in diameter, and 3 to 57 feet tall. Shrub species include Sitka alder, willow, blueberry, salmonberry, devil's club, and elderberry. The alder and willow are 1 to 4 inches in diameter and 8 to 25 feet tall. The herbaceous species present include five-leaf bramble, foamflower, twisted stalk, bunchberry, wood fern, and oak fern.

The purpose of this project is to develop guidelines for managing the young forests in Prince William Sound and to facilitate recovery of species and services injured by the oil spill. The objectives are to: 1) shorten time the stand is in early successional stages, to promote development of complex forest structure; 2) maintain understory vegetation throughout the successional stages and manage for characteristics important to injured wildlife species; and 3) monitor how vegetation responds to treatment, and evaluate how the stand growth and structure changes over time.

Plot 2 on Montague Island, Prince William Sound, Alaska: thin and prune treatment.

A diverse stand structure with a mix of tree, shrub, and herbaceous species, sizes, and densities is desired. The shrub layer can provide cover for a variety of wildlife, including river otter. Thinning to promote large-diameter trees can provide future perching and nesting habitat for bald eagles, and large downed material and cavities for river otter dens. Alder and willow were retained to provide diversity and improve soil nutrients. Multi-topped and deformed trees

were retained if they could provide future nest platforms or otter dens.

Ten treatment blocks were installed during 1998-2000. The blocks were one acre in size, with a 0.2 acre permanent monitoring plot located in the center of each block. Felled trees were bucked and limbed to aid decomposition and reduce potential for bark beetle infestation. All remaining trees including alder and willow were tagged and their diameter, height, and height to live crown measured. Nine 7.45 foot radius plots were established in each block to track changes in shrub, forbs and herbs. Information collected included: species composition of tree, shrub, forbs and herbaceous layers; tree stem density, diameters, heights, and percent crown; and shrub, herb, and forb percent cover and height by species.

Six blocks were installed in the area that had been previously thinned. Three blocks were thinned again to a 16 x 16 ft. spacing, and one of these was pruned to a minimum 9-foot lift. Two blocks were thinned to a minimum 12 x 12 foot spacing. One of these was pruned to a 9-foot lift and the other pruned to a 12 to 16 foot lift. The higher lift was used to increase the amount of sidelighting and length of time before crown closure occurred. The remaining block of these first six was not thinned again.

Three treatment blocks were installed in the area not thinned in 1988. One was thinned to a 16 x 16 foot spacing but not pruned, to explore the effects of delaying thinning 10 years. A gap enhancement treatment was also installed in the area not previously thinned. Here, thinning corridors 12 to 16 feet wide connected the existing gaps. The gaps are composed of robust salmonberry, devils club and blueberry. The corridors skirted large diameter trees. Since there was an abundance of moderately sized gaps, instead of increasing the size of the existing gaps, the treatment was limited to connecting the gaps to try to maintain the shrub component and provide a shrub and herb seed source in the stand. A variable spacing block was installed, which favored all trees over 9 inches in diameter even if densely spaced. The remaining trees in this block were thinned to a 12 to 16 foot spacing. No pruning was done. A control block was also installed in the area not previously thinned in 1988.

Sue Kesti checks Pam Vandenbrock's bicep diameter growth after two weeks of thinning.

My coworkers and I believe there is potential to improve wildlife habitat for those species depending on a complex forest structure by treating young growth stands in Prince William Sound. Thinning the stands can improve diameter growth on residual trees and shorten the length of time the forest stand remains in the stem exclusion phase of secondary succession. Thinning can increase light penetration to the understory. In southeast Alaska, the decline in understory development in young-growth forests immediately after canopy closure is significantly associated with tree basal area and percent tree canopy cover.[1] By delaying canopy closure, the understory component may be present longer and abundance enhanced. This can provide stand structure diversity, as well as cover and forage for a variety of wildlife species. Pruning can lengthen the time the benefits will last by delaying crown closure. It is anticipated that the old growth characteristics that some of the wildlife species injured by the oil spill depend on can be provided sooner than if no treatment was applied. Along anadromous streams, larger trees can be future sources of large woody debris, which can benefit fish habitat. Maintaining structural diversity will provide a greater variety of leaf litter and insects to the stream.

The information obtained from this project will allow changes to be tracked in stand structure and comparisons made of the results of the various treatments. Data will be collected from the plots every five years for the first 20 years, then every 10 years after the initial period. The monitoring information can be used to decide how to manage the newly regenerating stands resulting from recent harvest conducted in Prince William Sound.

Susan Kesti is a Silviculturist with the Chugach National Forest, stationed on the Cordova Ranger District. Kesti has worked for the U.S. Forest Service for 23 years and has been in Alaska for the past 17 years. She received her B.S. degree in Forestry in 1975 from Michigan Technical University, and worked in Idaho and Oregon before moving north.

The Editor sincerely thanks Jonalea Tonn, Forester, Rocky Mountain Research Station, U.S. Forest Service for assisting with this report.

[1] Alaback, P. B. 1982. Dynamics of understory biomass in Sitka spruce-western hemlock forests of southeast Alaska. Ecology 63(6):1932-1948.

A Management Column
by
Barb Springer Beck

Barb Springer Beck is President of Beck Consulting, a firm that specializes in meeting facilitation and managing organizational change. She is a WiNR Section Editor.

A Great Place to Work!

With the impending shortage of workers in our country, much attention is being paid to creating a work environment that will both attract and retain good workers. Why are businesses laying out the big bucks for free meals, four-day beach parties, gymnasiums, and nap areas? Well, if you stop and think about, our workplaces are very important to us. Most of us spend 40 plus hours a week there. We derive much of our identity and self worth from our work and we have friends at work. Fulfilling work can provide us with personal rewards in addition to financial benefits, health insurance, and security. While the private sector has some avenues available to it that government may not (such as certain types of perks), it seems there are some basic fundamentals that make a workplace a good place to spend time. Without these, all the free drink coupons and even stock options in the world wouldn't attract me!

I believe that much of the quality of our workplace rests in our own hands. Each of us can do a great deal to create a productive environment whether we're a manager or an employee. Here are some of the things I think contribute to a great place to work.

For me, and I'd guess many others, the most important thing is having meaningful work…such as being a steward of natural resources. Meaningful work is work you believe in because it's in harmony with your personal values, challenges you, and gives you a sense of accomplishment. According to the November 2000 issue of *Fast Company,* the greatest sources of satisfaction in the workplace are internal and emotional. For instance, when Nancy was able to suggest a new way of framing a contentious issue about ski area expansion that resulted in a breakthrough, she felt as though she had really made a contribution.

Also of key importance is a work situation where people respect each other and respect the contributions each individual makes to the overall effort. This doesn't mean that everyone who works together necessarily "likes" each other, but there is a recognition that everyone's efforts produce value. For example, when Kim develops her range program budget she needs the help of the budget analyst to evaluate program costs relative to other programs, plug in the appropriate unit costs, and prepare the spreadsheets. Kim values the expertise of the budget analyst because she has neither the knowledge nor the time to perform those necessary functions before she can submit her budget requests.

Another important workplace characteristic is good communication. Everyone needs to understand what is expected of them and have access to the information necessary to successfully perform their job. But, good communication goes beyond the basics. People also want to be "in the know," and be included when something important is going on. With the recent change in administrations, there was a great deal of speculation over President Bush's potential cabinet appointments. Hearing the latest news as the appointments were being made was important to agency employees both because of the messages those appointments sent about emphasis areas of the new administration, and because of their potential to directly affect individuals' work. Feeling a part of the larger effort helps all of us understand how our work as an individual can produce results for the group.

Although each of us has different needs for receiving recognition on the job, we all want to feel appreciated. This is particularly important when we've made an extra effort. During last year's fire season, many people accepted assignments that took them away from home and family to combat the wildfires. Those that stayed behind often picked up the extra workload to finish an environmental assessment on time, submit

the next fiscal year's budget, or keep the campgrounds open. At these times, appropriate recognition can be as simple as a word of thanks, or as formal as a cash award presented in front of all employees. The point is, hard work and accomplishment are recognized in good places to work.

Feeling competent is an important benefit of mastering our work. But, most people want a chance to improve their skills, tackle new challenges, and have an opportunity to better themselves or their position. Leaders in good workplaces recognize this desire, believe that employees have the potential to perform at higher levels, and offer a variety of opportunities for employee development. Because this isn't a one-size-fits-all kind of thing, an array of opportunities might include help with formal education, on-the-job training, work details, or short-term assignments in other positions.

A workplace that will attract and retain people allows for, and even encourages, fun. An office without laughter is not a good place to spend so large a part of your life. Harmless pranks and appropriate jokes (jokes that don't belittle), can lighten the mood and enhance the camaraderie and sense of belonging. "I get it" are powerful words for inclusion. After lunch break while hiking with other geologists, Beth noticed that her pack seemed heavy. When she investigated its contents she discovered that her hiking companions had, in the spirit of fun, placed some small rocks in the bottom of her backpack. Each time the group stopped to rest, they would add several more stones, and then waited to see how quickly she would notice. Everyone, including Beth, had a good laugh when she made the discovery.

And, last but not least, is having a comfortable place to work. This is something most of us probably take for granted, but many people don't have a comfortable physical environment in which to work. Comfortable takes in a wide range of characteristics, from the physical comfort of your chair and desk, to adequate lighting, ventilation, and temperature, to noise maintained at or below the level required for concentration. I recall many years ago sharing office space with a cigar smoker. At the time, smoking was allowed in all offices, but that sure didn't help the headaches the smoke caused me. Many non-smokers are thankful that exposure to smoke in workplaces is no longer a problem.

Here's what you can do towards improving a currently less-than-ideal workplace or making a great workplace even better.

- Treat your co-workers with respect,
- Extend small courtesies,
- Honor others' individual needs, whether it be an hour of uninterrupted work time or understanding that not everyone wants a big retirement party,
- Learn to ask that your needs be met,
- Support management's efforts to provide for physical comfort,
- Advocate and be willing to work on policies to benefit employees, and
- Carefully consider your present workplace—what are the problem areas and can they be addressed?—before making a job change.

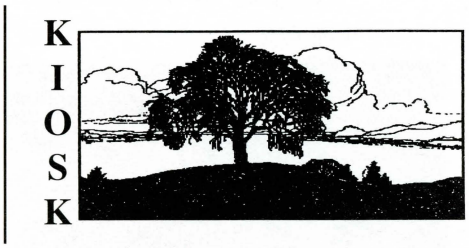
So, if you are a manager concerned about attracting talent and don't have stock to offer, make your workplace an environment where people enjoy spending their time and feel rewarded for their efforts. If you're not a manager, do your part by respecting and showing consideration for others, and pitching in to make things better. And, although it's probably a good idea to skip the four-day beach party, maybe you can be the first BLM field office or National Park headquarters to have an employee juice bar!

NEWS & NOTES, cont. from page 36

Arbor Day Farm Activities Filmed by Chinese

An estimated 90 million people on the other side of the globe will share in the educational projects at Arbor Day Farm, operated by the National Arbor Day Foundation in Nebraska. A film crew from China's national science and technology channel visited the farm a few months ago and will report what they saw on "Time for the Environment," the country's only non-governmental television program. The program's hostess, Sheri Liao, is founder of an environmental activist organization, Global Village, and winner of a prestigious Norwegian environmental award. She was particularly interested in the farm's riparian buffer zone, agroforestry techniques, and hazelnut plantation. Liao was impressed by the fact that the Foundation, a private organization, promotes research, public education, and environmental stewardship. "We don't have anything like that in China and we'd like to promote that sort of idea," said Liao. The film segments shot at Arbor Day Farm will be part of a series on sustainable agriculture, U.S. agricultural policy, forest management, and related subjects. The documentary is being funded by the U.S. Department of Agriculture.

—*Arbor Day*, Nov./Dec. 2000



National Women's History Month, March 2001. This year's theme is "Celebrating Women of Courage and Vision." Visit the National Women's History Project website for information and program ideas: www.nwhp.org/whm/programs/programs.html. Women's History materials, including timelines, primary source documents, lesson ideas, quizzes, press releases, and a variety of other resources are available to access and download.

Social Issues and the Environment: A Green Approach to Improving Our Community National Conference, March 6-8, 2001, Nebraska City, Nebraska. This national conference has been designed to provide an exchange of information and an opportunity for community leaders to better understand the inter-relationship of societal and environmental issues. Key topics will include community gardens, improving open spaces, business district revitalization, youth projects, and their impact on societal concerns such as crime, economics, and public health. For more information contact Conference Services at The National Arbor Day Foundation, P.O. Box 81415, Lincoln, NE 68501-1415, phone 402-474-5655, or e-mail conferences@arborday.org.

Riparian Habitat and Floodplains Conference, March 12-15, 2001, Sacramento, California. This conference seeks to integrate riparian and floodplain restoration, research, conservation, partnerships, education, policy, and biota. Plenary sessions, concurrent technical sessions, and workshops will focus on conservation and restoration, research and technology, and policy and programs in riparian and floodplain habitat. For information, contact: Diana Craig, USDA Forest Service (707) 562-8930, dcraig01@fs.fed.us, or Lyann Comrack, California Department of Fish and Game, (858) 467-4208, lcomrack@dfg.ca.gov.

17th Annual All University Conference on the Advancement of Women in Higher Education, April 20, 2001, Texas Tech University, Lubbock, Texas. The conference theme is "Breaking Boundaries: What Culture, Contexts, and Sports Tell Us." The keynote address will be given by Donna Lopiano, Ph.D., Director of the Women's Sports Foundation. For more information, contact the Office of Women's Studies at TTU at 806-742-2404 ext. 278, or Esther Lichti at elichti@hs.ttu.edu.

Society of Wetland Scientists 22nd Annual Meeting, May 27-June 1, 2001, Chicago, Illinois. Everyone who is involved in wetland science, research, protection, management, education, or policy is invited to attend this conference, which has a theme centered on urban wetlands. The Congress Hotel & Convention Center will serve as the host hotel for the SWS 2001 Annual Meeting. Contributed Sessions will include Threatened and Endangered Species in Wetlands, Resource Inventories and Assessments, Wetlands Education and Public Outreach, Invasive Species Management, Hydrology and Hydraulics of Wetlands, and Wetlands in Land Use Planning. A special symposium will be held, as well, titled Wetlands and the Revitalization of Degraded Urban Landscapes. For information, contact: Society of Wetland Scientists, PO Box 7060, Lawrence, Kansas 66044-7060. Phone: 785-843-1235 or 1-800-627-0629, Fax:785-843-1274. Web: www.sws.org.

Forest Products Society 55th Annual Meeting, June 24-27, 2001, Baltimore, Maryland. The conference will include 16 Technical Interest Group Sessions and a Technical Forum (Poster Session). For more information: Forest Products Society, Conference and Meetings Dept., 2801 Marshall Court, Madison, WI 53705-2295. Phone, 608-231-1361 ext. 208, Fax: 608-231-2151, email: conferences@forestprod.org.

2001 Society of American Foresters Convention, September 13-17, 2001, Denver Colorado. Call for Presentations. Submissions are sought for this conference, titled "Forestry at the Great Divide," in the six following areas: Resources Measurements, Forestry Systems, Ecology and Biology, Management and Utilization, Decision Sciences, Social and Related Sciences. Deadline for all proposals is February 28, 2001. Contact: Terry Clark, Science Mgr., Society of American Foresters, 5400 Grosvenor Lane, Bethesda, MD 20814-2198. Phone: 301-897-8720 ext. 123, Fax: 301-897-3690, email: clarkt@safnet.org. Web: www.safnet.org/calendar/2001call.htm.

Greening of the Campus 4, September 20-22, 2001, Ball State University, Muncie, Indiana. Call for Papers. Our society needs ideas and actions that enhance the environmental health and integrity of the places where we live and work. Educational institutions are

complex human communities that represent unique opportunities to explore, understand, and respond to the interrelationship of environmental issues. College and university campuses can be a vital link bridging current community needs and understandings with future visions. Proposals for papers, posters and workshops in these categories are sought: Technical Issues, Educational Development, and Social, Political, and Spiritual Issues. For More Information, contact Becky Amato, University College NQ 323, Ball State University, Muncie, IN 47306-0220. Email: bamato@bsu.edu, Phone: (765) 285-2385, Fax: (765) 285-2384. Web: www.bsu.edu/greening.

8th Annual Conference of The Wildlife Society, September 25-29, 2001, Reno, Nevada. Call for Papers. Deadline: February 15, 2001. The meeting will include symposia, workshops, contributed papers, and posters on topics of wildlife science, management, education, or policy within the broad theme of Excellence in Wildlife Stewardship through Science and Education. Questions about abstract preparation and submission may be directed to Program Committee Chair Michael Morrison at michael.morrison@verizon.net . For all other conference questions, please contact The Wildlife Society office at (301) 897-9770, fax: (301) 530-2471, or email: tws@wildlife.org.

MOVING?
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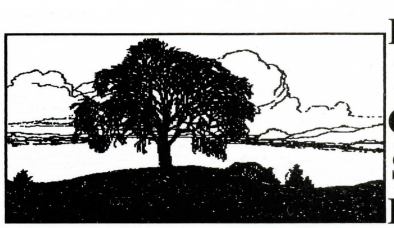
13th Annual International Society for Ecological Restoration Conference, October 4-6, 2001, Niagara Falls, Ontario, Canada. Call for Abstracts. The conference, titled "Restoration Across Borders," will include sessions on Great Lakes Restoration and Recovery, Agriculture and Resource Extraction, Traditional Knowledge in Restoration, Restoration of Public Lands, Invasive Species Control, Restoration in Parks, and River and Riparian Restoration. Contact: SER 2001 Conference Coordinator, Niagara College, Ventures Division, 135 Taylor Road, R.R. #4, Niagara-on-the-Lake, Ontario, Canada L0S 1J0. Email: SER2001@niagarac.on.ca. Web: www.SER.org.

The Practice of Restoring Native Ecosystems, November 6-7, 2001, Nebraska City, Nebraska. Call for Presentations. This conference is designed to encourage



the sharing of information among the many disciplines involved in ecological restoration. It will examine the principles behind the concepts of restoration as well as current issues, approaches, and techniques. Proposals for case study presentations of restoration projects representing a variety of ecosystems are especially invited. Proposals should be submitted via mail, fax or email by February 16, 2001. Mail: Restoring Native Ecosystems Conference Program Development, The National Arbor Day Foundation, PO Box 81415, Lincoln, NE 68501-1415, FAX: 402-474-0802, email: conferences@arborday.org.

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