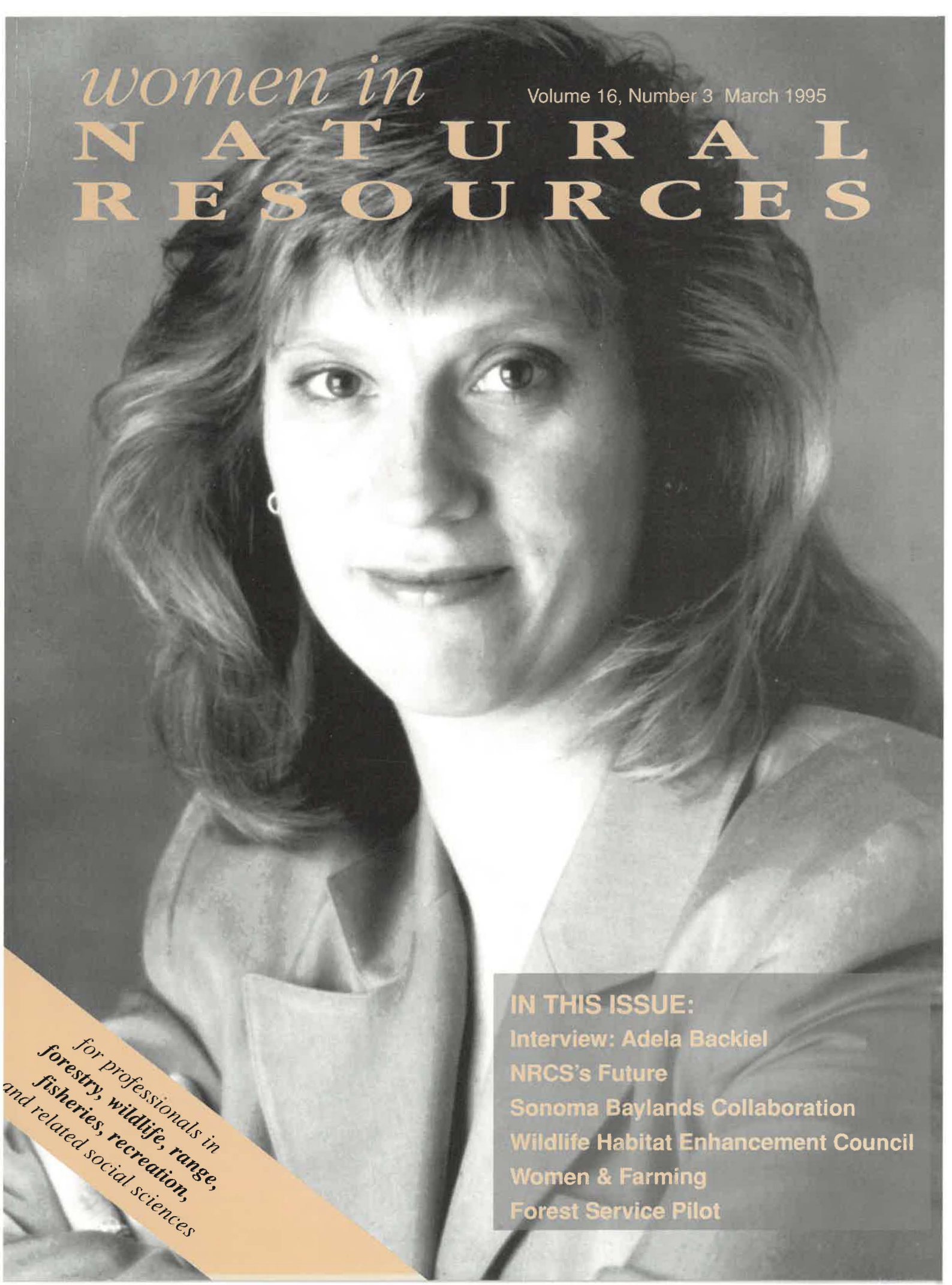
Volume 16, Number 3 March 1995

women in NATURAL RESOURCES



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

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• Editorial •
Dixie Ehrenreich

We ought to speak up for AA/EOE programs. We need to look out for our own self interest here, because many of us have benefitted. Earlier generations thought they had gotten the job done, but they did not get the necessary legal framework AA/EOE provides.

This is a tough editorial to write. I hesitate to discuss affirmative action and equal employment opportunity in a compressed space because it will do a disservice to a subject worthy of a long article. But I'll give you my nickel's worth of opinion about it, hoping that you will fill in the blanks. I won't define them—let's just call it pro-underdog/pro-underrepresented folks' legislation.

I'm for it. Mostly because we hadn't had *anything* remotely as effective to protect women or minorities in the workplace until it came along. I think it has worked fairly well for the short time it has been in place. Given some refinements, and time to work for another generation or two, we could probably do away with it. But that time has not come.

There will be no structure to replace it. And there is no inherent fairness doctrine built into humans or institutions which insures that should it be dismantled, then common sense would immediately rush to the fore to assure that qualified women would get a fair shake. In two arenas that have not had strong or continued effort—private industry and university faculties—women professionals continue to lag way behind. Common sense is not lacking in those two places, but a workable fairness doctrine is.

Affirmative action kinds of regulations provide a worksite fairness doctrine. Let's call it a framework. This has been a generally accepted framework that lays out some rules and guidelines—some in the law and some just accepted as do-able—that we can hang our human interactions on. We are familiar with other non-work ones, such as marriage which has long provided such a framework; city governments, and public school systems are other examples. In these examples, hierarchy is established (e.g., kids are bossed by adults), roles are sketched out, social and legal contracts are forged. The systems usually provide for change, improvement, or dissolution. These can evolve over time, but sometimes when resistance arises in sectors, then disputes over the arrangements are rethought and sometimes fought over. But the frameworks themselves aren't abandoned.

Since evolution and internal provisions for change are built into most systems in a democratic society, really big blowups are rare. But we have had them. The Civil War of the 1860s over the issues of slavery, property rights, and westward expansion—quickly come to mind. The civil rights movements of the 1960s and the 1970s never boiled over into actual warfare, but the issues commanded attention at every level.

Most of the foundations which traditionally have provided underpinning for our current systems have not favored women. Our Constitution is relatively quiet about the rights of women. Indeed, in the 200 plus years since it was written, the right to vote was not ratified until the second decade of our own century. But that was after five decades of heavy-duty lobbying and organizing on the part of women beginning right after the Civil War. The coalitions which had formed around the push to get the vote, however, drifted off in the 1920s. Women had assumed that jobs and status—and maybe even power— would follow the vote, but it was not to be. They missed an opportunity to stay with the issue to completion.

Another foundation upon which this country was built has to do with religion. But just as often as the various dogmas have helped sustain women spiritually, they have hurt in secular life, as doctrine advocated that women be subservient to men. What one hears lately from the fastest growing or largest religious groups is a reiteration of the call for men to command and for women to obey. One does not often hear a call from them for women to take their rightful places in the administration, in policy making bodies of the religious groups, nor even as the heads of traditional households. So there will be no groundswell of public opinion to aid women from that portion of the foundation should affirmative action programs fail.

Am I saying that there have been historical precedents for the taking away of advances women have made in the workplace? And that it could happen again? Of course, I am. The 1950s (and late 1940s) provide a good example. The wholesale squashing of women into subservience after their military service, factory work—and the running of the country from the ranks of the civil service during World War II—set this country up for the excesses of the 60s and the 70s. Boxing talented women into their kitchens paid off handsomely—temporarily—for the men who ordered it, but we have been paying for it ever since. The women who had run government programs or who had worked in war-time factories while raising their children by themselves, had no recourse, no framework of affirmative action. Nothing else worked for them when they wanted to keep jobs that men said were theirs. They went home.

So there you have my nickel's worth. It is also my call for you to stand up and speak now so your kids won't have to fight this battle again. If we sweep away, or allow to be swept away, the fragile legal protections we now enjoy for entry and promotion—under the rubric of affirmative action—by those who don't like the annoyances or inconvenience (the cost?) of having to play by fairness rules, who are you going to call on to protect a generation's worth of professional advances? Not the Constitution or your congregation. Who? Professional societies or unions? Not a good track record. Your boss? His or her boss? Aren't they also downsizing, keeping their heads down, hoping that backlash snaps by them? Other women? Could you call a talk show host? Write a letter to the editor? Yeah, sure, but put your home address on the return if affirmative action has failed.

Dixie L. Ehrenreich

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Industry and schools benefit in collaborations with the Wildlife Habitat Council to restore wildlife habitat on industry lands. See page 30.

LETTERS & OPINIONS

University of California-Davis Three positions

•Wheat Geneticist/Plant Breeder. Assistant Professor (.30)/ Assistant Agronomist (.70). Academic career track, nine-month tenure position. Develop comprehensive modern genetics research program emphasizing molecular or quantitative approaches. Breeding effort focused on development of wheat cultivars adapted to growing regions of California. Funding is potentially available from California Wheat Commission and California Crop Improvement Association. Develop/instruct section of new multi-quarter undergraduate course in crop production/teach graduate course in Cropping Systems; participate in training of graduate students. Ph.D. required in genetics, plant breeding, related field/background/experience in germplasm development/crop improvement. Postdoctoral experience desired; not required. Send cv; undergraduate/graduate transcripts; publication list/reprints; statement of teaching/research interests; names, addresses, telephone and FAX numbers of 3+ references to: Dr. Larry R. Teuber,(c/o Damanchyk), Chair Wheat Geneticist/ Plant Breeder Search Committee, phone 916-752-2461: fax 916-752-4361: e-mail lrteuber@ucdavis.edu. Open until filled. **Review of applications begins April 24, 1995**—to assure consideration, submit by April 21, 1995.

•Cropping Systems/Agroecology/Soils/IAD. Academic career track, nine-month tenure Assistant/Associate/Full Professor (.35)/ Agronomist (.65). Eleven-month term employment offered. Develop comprehensive research program on analysis of production systems evaluating various management strategies of single and multiple cropping patterns. Emphasis on resource management: soils/related processes influencing flow of resources and energy in managed agroecosystems. Provide leadership role addressing crop production issues relevant to California, national/international systems. Responsible for teaching graduate course, "Analysis and Determinants of Cropping Systems" and contribute to undergraduate courses on production/management of temperate/tropical crops. Participates in academic advising/training graduate students. Ph.D. required in Soils/Plant Science/Ecology/related field/strong background/research in cropping systems. International experience desired. Send cv, undergraduate/graduate transcripts; publication list/reprints; statement of teaching/research interests; name, address, telephone/FAX numbers of three+ references to: Dr. D. William Rains, Recruitment Comm. Chair, phone 916-752-1711: fax 916-752-4361. Open until filled. **Review of applications begins May 10, 1995**. To assure consideration, submit by May 1, 1995.

•Quantitative Ecology. Academic career track, nine-month tenure position, Assistant Professor (.30) and Assistant Agronomist (.70). Eleven-month term employment offered. Responsible for research on study/application of ecological principles/processes to enhance natural resource use/environmental compatibility in agricultural systems. Graduate/undergraduate teaching in quantitative methodology in agricultural/ecological systems. Send cv; undergraduate/ graduate transcripts; publication lists/selected reprints; statement of teaching/research interests; and name, address and telephone numbers of three+ references to: Dr. Shu Geng, Chair, Quantitative Ecologist Search Committee, phone 916-752-6939: fax 916-752-4361: e-mail sgeng@ucdavis.edu. Open until filled. **Review of applications begins May 5, 1995**. To assure consideration, submit by May 1, 1995.

Address for all materials: Dept. of Agronomy and Range Science, University of California, Davis CA 95616-8515. *UC is an EO/AAE.*

I was so surprised to read the letter to the editor from the woman writing in about your t-shirt ad. Doesn't she connect Rosie the Riveter to her historical setting, which *was a war*. The Rosies of that time were allowed and begged to go to work in men's jobs, earning men's pay, because the war effort took all the working men. As soon as the war was over, and the men were mustered out of the armed forces, millions of Rosies of the 1940s were thanked profusely and told to go home. I think that is so sad. They had qualified for the work and had responded to a call from the government to get the needed training, yet these Rosies experienced the ultimate in backlash. I like to see Rosie. She reminds me of our past history—part of which is a wartime history.

Rosie (yes, that's my name, too) Lewis, Riverside, California

Editor's note: Thanks. Read on for comments from those who don't like Rosie or her historical war-time setting.

I am the Federal Women's Program Manager for the Natural Resources Conservation Service in South Dakota. I have been asked to express our displeasure [at the Rosie the Riveter T-Shirt ad] that is found in Women in Natural Resources.

Linda McFarlane, Huron South Dakota

I appreciate the roads women before me have paved. However, the attitude of war and aggressiveness [portrayed in the Rosie T-Shirt ad] will get us backlash rather than progress. Yes, we need to be assertive, but not aggressive to the point of causing this backlash—and then losing ground.

Shannon Skibeness, Seward, Alaska

In the December 1994 issue of WiNR, I read a letter from Nancy Thomas, Las Vegas, who was interested in Rosie the Riveter. The National Women's History Project (phone 707-838-6000 for catalog) sells t-shirts, posters, mugs, magnets, and notecards with Rosie's likeness on them. As you noted in your editorial, I too find Rosie "an icon of grit, muscle, and determination" but, along with Bonnie Brooks Erpelding, was uncomfortable with the WiNR ad stating, "It's war out there, friend." I enjoy the journal very much.

Anjeanette L. Perkins, Ames, Iowa

You don't know how appreciated your long, in-depth interviews are. You have had some superb ones. The smiling

Rosie the Riveter

face of Joan Perry, the Pacific Basin NRCS Director—standing in front of an expanse of tapioca, banana, and the rock islands of Palau on your last cover—was a wonderful way to get me to start on the journal immediately. The whole issue was great. NRCS is really doing some interesting things all over the world.

Terry Maltheus, Raleigh, North Carolina

INTEGRATING ECOSYSTEM BASED ASSISTANCE PLANNING IN THE NATURAL RESOURCES CONSERVATION SERVICE IS PROCEEDING. IMPLEMENTATION IS NOT FAR BEHIND.

ECOSYSTEM PLANNING FOR *PRIVATE PROPERTY*

CHERYL TROTT

As the Volume 16:2 issue of *Women in Natural Resources* (WiNR) described, the Natural Resource Conservation Service is going through some changes. Many of my colleagues who have been with the agency for years believe there has never been a more tumultuous time. Whatever the administrative, programmatic, hierarchical, and cultural changes that are made, ecosystem-based assistance remains the cornerstone undergirding many of these changes.

In that same WiNR issue, Doug Helms, NRCS Historian, portrayed the movement to ecosystem-based assistance (EBA) as a variation of a familiar question: "to what extent are the things the Soil Conservation Service does for the benefit of the individual, and to what extent are the operations for the benefit of the whole nation?" If managed well, EBA will benefit both the public and the individual. The public benefits because they will have greater involvement and they will see a greater emphasis on the interconnectedness of on-site changes in the landscape to off-site impacts. And the individual landowner should too, because EBA emphasizes the importance of the development of one plan that will address the resource needs of a farmer while encompassing the community's interests, thereby strengthening the often uneasy relationship between the farmer and the urban/suburban community.

The agency's strategic plan identified EBA as a means for NRCS to achieve its overall goals. Chief Paul Johnson has been instrumental in supporting the initiative and seeing that it developed momentum. Chief Johnson noted in the agency's action plan that "SCS will implement ecosystem-based assistance for the management of natural resources through changes in organizational attitudes, structures, and processes. SCS will provide ecosystem-based assistance to all our customers to help them improve ecosystem health, restore damaged ecosystems, and sustain natural resources. All assistance will be based on ecological principles and will stress integrated management of soil, water, air, plants, and animals, including human considerations." The chief recognized that in order to meet the goods and services provided by ecosystems in perpetuity, citizens must value ecosystems for more than economically important goods and services.

As an outgrowth of this commitment to a stronger scientific-based, ecologically sound approach, the Chief set up an EBA oversight committee—with subcommittees—to take on specific tasks. I am a member of the workgroup charged with developing principles and guidelines in order to implement EBA throughout the agency. We were to "develop guidelines to integrate EBA into the NRCS planning process in order to maintain and enhance the quality of the environment to best meet society's current and future needs."

The "Principles and Guidelines Action Team"

Our group of approximately 20 individuals seemed to fluctuate through time as buyouts enticed some into early retirement while others were added later to provide more technical and scientific expertise. The demographics of the group reflected that of the agency as a whole, both in disciplines, positions, gender, and ethnicity. There were several biologists, a couple of economists (including myself), a sociologist, a landscape architect, some district conservationists, a watershed coordinator, a soil scientist, and several middle managers with various natural resource and scientific backgrounds. Besides myself, there were three other women. While our numbers were small, the women were influential on several key issues such as the importance of including human issues up front, the inclusion of cultural resource concerns, and aligning EBA principles with the one-plan conservation planning effort.

Our first meeting was marked by both nebulousness and temerity. Many thought the questions far exceeded answers, while others were inclined to be unwavering in their positions. Our charge—and the nature of our task—was subject to a wide spectrum

of interpretation, speculation, and bias. However, by the end of the first week, the most relevant points were teased out and we were better able to focus. We reached a concensus on the essential character of EBA: it must be based on analysis from a large scale area, such as a river basin or watershed, delivered on a smaller, individual site basis. While a watershed, field or other landscape unit may be used to initially define an area, EBA requires that conservation plans must reflect the constraints and requirements of the larger ecosystem.

We also knew that the resulting product had to be user-friendly. Training for agency personnel would be based on some of what our committee developed. Our information would be integrated into the agency's planning process and into manuals and agency documents. The field staff would need to understand and buy into the principles and guidelines even though understanding the nature of ecosystems is not easy. Ecosystems are not designed to accommodate bureaucratic structures and processes.

Although the philosophical divergencies on the team would prove to be an initial stumbling block, they also helped the team forge a middle ground. On the one hand, biologists on the team were pleased that NRCS would be recognizing ecological systems, interactions, and processes and emphasizing environmental benefits in the planning process. Science would prevail over political compromises! Resource planners' and local district conservationists' skepticism was apparent, on the other hand. They asked, *How is this different than what we are presently doing? Farmers are already stewards and are doing their best to be conservation minded. Won't EBA eat into their already eroded bottom line?*

After literature searches, interagency meetings, and studying, we discovered that ecosystem management in its various forms is one of the most written about, most provisional, least understood, and most loosely interpreted subject in natural resources now. Numerous workshops and seminars have been held, and many papers examining the issue have been published. An estimated 18 federal agencies are currently involved in ecosystem management at some level (CRC 1994). But what did this body of literature mean to NRCS—an agency whose mission is to provide information and assistance to *private* landowners and managers? The prevailing information had to be tailored and assimilated into the agency's planning process.

After meeting twice and teleconferencing, drafts were developed, and compromises forged. In the process, many came to realize that they were saying the same thing—that in fact they may be agreeing—but the lexicon of their discipline and the specificity of their experience could not allow them to see the areas of mutuality.

We found that

- EBA is a *process* for the sustainable management of natural resources and of the ecosystem where those natural resources are located.
- Although "ecosystem" is a scientific term, it does not always have a precise definition. The EBA Action Plan defined an ecosystem as "a biological community and its interaction with the environment."
- The group agreed on six defining principles that guide the EBA planning process (see box). These principles would be backed up by guidelines that detailed how they would be implemented. An NRCS field planner would be able to look at this documentation for a particular planning situation (either at the field level or area-wide) and be able to determine whether or not he/she was following EBA.
- Reflecting our embodiment of adaptive management principles, we considered these principles to be fluid, subject to

ECOSYSTEM-BASED ASSISTANCE (EBA)
PRINCIPLES and GUIDELINES

The following principles provide the basic EBA concepts that NRCS will incorporate into all program activities.

- Ecosystems are hierarchical. Every planning area is encompassed in larger ecosystems and encompasses smaller ecosystems. When providing EBA:

1.) consider interconnections between hierarchical levels to predict the consequences and cumulative effects of proposed actions or activities.

2.) recognize that both the larger landscape and the smaller ecosystems within the planning unit may represent differing objectives, which may influence and guide decisions about the planning unit.

3.) consider transcending administrative, jurisdictional and geographic boundaries and their possible conflicting influences on the planning process.

- Ecosystems are complex. The living and non-living components are interconnected and interdependent. Consider how proposed actions and activities will affect ecosystem components and their interactions.

- Ecosystems are dynamic. Temporal changes occur in structure and function. Consider short- and long-term effects of proposed actions or activities on the structure and function of ecosystems.

- Ecosystems perform critical life support functions. Consider how proposed actions will affect biological, chemical, and physical ecosystem processes which sustain all life-support functions.

- Humans are an integral part of ecosystems. When planning

1.) recognize that human influence on ecosystems is significant.

2.) consider the goals and objectives of individuals and social and cultural groups.

3.) recognize that human welfare depends on the health and sustainability of ecosystems.

- Knowledge of ecosystems is incomplete. EBA therefore

1.) is based on the best currently available knowledge, science, and technology.

2.) represents the proactive expansion of the knowledge on ecosystems.

3.) is flexible and rapidly incorporates knowledge gained from its application (adaptive management).

4.) requires cooperative and integrated data collection, planning, and evaluation.

5.) requires shared resources and expertise.

further refinements and new knowledge.

In addition, the principles are backed up with expanded definitions and guidance with examples. While we had an extensive library of ecosystem management literature to draw upon, much of our thinking was influenced by two documents. One is a draft being developed by the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. This document provided sound scientific guidance defining what an ecosystem is—and what ecosystem management is—along with examples illustrative of the points being made. The other was R. Edward Grumbine's "What is Ecosystem Management" which appeared in *Conservation Biology*. This article served as a starting point to our exploration of understanding ecosystem management.

Providing EBA in an agroecosystem environment

We had found the scientific support for our assertions, but persistent questions continued to confound the group. How is ecosystem integrity defined, especially for agroecosystems and other highly managed ecosystems that the NRCS traditionally works in?

We needed to reconcile the fact that extractive management systems such as agriculture—that *explicitly reduce complexity and diversity in order to increase productivity of particular ecosystem components*—may be deficient in key ecosystem functions, and certainly less stable than intact and diverse natural ecosystems. Market and other economic and political forces, urbanization, and human population growth have transformed agroecosystems from "domesticated" ecosystems that were relatively harmonious with our general environment into increasingly "fabricated" ecosystems. These fabrications more resemble urban-industrial ecosystems when it comes to energy, material demands, and waste production.

From the ecological perspective, however, agroecosystems, coupled with natural ecosystems, constitute the human life-support module for earth since they provide food, water and air purification, and other goods and services that sustain us. We recognized that EBA acknowledges the role of humans not only as the cause of the most significant challenges to sustainability, but as integral ecosystem components who must be engaged to achieve sustainable goals.

Viewing cropland and pastureland (and also plantation forestlands) as dependent ecosystems that are functional parts of larger regional and global ecosystems is the first step in bringing together the disciplines necessary to accomplish long-term goals. The problem is that when short-term yields are maximized at the expense of long-term sustainable production, then the agroecosystem becomes more of a drain than a contribution to the life-support environment.

Conservation practices have the general effect of making the agroecosystem more like the natural ecosystem and less like the industrial-urban ecosystem, and hence a less disorderly and more harmonious component of the landscape. Of course there are exogenous forces (export market forces, absentee owners, and the federal government) at work that provide disincentives for conservation farming. EBA seeks to reestablish controls and goals to local levels in the hierarchy of agroecosystems. So we recognize and need to constantly remind ourselves that the ultimate decisions that affect the health of the landscape are not made by the NRCS, but by landowners and operators. These concepts need to be embedded into our technical and financial assistance and the planning process.

Farmers and NRCS field planners respond to EBA

Beyond the work of this group, the harder work of implementation will begin. In order to anticipate and understand reaction to our work, NRCS organized focus groups among district conservationists, farmers and ranchers. These groups revealed important themes that operators, especially, brought to the table.

In general, farmers are deeply concerned about their economic prospects. They believe prices for farm products are low and that those involved in farming face a continual struggle for economic survival. Farmers perceive that regulatory changes will add to the cost of production and are viewed with skepticism.

In addition to feeling economic pressure, farmers are aware that the overall numbers of farmers in the U.S. is declining. While economics is seen as the main cause of this trend, one result is that farmers are somewhat defensive about their way of life and believe that young people do not see the profession as attractive. As noted by the anonymous rancher writing in My Story *(Women in Natural Resources* 16:2) they often feel unappreciated by the public and buffeted by stringent environmental regulations. Consequently, farmers don't think they have many allies who are willing to stand up for them and help make the case that they are responsible stewards of the nation's farm land. Contrary to the sentiment expressed by that same rancher, however, our focus groups told us the NRCS is held in high regard and farmers appreciate the service they have received from the agency over the years. Initial reactions among some farmers to descriptions of ecosystem based *assistance* are quite positive or at least benign.

The word "ecosystem" evokes a wide array of images, suggesting more regulation and government interference to many farmers. Farmers are also concerned about allowing the public to become more involved in the planning process. Many think that the public doesn't understand what it takes to farm and that public sentiment leans to heavy environmental regulation. EBA is also seen as contrary to the 1994 election message.

Reactions to the word "ecosystem" itself range from negative to neutral to positive. Many see the word as politically correct and coined for politicians, urban residents, and environmental audiences. It is not a word, farmers say, they use amongst themselves. Some profess not to know what ecosystem means, yet still use the term appropriately in conversation. Some believe the concept is just another name for what NRCS has been doing all along. Yet, the term evokes strong emotion and passion that can only be described as hostile and angry. The emotional temperament of those who respond negatively to EBA is much higher than those who respond positively to it. Like some on the NRCS workgroup, farmers felt that EBA is far too ambitious, is too all-encompassing and therefore impractical and unrealistic.

The focus groups also confirmed that EBA remains a term that has not been clearly defined and that the language in the printed descriptions of EBA is too vague and lacks specificity. Speaking for himself and many other NRCS employees, one District Conservationist observed: "Since it is not very well defined, it's open in my mind. It could be a fantastic thing for the agency or it could be a very dangerous thing... What is an ecosystem and which one are we talking about? Are we talking about the ecosystem on a farm, in the sub-watershed, the Chesapeake Bay watershed, the watershed of the Atlantic Ocean, this hemisphere, the world? And then who gets to decide what is the most important consideration in that watershed? Is it endangered species, is it the needs of the

farmer, is it the need of that sub-watershed [to provide] drinking water supplies for a small community, or is it the larger picture?" (Lauer, Lalley & Associates, December 1994).

There is still a strong agency-wide sentiment to avoid using the word "ecosystem." Some advocate using phrases like "total resource planning" or natural resource planning terminology to describe this planning process. Our work was designed to help foster an awareness of EBA for field planners and to clear up that vagueness that seems to characterize any discussion of ecosystem approaches to planning.

EBA tools and future plans

Obviously, much work remains if the agency is to facilitate ecosystem planning on the nation's private lands. Once our group's documentation is finalized, other teams' work begins. A training team is developing an extensive ecological principles and ecosystem planning course that will be channeled to employees through remote teaching methods. Other teams will be working on public involvement, conflict resolution and social concerns, training needs, policy inventory and recommendations, and inventory and evaluation of existing planning and evaluation tools. There are eight pilot EBA projects in eight states right now.

For landowners and operators, the Comprehensive Resource Planning System (CROPS) is an example of a new tool being developed which will facilitate EBA planning. The prototype CROPS is a computer based decision support and planning tool designed to assist farmers in selecting crop rotations and conservation practices. CROPS represents a significant development in the evolution of conservation planning and assistance because of the following unique characteristics:

- automated Conservation Management System generation
- achievement of multiple and often conflicting production and environmental objectives, and
- direct client input and feedback mechanisms.

The resulting CROPS generated plans are based on sustainable agricultural principles and include

- nutrient and pesticide leaching and runoff evaluations
- soil conservation considerations
- client production and income goals.

The comprehensive plans that CROPS produces will move us closer to EBA because our soils database could be supplemented with more detailed plant and animal community data which form the means for defining and evaluating the importance of ecological site considerations in private land use decision making.

CROPS is only one piece in the puzzle. The Ecological Society of America identified institutional cultural change as critical to the success of an ecosystem approach. Enhanced communication among scientists, managers and decisionmakers is essential. They even suggest that it may call for the development of a new type of professional with an understanding of the scientific, management, and social issues, and the ability to communicate with scientists, managers and the public. It is certainly a persuasive argument for a continuous training program aimed at keeping managers informed as our knowledge base changes.

When successfully implemented, EBA will allow adaptation to a shifting knowledge environment to occur quicker. The NRCS will have an opportunity to facilitate change in the landscape through its planning and assistance programs. The agency is endowed with some of the most practical institutional knowledge about working with people on the land. Fine tuning that knowledge and reorienting the field staff toward a more systems approach to planning is what is needed.

References

Anonymous. 1994. My Story. *Women in Natural Resources*. Vol. 16:2.

CRC. 1994. Ecosystem Management: Federal Agency Activities. Congressional Research Service, Library of Congress. Washington, DC. 124p.

Focus Groups on Ecosystem Based Assistance. December 1994. Conducted for The Natural Resources Conservation Service, prepared by Lauer, Lalley & Associates. Washington, D.C.

Grumbine, R. Edward. 1994. What is Ecosystem Management. *Conservation Biology*. Vol 19:1.

Cheryl A. Trott was a Resource Economist at the USDA Natural Resources Conservation Service's Virginia State Office in Richmond at the time of this writing. She served on the EBA Principles & Guidelines Action Team and assisted in the development of the economics portion of the Ecosystem Based Assistance Training Course. Prior to her employment at NRCS, she was a Research Assistant at Resources for the Future. She has a Bachelor's in Economics from Framingham State College and her Master's is in Agricultural and Resource Economics from the University of Maine. She is presently Senior Manager of Research for the Metropolitan Richmond Chamber of Commerce.

Jessie A. Micales

Research In Progress

Focus on:

The Internet

I am NOT a computer person. I use computers for my research and have learned the basics of word processing, spreadsheets, and certain statistical and graphing programs by necessity. As secretary of a local fencing club, I use computers to keep up the membership records and produce promotional literature. I balance my checkbook on the computer and relax with a few favorite games. Although computers seem to permeate my life, they do not dominate it. I don't enjoy learning how they work or fixing them when they misbehave. I am not intimidated by them, but they do not have the allure for me that they do for my husband or many of my friends.

Given this type of background, I am amazed at how useful the Internet has become in my scientific and personal life. I am so excited about this that I want to share my enthusiasm with other readers of Women in Natural Resources. I have expanded my normal "Research in Progress" column to try to give you a brief summary of what the Internet has to offer. Examples are then given by women in natural resources and other biological fields to show how vital the Internet has become to their daily research. Everyone in the natural resources field can benefit from the Internet. As more and more people use it, it becomes more useful for everyone. It is the ultimate example of networking!

There are many different facets of the Internet. One of the most useful is electronic mail, or "e-mail." If you have another user's e-mail address, you can write them a note or transfer short documents to them. Obviously this greatly benefits researchers, but it can be useful to anyone. Mailing lists and newsletters use e-mail to link people with similar interests. There are thousands of mailing lists on many different (and sometimes obscure) topics. All subscribers to a list share their messages with everyone else in the group. Several hundred mailing lists of interest to biologists (and instructions for using them) are described in "A Biologist's Guide to Internet Resources" (Smith, 1994), and new mailing lists are created daily.

A more formal linkage of people with common interests is the Usenet newsgroups. There are currently several thousand newsgroups on the Internet covering practically every subject you can think of. Many of the newsgroups that biologists are interested in come under the general heading of "bionet" or "sci." Specific examples include newsgroups on plants, population biology, ecology, environment, molecular biology, mycology, microbiology, agroforestry, and laboratory methods and reagents, to name a few. There are also newsgroups that list job announcements, summarize the contents of biological journals, and provide biology-related software. Smith (1993) lists many of the newsgroups of interest to biologists. The newsgroup "bionet.women-in-bio" should be of particular interest to readers of Women in Natural Resources. Topics that have been discussed recently in this newsgroup include difficulties of women in graduate school and in the workplace, the image of women in science, mentoring, dual career families, job satisfaction, and the impact of children on careers. It also includes job listings and announcements of research conferences. The newsgroup does not have a large amount of traffic, but it is widely read, and I would really like to encourage people from our readership to participate in this forum. This is an excellent venue for readers to share ideas and concerns, and to network with other women in the biological sciences.

The Internet also has large archives of biological information on file. Much of it is highly specialized, but material is also available for the general reader. A list of biological archives is provided by Smith (1993). Archives include bibliographic databases, complete with abstracts. The table of contents of many scientific journals are also available. Culture collections provide lists of the organisms they have for sale. Various organizations, including the U.S. National Institute of Health, the U.S. Department of Agriculture, and the National Science Foundation, provide directories of scientists and research projects that they are funding. Software packages of interest to biologists are available at no charge. Some collaborative research projects are even storing their data on the Internet so that other researchers can have access to it. This is especially common among molecular biologists who are archiving gene sequences of different organisms.

Large files, including software and graphic images, can be transferred by "anonymous FTP" (file transfer protocol). Universities and other agencies and organizations have set up Anonymous FTP sites all over the globe with files and software that can be downloaded. Many of the newsgroups archive their old messages at FTP sites. Anonymous FTP has been described as "the largest library of information every accumulated. Moreover, it is a library that is always growing, never closes, covers every conceivable topic and, best of all, is free" (Hahn and Stout, 1994). Anonymous FTP sites can be searched using Archie, a program that searches the Internet database and lists every FTP site that contains documents on a specific topic.

Telnet is a program that allows you to link to another computer at a remote site. It is then possible to access information on that computer as if it were your own. This is especially good for searching the electronic card catalogues of distant libraries.

Gopher is another system that allows you to access information from all over the world.

Like anonymous FTP sites, many universities, companies, and other groups store information on Gopher servers. This information is meant to be of interest to local users (for example, within a University department) but is also available to the general Internet user as well. The Gopher is a menu-driven system that is easy to use and allows one to browse the contents of thousands of gopher and FTP sites.

The World Wide Web (WWW) provides another access to the archives stored on the Internet (in World Wide Web sites). All of the files in the WWW are interlinked. If you are reading a document, certain key terms in the document will be highlighted or underlined. These terms can be selected, and you will be connected to other documents that contain these same terms. The WWW uses multimedia, so sound and video files are also available. The WWW is analogous to the multimedia encyclopedias that are available on CD ROM, but the "Web" is infinitely larger.

So how do I actually use the Internet in my work? A few weeks ago I was interested in learning about "sick building syndrome." I had first heard of this phenomenon at a mycological meeting in Prague. It describes houses in which a complex of mold spores, dust mites, and chemicals released from construction materials combines to make people ill. I thought this might be a possible research topic for me to explore since I work as a plant pathologist at the Forest Products Laboratory, and I get a lot of inquiries concerning the growth of mold in houses and other buildings. I put out inquiries about sick building syndrome on the "bionet.mycology" and the "sci.environment" newsgroups. This topic had not been discussed in either of these newsgroups in recent months, so I really didn't know what to expect. Within a week, I had a listing of major research publications on this topic, had conversed with several top experts in the field, and had learned the name of a contact person in the EPA with whom to discuss funding. I also received information about classes on identifying mold fungi in Canada and Texas, learned about an allergy support group newsletter, was given the address of a world-wide web site on sick building syndrome sponsored by the EPA, and was warned several times about the dangers of getting involved in litigation as an expert witness upon entering this field. This was much more information than I could have received by going to the library for the afternoon! It has been estimated (Smith, 1994) that 50,000 people read the newsgroups on topics related to biology. This is a tremendous pool of expertise, and most people are extremely helpful.

I also want to provide some words of caution about using the Internet. As in any journal or newspaper, don't believe everything you read without checking it out first. A computer friend of mine once told me that "everyone is an expert on the Internet," so be careful about your sources, just as you would be in the literature. It is possible for people to log on under other people's signatures, so always take everything you read with a grain of salt. This somewhat anonymous mode of correspondence also allows certain people to dispense with normal polite modes of conversation, resulting in "flaming" or "flame wars" when writers disagree on a topic and address each other in quite disparaging terms. I haven't seen this in the biological newsgroups, but it is very common in some of the more recreational or politically oriented newsgroups. Remember that as soon as you post something, people from all over the world are going to read it. Be careful of your facts, and don't be extremely thin-skinned or unnecessarily sensitive to criticism.

So how does one get access to the Internet? Until quite recently, the Internet was restricted to people affiliated with universities, some government agencies, and certain companies. Complete software packages that provide total access are now available at most computer stores for both Macintosh and PC users. Now all a person needs to "cruise the net" is a computer, a modem, a telephone line, and a local service provider. These local service providers are available in most major cities and usually charge a flat monthly fee for Internet access, anywhere from $10 - $25/month. On-line services, such as America Online, Delphi, and Prodigy, are now connected to the Internet as well. One must be cautious with these on-line services, since some give only partial access to the Internet and may be somewhat costly. America Online, for example, charges $9.95 per month plus $2.95 per hour (although the first five hours per month are free). Many of the software packages and online services (including prices) have been recently reviewed (Ayre and Raskin, 1995; Keizer, 1995). The Forest Service's computer system currently has access to e-mail, but one must use awkward additions to normal Internet addresses to get through the Forest Service computer network. Forest Service computers can also do Telnet and Anonymous FTP, but the system is not capable of handling complex graphics files. The Forest Service is in the process of upgrading its computers, and the new system should have direct and complete access to the Internet.

The following paragraphs describe how some other researchers use the Internet in their daily work. I hope that all readers of Women in Natural Resources will take advantage of this excellent opportunity to communicate with each other and with people throughout the world.

If you have any questions, please contact me at the Forest Products Laboratory, One Gifford Pinchot Dr., Madison, WI 53705 (608-231-9215) or write to me at "jmicales@facstaff.wisc.edu." See you on the Net!

Gail Olson
Department of Fishery and Wildlife Biology, Colorado State University

I am a Ph.D. student in Wildlife Biology at Colorado State University. Aside from using the Internet for e-mail to keep up with the latest topics in ecology (through Ecolog), and checking for job listings (various places, including Gopher and bionet), I use the Internet directly to aid in my dissertation research. I am developing a spatially explicit model for Townsend's ground squirrels. I am in Colorado with all my data files for the ground squirrels, the person doing the computer programming is located in Maryland, and the computer with the the master files and Geographic Information System (GIS) is in Idaho. Through the Internet, I can keep in touch with the programmer by e-mail, and we exchange files either back and forth or through the computer in Idaho via e-mail and FTP.

Una Smith
Department of Biology
Yale University

In the interest of encouraging greater communication and education about science, I have done a lot of work over the past 8 years to create mailing lists and Usenet newsgroups on scientific topics, mostly in the "sci.bio" hierarchy. (Editor's Note: Dr. Smith is the author of "A Biologist's Guide to Internet Resources," an excellent reference that summarizes biological applications on the Internet. It is listed in the "Literature Cited.")

I have found it extremely rewarding to answer what seemed like a foolish question from a lay reader. I first point out how the question is not foolish at all but rather goes to the heart of a difficult and interesting problem. I then discuss what we know, and how it can be applied to confine and reduce the problem — to focus it more sharply.

For instance, there was a question a few months ago about the difference between apples and oranges. I discussed the fossil record of flowering plants during the Cretaceous, pointing out that many families were already well established before the evolution of fruits having multiple seed-bearing compartments from ancestors having just one compartment. These fruits were probably evolved, in many different lineages, in response to a new niche: directed dispersal of seeds by small mammals that

ate the fruits. Small mammals evolved during the Cretaceous, but did not become abundant or very diverse until after the Cretaceous/Tertiary boundary, when the dinosaurs disappeared, leaving behind many niches for mammals to fill. That short essay was probably read by a few tens of thousands of Usenet readers, and it generated four e-mail thank you letters to me.

Recently, in various Usenet newsgroups, there has been a very annoying thread about how Usenet is male-dominated and women are rarely heard from. I don't claim to know why this is so, but it is a fact that most people who post are male. There is some evidence that male readers post more often than female readers do, and that there are fewer female readers than male readers in most newsgroups. There are now nine newsgroups in "sci.bio.," all widely propagated and active, and thus widely read. I encourage you to reach out and post there sometimes, as well as in the cosy women's corner of "bionet.women-in-bio." (Smith, 1995)

H. Frances J. Bligh

Queens Medical Centre,
University of Nottingham
United Kingdom (England)

As a Postdoctoral Research Scientist, I have found the newsgroups one of the most useful aspects of the Internet. In the past, people have helped me to find references on a certain technique (the keywords I was using in my literature searches were all wrong), have given useful tips on commercially available kits, and also provided new and/or cheaper methods for routine procedures. I have also inadvertently learned that there are people up the road from me with similar research interests who I probably never would have met otherwise! My other main application of the Internet is the use of databases of DNA sequences, such as Genbank (I am a molecular biologist), and analysis programs from the University of Wisconsin.

Luz Garcia-Del Pietro

CID, CSIC,
Barcelona, Spain

This chronicle should not be entitled "Women and Internet" — more appropriate would be "How women researchers do NOT use Internet." I am a 30 year-old woman with a Masters in Biochemistry who does collaborative research tasks in the Department of Surfactants in a public research center settled in Barcelona, Spain. Around 80% of the staff in my department are women, including professors and Master's and Ph.D students. This disproportion is mainly caused by the discrimination that women suffer when they look for jobs in the chemical or pharmaceutical industry in Spain.

During the past two months, I have been promoting the use of Internet among my colleagues, mostly Ph.D. students but also among senior researchers. I believe in the Internet as one of the most powerful sources of information that technology offers us. It is the base on which most communications, exchanges and collaborative research will run in the very near future. The results of such a personal campaign were pitiful. The most common answers were: "Sorry, I do not feel comfortable using computers" or "...this is too modern for me, I am an old fashion woman" or "Fax is all I need to communicate and besides, it is faster than email." After that I gave up. Believe me, I felt like a Star Trek character coming from another planet, trying to explain an advanced and sophisticated technology to people of a primitive civilization!

Common words among scientists in North America, such a FTP, gopher, Mosaic (a software package that navigates through the World Wide Web), etc., remain a mystery, not only for women of my professional surrounding, but also for many men. Last week I made a personal inquiry in our research center. We have a computer service for researchers, where users have access to Internet. Here you have the results: 95% of the staff, whether women or men, use no other facility than email.

Finally I would like to encourage women to use Internet for their own benefit. It is easy, fun, and educational and will become one of the most powerful tools of information during the next century.

Gina Berardesco

University of Massachusetts,
Boston, Massuchetts

I'm a doctoral student doing work in microbial ecology. The net has been particularly useful for me. I read the "bionet.molbio.methd-reagnt" newsgroup all the time. I've also posted questions to it and gotten useful answers. I've done DNA sequence comparisons via email at GeneBank, and retrieved various sequences for helping me design pcr primers (a molecular biological technique in which small sequences of DNA are copied many times). I've also looked up various bacterial strains from the American Type Culture Collection through gopher. I've gotten tons of useful analytical software via FTP. I also do literature searches using the Carl system. It's been a big help (and lots of fun).

Sharon K. Garcia

U. S. Air Force Armstrong
Laboratory
San Antonio, Texas

I am a research psychologist. My area of research is oriented towards developing instructional strategies for education and training. When I am not performing job-related research, I am involved in my own research in the area of clinical/counseling psychology.

I have used e-mail for a good while now. It has become a lifeline for me to accomplish such things as contacting research colleagues, customers, obtaining information on conferences, and just chatting with others. This results in a tremendous cost savings in terms of travel and communication time spent on the phone, and allows a faster turn around time for valuable information than usually achieved via the U.S. mail.

Phoebe Rice

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Bethesda, Maryland

I'm a post-doctoral scientist at the National Institute of Health doing structural biology. I would say the most useful aspect of Internet for my research has been e-mail, and after that the FTP sites. I use e-mail a lot for "shop talk" with old colleagues and people at different institutions who work on similar systems, as well as for transferring data files and occasionally manuscripts in progress. There are several FTP sites that I have found useful as sources of software and/or data files. Although I regularly browse several newsgroups, I must admit that most of what I read is of no real use whatsoever, and that my main motivation is procrastination. It is easy to use newsreaders as a sort of legitimate video game. On the other hand, I have found one technically oriented newsgroup where the traffic is fairly low but which sometimes does have useful tidbits of information. I've also posted an occasional question there and gotten several good pieces of advice in reply. So even though it can be an excuse for wasting time, it can also be an invaluable way to tap the expertise of people all over the globe. As far as being a woman scientist using Internet, other than browsing through "women-in-bio," I don't see anything at all gender-specific in the way I use Internet, even in the data:gossip ratio of my e-mail correspondence.

Pamela A. Norton

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Philadelphia, Pennsylvania

I don't believe that I use the net much differently than many of my male colleagues; there is a wide range of participation levels (from none to heavy) that transcends gender differences. That said, I use email for communication with colleagues. This has many advantages, and is particularly useful for contacting people that live across the globe. Not long ago, we began trying a new procedure with little suc-

cess. However, I knew someone who has had excellent results with the technique—but she is in Hong Kong. Nevertheless, a short email request resulted in our obtaining their protocol within a couple of days; and it has worked beautifully in our hands ever since.

I also use FTP or gopher to obtain software and information. This is often more entertaining than practical, but I have obtained some useful software in this fashion.

Finally, we have benefited on more than one occasion from the bionet newsgroups, especially the methods and reagents group. Searching of archives of postings to the groups often produces the answer (or answers) to a question that arises during the course of our work. In addition, a recent posting for help with a particularly vexing problem resulted in several responses, one of which proved correct. This has saved us a great deal of wasted effort.

Shaily Menon
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Boston, Massuchetts

I am involved with research in Conservation Biology and applications of Geographical Information Systems (GIS) to biodiversity conservation. The Internet has become a crucial and increasingly indispensable catalyst in my research-related activities. Internet enables rapid and widespread networking with colleagues in my field via electronic mail. I regularly scan newsgroups to keep abreast of future meetings, conferences, job and funding opportunities, discussions and controversies that reflect cutting-edge research, and opinions. Newsgroups and listservers that I subscribe to range from those that deal with research in specific topics, such as "Primate-Talk," "bionet.biology.tropical," and "BENE" (Biodiversity and Ecosystems Network), to groups such as "bionet.women-in-biology" that might carry a thread discussing how many women use the Internet and how these numbers can be increased, along with other concerns of women seeking career niches in biology.

I access resources around the world through the Internet to locate literature and data sources. I frequently use FTP to exchange manuscripts, data and graphics files, and imagery and maps across the Internet. I am looking into the possibility of setting up a World Wide Web site for digitized maps, satellite imagery, and ancillary tabular data for exchange with collaborators.

Internet has permanently altered the way we communicate and the speed with which we access and exchange information. To quote the somewhat overwhelmed father in the comic strip "Fox Trot," the Internet is "the data superhighway..., the information autobahn..., the bullet train to Cyberville..."

Rosalie Cull
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La Trobe University,
Melbourne, Australia

I have only recently started using the Internet for work and play and have so far found it a very valuable resource. I am currently in my third year of a Ph.D. in Biochemistry. My research involves the purification and characterization of Type II restriction endonucleases from extremophiles. The Restriction Enzyme Database created by Richard Roberts is the best thing that could have happened for my work. Without it, I would have spent literally months in the library (instead of in the lab) trying to keep up with all the recent advances in the literature and worried sick that I had missed something vital along the way. I have also been following the interesting discussions taking place in the women-in-biology newsgroup and feeling less isolated and out of place in the world because of it.

Literature Cited

Ayre, R. and Raskin, R. 1995. The changing face of on-line. *PC Magazine*. 14 (4): 108-175.

Hahn, H. and Stout. R. 1994. *The Internet Complete Reference*. New York: Osborne McGraw-Hall. 817 pp.

Keizer, G. 1995. Accessing the internet. *Computer Shopper*. 15 (1): 533-543.

Smith, U. 1993. A Biologist's Guide to Internet Resources, version 1.7. Usenet sci.answers. Available via gopher, anonymous FTP, and e-mail from various archives. For a free copy, send the text "send pub/usenet/sci.answers/biology/guide/* to the e-mail address mail-server@rtfm.mit.edu. 45 pp.

Smith, U. 1994. A Biologist's Guide to Internet Resources, version 1.8a, Mailing Lists. Usenet sci.answers. Available via gopher, anonymous FTP, and e-mail from various archives. For a free copy, send the text "send pub/usenet/sci.answers/biology/guide/* to the e-mail address mail-server@rtfm.mit.edu. 21 pp.

Smith, U. 1995. Scientists' popular images. Bionet.women-in-bio, January 5. Available from FTP site "bio.indiana.edu" in the "Bionet.women-in-bio" archives, message # 1580. 2 pp.

"Working for the government is quite different than working for industry. In my experience, if you didn't produce for a private company you were fired. With Uncle Sam, you get promoted.... No one has offered me a promotion in the Forest Service, so I must be doing a good job."

Lead Plane & Smokejumper Pilot

Catherine "KT" Roetzler

I never knew I was in a minority until people in the government told me I was. In my world of private aviation, there had never been any distinction between male and females. Pilots are pilots. No one has ever not flown with me because I'm a female, but there are still people in the government that are surprised to see a female pilot. Today I'm one of the Forest Service leadplane pilots out of Redmond Oregon. I have been flying for 16 years, five of which has been with the Forest Service.

I'm a farm girl from Minnesota. We raised Black Angus cattle and my father had his own plumbing business. My mother was a nurse. In 1978, my senior year in high school, my mother said if I stayed home after graduation, I'd have to get a job. At that time, my goal in life was to marry a farmer and have nine kids, just like everyone else.

We lived four and a half miles from the local airport. The airport manager told me about some of the job opportunities at the airport such as becoming a rental car agent, a waitress in the restaurant, or secretary at the National Weather Service. I chose the last one. One day a flight instructor asked if I'd ever tried flying. I laughed and said I wasn't smart enough to be a pilot—I'd just graduated from high school two weeks before with a GPA of 1.98. He laughed too and said it wasn't that hard. My mother said OK and the next day I took my first lesson. The rest is history.

I almost gave up flying because I couldn't land the airplane. My depth perception was off and I'd drop the airplane in from 10 to 30 feet off the ground. It still amazes me that the landing gear didn't collapse. But I kept dropping it in every day for about two weeks until finally the light clicked on.

At the end of the summer, I was hired by the Flight Service Station in the same building as the National Weather Service, so I kept up my lessons. By the next summer I had received my private pilot's license and my job was phased out.

Not really knowing where to go with my "flying career," I went to the most obvious place, our local Air Force recruiter. I told him I'd just received my pilot's license and I wanted to make a career of flying. "No problem" he said. So I took the required tests and the physical and passed. I'm sitting there ready to sign eight years away and I asked about the flying program. The recruiter acted very surprised: "We don't have women fighter pilots," he said. I said OK, then, what do women pilots do in the Air Force? He said, "You're not going to be a pilot, but I can guarantee you a secretary's job." I got up, walked away, and have never regretted it. But that was not the end of clerical work for me.

Next door to where I had worked earlier was a fixed-wing based operator, Aerodrome, Inc. They hired me in 1979 as a secretary, and by spring 1980 I had earned my Multi-Engine, Commercial, Instrument, and Flight Instructor ratings. The company president told me I was a great secretary but the company had enough flight instructors. I told him I wanted to start building up my hours and would settle on being a part-time secretary in between students. He repeated what he had said earlier but offered me a raise. I put in my two weeks notice and moved to Texas.

I had a friend in El Paso who had worked at the National Weather Service in Minnesota with me. He had moved there the year before. He and his family took me in when I showed up on his doorstep with a suitcase. I was 19 years old. Three days later, I got a flight instructor's job at a small airport east of El Paso called West Texas. I worked as a free-lance flight instructor for a few years plus took whatever other flying jobs I could find. My motto was I'd fly anything, anywhere, anytime, if it was legal. Since it is virtually impossible to make a living just flight instructing, I also was a cocktail waitress in a bar at night. I made more money there.

I went home to Minnesota for Christmas that year, and while I was there an aircraft salesman I knew from El Paso called. He wanted to know if I would fly a Beech Baron he'd just sold to a "rancher" in the Big Bend area in southern Texas. I'd be paid cash. Boy, I thought, with only 400 hours of flying time under my belt, only 20 hours of which were multi-engine, I had landed my first "corporate" flying job! I was back in El Paso right away. Well, I'm not going into details, but the "corporate" job for this "rancher" turned out to be flying a piece of garbage aircraft off a dirt road 10 miles north of the Mexican border 75 miles from nowhere. We lived so far out of civilization that once a week I'd go shopping with all the "ranch" workers' shopping lists. I'd fly in the Baron to the nearest town 150 miles away, fill the airplane up with stuff and bring it back. I started out one day to shop for my boss only to be called back to his office because the check he'd given me didn't have the right name printed on the top. In other words, he used a few different names. I quit, leaving the aircraft in El Paso, calling him up to tell him where his plane was. Six months later, he was in a state penitentiary in Georgia for land fraud.

I took two years off 1982 to 1984 to go to college in Arizona, reasoning that if I ever lost my medical certificate and had to quit flying, I would have a degree to fall

back on. To make ends meet, I was a cocktail waitress, tutored math and english, exercised horses at a nearby ranch, and was a disk jockey at a radio station. I couldn't stand not flying, though, so after an Associate degree in Business Administration, I left college and flew freight from 1984 to 1987 out of Phoenix. And flying freight was a lot more fun than instructing. I was by myself in the airplane and the responsibility for that freight was all mine.

I flew for a company called Universe Air Cargo all over Arizona, New Mexico, West Texas, and southern Nevada. Our morning run started out from the cargo ramp in Phoenix at 0600 in the morning. Other pilots who flew freight were there at the same time and we became a family. They, too, were trying to build time flying light Cessnas and Pipers. Every morning it was a competition to see who could load up, jump in, crank up, call the tower, and get out first. Once we'd all scrambled out and were on our ways, the radio was filled with chatter about weather (which wasn't of much interest in Arizona), what we were going to do for the rest of the day at our destination, conditions of the aircraft, and of course, jokes . In the evening, we'd all be on the radio again, catching up on the day's events all over Arizona and New Mexico.

After about a year with Universe Air, Roger, the owner of Aerocrafters, another freight company, asked me if I wanted to work for him. He paid a little more, but didn't have any bigger aircraft. I said no, but a few days later, the owner of Universe Air and I had an argument about his not respecting my decisions as pilot in command of the aircraft I was flying. I quit, and that night went to work for Roger. Next morning at 0600 I was on the same cargo ramp in another aircraft. Roger was a jewel. He'd retired from the Air Force and had flown a number of tours over Vietnam and Korea in jet fighters. He, his wife, and son ran Aerocrafters—the perfect mom and pop company.

The Arizona route I usually flew was from Phoenix, to Prescott, to Sedona, to Flagstaff. Once in Flagstaff I had an eight hour layover so to augment my pay, I got a job with Avis rental cars at the airport, driving to the gas station for a fill up and then washing the cars for the next customer. In the evenings, I flew the route back to Phoenix reversing the stops. One winter evening I was to leave snowy Flagstaff at 1900 (in the dark) and fly directly back to Phoenix because Sedona and Prescott were socked in due to snow. I was flying a Cessna 207, single engine, high wing, which usually held six plus the pilot, but all the seats were out to accomodate freight. I took off and a few feet off the ground I was in the clouds. I looked at my instruments and the attitude indicator made a 90 degree bank turn to the right, then one to the left, and then upside down—and stayed there. *My* seat still wanted to stay in the seat, so I knew something was wrong with the attitude indicator. In flying instrument flight rules (IFR) the attitude indicator tells you if you are climbing, descending, or turning. I still had an altimeter and compass to tell me that stuff—no big deal. But I also started to pick up ice as I headed to 11,000 feet to where air traffic control cleared me. The attitude indicator was rolling around on the instrument panel directly in front of me and I had no way of covering it up. I got serious vertigo. I thought I was in a right descending turn, so I would compensate but the altimeter and compass were telling me that in fact I wasn't correcting anything but climbing and turning left. This went on for 45 minutes. Finally, I started my descent into Phoenix some 60 miles north and still in the clouds. By now I had accumulated about three-quarters of an inch of ice on the airplane, which really isn't that much, but it was something else on my mind. As I descended, the ice started melting, the water from the ice got inside where the antennas were, and shorted out all of my electrical equipment. So here I am, alone in the clouds, no lights, no navigation, no way to talk to anyone, and my vertigo tells me I'm upside down. When I finally landed in Phoenix, I unloaded on my boss about flying his piece of garbage and how tired I was of being scared, and so on. When I was through, he said some consoling words and that he'd see me bright and early Monday. I flew for him two more years.

But I finally burned out working the 12-16 hours a day for $600 a month and applied to fly for the US Customs Service at Tucson. After being hired in the spring of 1987, I was told, "The only reason you were hired is because you're a girl."

Pilots for Customs have to carry a gun and badge. In order to be allowed to carry these, you were required to go to law enforcement training in Georgia. Since my class would not meet until December (six months away), I got approval to go back to El Paso and fly freight for a woman who owned a company called Aerofreight. I flew her Cessna 402 from El Paso to Chihuahua, Mexico, back to El Paso to clear customs, and then on to St. Louis, Missouri. Six months later I was called back to Tucson for my class.

It's funny, but if I'd known I was a minority before I applied with the US Customs Service I'd probably not have applied. As it turned out, the job with Customs was the worst I'd ever had because of their structure and their upper management attitudes. But it lead to my present position.

Working for the government is quite different than working for industry. In my experience, if you didn't produce for a private company you were fired. With Uncle Sam, you get promoted: the motto "screw-up move-up" is alive and well. No one has offered me a promotion in the Forest Service so I must be doing a good job. I'm doing what I love most, so over the years I've learned not to listen to people who comment on me being a pilot, good or bad.

When I fly passengers for the Forest Service, my objective is to get them to their destination in the most safe and comfortable way I can—on time. As a leadplane pilot, my job is to coordinate air traffic over a fire, along with maintaining the safety of fire fighters on the ground from the retardant. I received a type rating in the Forest Service Sherpa (smokejumper aircraft) and have been flying it off and on.

My immediate future goal is to fly the Sherpa more. Both leadplane and smokejumper flying offer interesting work. Flying smokejumpers is fun because I fly with another pilot in the cockpit and the jumpers are a very professional group of folks to work with. In the leadplane I have a direct effect on the fire and I see the results of my efforts almost immediately.

I admit I hold to some of the old fashioned ideas, like loving this country, believing in God, and having important goals. Just because I'm a female in "a man's world" doesn't mean that I have to stop being a lady or lower my standards. If I fail at anything I try, I pick myself up and move on. It's easy to get into a rut with a job you're not happy with. It's very scary to make changes, but it's in changing that I've learned about myself and the world I live in.

Catherine "KT" Roetzler lives in Redmond, Oregon. She is pictured with the Sherpa.

Is it really necessary to put people out of work to protect our environment? Must we sacrifice natural resources and wildlife for the sake of jobs and industry? A major marsh restoration project now under way on San Francisco Bay shows that such a choice need not be made.

The Sonoma Baylands

Laurel Marcus

This pioneering project was made possible by a diverse coalition that has united environmentalists, industries, labor leaders, government agencies, and elected officials. It demonstrates how economic and environmental needs can be integrated, with benefits all around and no losses; and how a unique political coalition can form around a creative solution.

Sound too good to be true? No such coalition was envisioned at the project's inception. It was accomplished by means of innovative thinking and a diligent effort to understand and accommodate the needs of all whose interests were involved.

The Sonoma Baylands Tidal Marsh Restoration project, developed by the California State Coastal Conservancy and the Sonoma Land Trust, will restore a hayfield to its historic condition as a tidal wetland and use more than 2.5 million cubic yards of clean dredged material in the process. This dredged material will come from the Port of Oakland, allowing the deepening of channels to accommodate larger container ships. San Francisco Bay will gain a 322-acre tidal wetland designed especially to aid two endangered species, the salt marsh harvest mouse and the California clapper rail. The port and the region will benefit by increased economic activity.

The seed: A good idea

The sonoma baylands project began in 1988 as a wetland and open space preservation project. The nonprofit Sonoma Land Trust had negotiated a purchase option for a large hay ranch near the mouth of the Petaluma River and had approached the Coastal Conservancy for funding to acquire the property. The Land Trust seeks to protect agricultural and environmentally sensitive lands in a rapidly urbanizing county by outright purchase or acquisition of conservation easements. The Conservancy undertakes projects toward these same purposes, as well as for public access. Prior to acquiring the property, the Conservancy and the Land Trust prepared a resource enhancement plan to identify natural values and the possibilities for their restoration.

Like much of the north bay shoreline, the hay ranch had once been a tidal wetland, part of the vast, productive marshlands that bordered San Francisco Bay. About 90 percent of these historical tidal marshes have been diked and drained for agriculture or filled for urban development. Some have been permanently lost. Others could become wetlands again.

The enhancement plan found that the property's southern 322 acres, which adjoin the bay, were suitable for restoration as mudflats and salt marsh. The mudflats would feed numerous bird and fish species, and the salt marsh could help the salt marsh harvest mouse and California clapper rail to survive.

Such restoration, however, would require far more than flooding the site with tidal water. The hayfield had subsided as much as four feet below sea level. Salt marshes occur at three and a half feet above sea level. Therefore, up to seven and a half feet of new mud would need to accumulate before the marsh could form. Left to natural tidal sedimentation, this build-up would take many years—years the endangered species did not have.

Joan Vilms, project manager for the Sonoma Land Trust, and I realized that the process could be speeded up by bringing in some clean fill, such as clean dredged material. We discussed the option for several months, as our enhancement plan neared completion and we contemplated ways to fund its implementation. We understood that if we pursued this option, we would have to work with the industrial ports and the U.S. Army Corps of Engineers, rather than just with the typical supporters of environmental and wetland projects. This idea was both intriguing and frightening.

Both of us knew from other experiences that we would have to negotiate very carefully so that the needs of the ports and the Corps to dispose of dredged material did not subvert our wetland restoration project. But as the Conservancy and the Land Trust would design the project, and as ownership of the site would stay with the Land Trust during the negotiation period, we felt we could afford the risk. One day as we sat on the levee that extended between the verdant marsh on its bayward side and the hayfield to the north, we decided to take a chance. We would try working with the Corps and the ports to use dredged material, but remain ready to abandon this idea if the project veered away from its original intent.

In 1990 we convinced our superiors and the Coastal Conservancy board of the logic of our arguments. The Conservancy approved the enhancement plan, authorized $1.5 million to the Sonoma Land Trust to purchase the entire 830-acre ranch, and provided $250,000 for a design plan for the southern piece of the property. Together, the Conservancy and the Land Trust assembled a multidisciplinary team consisting of wetland ecologist Ted Winfield, tidal hydrologists Philip Williams and Joan Florsheim, and Rick Olejniczak from Gahagan and Bryant Associates, a dredged material engineering firm. This team began a detailed engineering and biological design for the marsh. It studied not only the site's physical conditions, but also the outcome of earlier wetland projects in the bay.

During this time, the Port of Oakland was in the midst of a battle with many interest groups over proposed sites for disposal of some 6.6 million cubic yards of clean dredged mud. Until acceptable sites were found, the port could not proceed with an essential channel-deepening project to accommodate larger ships. The port is San Francisco Bay's largest maritime shipping center and the nation's fourth-largest port. With its related industries, it employs over 100,000 people and fuels over $5 billion in regional economic activity. As the debate over dredging wore on, shipping lines began to use other ports, and Oakland's share of the maritime market dwindled.

The Corps of Engineers, which is primarily responsible for dredging in navigable waters, had proposed to dump the mud back into the bay near Alcatraz Island, as it had been doing for years. It had also proposed disposal in the ocean, near Half Moon Bay. Both proposals had evoked angry opposition from commercial and sport fisherman, environmentalists, and even bay swimmers. The Half Moon Bay Fishermen's Association won

a court battle to protect its productive fishing grounds. By 1989 all sides in the conflict were embittered and angry, and no solution was in sight. Even before our design plan for the Baylands was completed, the Corps and the port began to inquire about our idea of using dredged materials to restore a marsh.

How to proceed

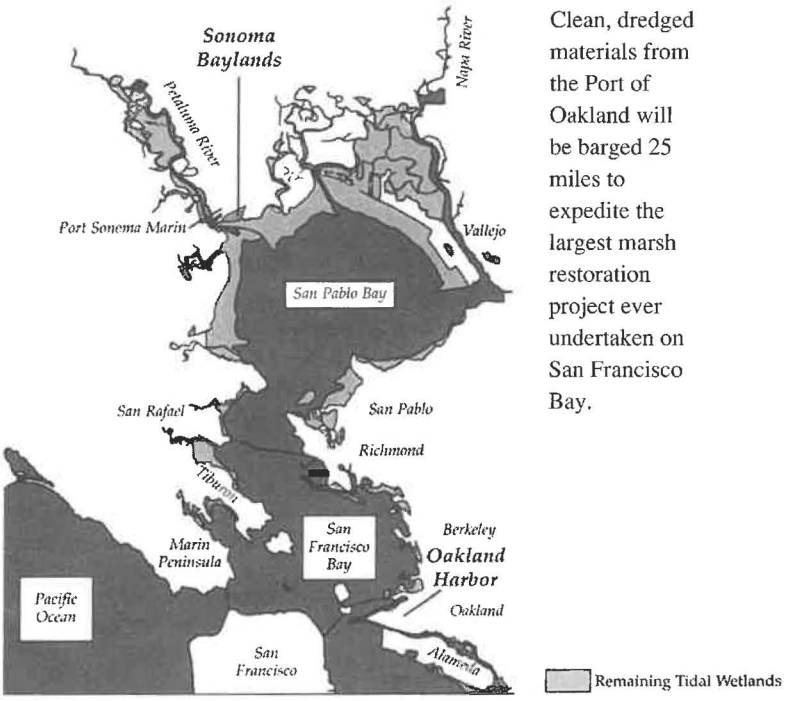
The design team had identified two alternative ways to proceed at the Sonoma Baylands. Both required that a new levee be built and the old perimeter levee breached, flooding the site with tidal water. Beyond that, the restoration job either could be left to the process of tidal sedimentation, which would take some 35 to 50 years, or that process could be considerably shortened by raising the elevation of the site with suitable dredged material, allowing a vegetated marsh to form within 10 to 25 years.

The design team concluded that the Baylands would benefit from 2.5 to 2.8 million cubic yards of dredged mud. The exact quantity would depend upon the ratio of sands, which are larger and take up more room, to the smaller silts and clays. This amount of material was significant: the project could take over a third of the mud that was to be dredged from the Port of Oakland.

Our cost estimates were encouraging, showing that barging muds 25 miles from the Port of Oakland would be cost-competitive with barging mud to the most recently proposed ocean disposal site 70 miles outside the Golden Gate. The primary environmental issue remaining was to assure that all the material placed at the Baylands was clean and passed the rigorous ocean disposal testing.

The Environmental Protection Agency (EPA) and the San Francisco Bay Regional Water Quality Control Board oversee testing programs, assure the validity of test results, and determine the suitability of the materials for disposal in bay, ocean, and wetland environments. They base their conclusions on the results of chemical testing and the results of bioassay tests which evaluate the toxicity of water and sediment from the dredged materials to various species of zooplankton. Only dredged material deemed suitable for aquatic disposal would be allowed at the Baylands.

In addition, to make sure that chemicals from Oakland's material did not bioaccumulate in wetland plants and animals, the Corps grew these plants and animals in the sediments for a year in a laboratory. Results of these tests showed no significant uptake and concentration of persistent chemicals, even for dredged materials that were not considered suitable for ocean disposal. These tests assured us that we would not be creating a problem that would appear many years from now. As a matter of fact, much of the dredged material was cleaner than the samples tested from the existing natural marshes near the Baylands site.



Clean, dredged materials from the Port of Oakland will be barged 25 miles to expedite the largest marsh restoration project ever undertaken on San Francisco Bay.

Mustering Support

A new idea that can help to resolve a crisis while serving the purposes of many divergent interests can quickly gain support and bring opposing factions together. The Conservancy held a meeting in 1991 for all concerned elected officials, government entities, special interest groups, and the ports to discuss the Baylands and how to implement the project as a part of the bay dredging program. The response was surprising. The entire Bay Area Congressional delegation, federal and state regulatory agencies, environmental groups, and ports expressed support; the Corps of Engineers, however, was not encouraging and reminded everyone that it lacked specific Congressional authorization to undertake the Baylands project. Corps policy did not favor wetland creation as an option for disposal of dredged mud. Bound by a tradition of aquatic disposal and a national policy to implement the cheapest alternative, the Corps adamantly opposed the idea.

At this point, the Conservancy began a campaign to create a coalition of allies strong enough to persuade the Corps to shift away from its traditional policy. I approached all parties who held an interest in the dredging of the ports: organized labor, business and development, shipping lines, the individual ports, regulatory agencies, as well as Congressional and state legislative staff. The goal was to convince them that the wetlands project was the key to resolving the dredging impasse and that their assistance was crucial. This process of persuasion required patience, tolerance, and listening to numerous opinions about other involved parties.

The overwhelming support for the project by environmental groups, especially Save San Francisco Bay Association, Sierra Club, and Natural Heritage Institute, was a clear bargaining chip. These groups had successfully stopped the port in its previous attempts at dredging and had steadfastly opposed aquatic disposal. The Port of Oakland cautiously endorsed the Baylands, unsure of how much it might cost but very willing to help if that would aid its dredging project. Slowly, many different parties came to see the Baylands not just as a good compromise to get the port dredged, but as a good idea for reusing dredged material. Still, it would take an act of Congress to win the support of the Corps.

In 1992, the Bay Dredging Action Coalition (BDAC), newly formed by community, business, and labor leaders to resolve the dredging crisis, made the Baylands a cornerstone of its political agenda. The coalition's letterhead listed shipping lines, banks, chambers of commerce, numerous trade unions, and others with an interest in seeing the Port of Oakland channel deepening proceed. The project now had the broad-based backing it needed.

While environmental groups supported the project, it was largely this powerful coalition that pushed the Baylands through the system, helping the Bay Area Congressional delegation to overcome the Corps' resistance. In the 1992 Water Resources Development Act, Congress directed the Corps to build the Baylands project. Specifically it instructed the Corps to complete final engineering designs, to build the first stage of the project, including the new levee, and to place

clean dredged material on the site for the purpose of restoring a wetland.

The federal public works system that for so many years had produced dams, flood control projects, and other environmentally damaging developments, treated this major habitat restoration project as one of its own. The pork barrel system was made to work for environmental improvements—a change that could only have happened in the San Francisco Bay Area, and even here only because of the dedicated and powerful Congressional delegation—Congresswoman Nancy Pelosi, Congressmen George Miller, Ron Dellums, Vic Fazio, and Norm Mineta—and the coalition of business and labor forces. In the waning days of the Bush presidency, the Baylands slipped into this system.

A supprising setback

Following this victory, support for the Baylands became even stronger. In 1993, a major push was made to get the Corps to begin the work authorized by Congress and have the Baylands ready on the same schedule as the Port of Oakland channel deepening project. Individuals who previously had been on opposite sides of every major issue regarding the bay attended a meeting with representatives from Corps headquarters and voiced unanimous support for the Baylands. The Corps agreed to proceed with the next steps in the process. All the years of hard effort, persuasion, and alliance building were paying off.

Then a very strange thing happened. Just as we had persuaded the Corps of the benefits of the Baylands project, the federal agency with principal responsibility for the protection and recovery of endangered species responded to the Baylands with a very negative letter and recommended that the project be denied. The U.S. Fish and Wildlife Service requested a number of additions to the project, the most controversial of which introduced the assumption that tidal marsh restoration required mitigation for environmental impacts. Specifically, the Baylands hayfield retained low spots that ponded water in very wet years and thus created "seasonal" wetlands. The Corps had determined that 56 acres of such wetlands existed on the site. The Conservancy and the other agencies involved had agreed that a fully tidal 300-acre wetland would provide such high value habitat that it would more than compensate for the loss of these occasionally ponded hayfields. But Fish and Wildlife recommended that several hundred more acres of seasonal wetlands be created on another site as mitigation. This was a very expensive condition to accommodate, and it set a precedent that would make other future restoration projects impossible.

Perhaps the most difficult part of this request was its timing. The Fish and Wildlife Service had participated in the Baylands project for four years and had contributed to both the concept and the specific design. Why did it only now bring up such a fundamental issue? We were dumbfounded.

The other agencies—the EPA, the Regional Water Quality Control Board, the San Francisco Bay Conservation and Development Commission, the California Department of Fish and Game, and even the Corps—stood firmly in opposition to the Service's contention that tidal restoration projects required mitigation. Environmental groups, however, were split into two camps by this new requirement. On one side were those who had fought ocean and bay dumping and saw the Baylands as an environmentally beneficial answer to the dredging dilemma. On the other were people passionately concerned with seasonal wetlands, fearful of their destruction by future tidal restoration projects.

After many emotionally charged months of debate, the Conservancy brokered a compromise. It offered to make an effort to restore seasonal wetlands on another nearby 250-acre parcel, a project consistent with our future plans for this site, and to add 24 acres of seasonally ponded area to the Baylands site. These concessions would not be permit conditions and therefore would not set a precedent for requiring mitigation for other wetland restoration projects. Finally both the Fish and Wildlife Service and the environmental organizations that had supported its position withdrew their opposition to the project.

The final victory occurred in a particularly grand fashion. In December 1993, President Bill Clinton endorsed the Baylands project as a part of the Port of Oakland dredging effort. In the wake of large-scale military base closures, the port was seen as especially vital to the local economy. The dedication and hard work of Congressional representatives, most particularly Congressman Ron Dellums and Lee Halterman of his staff, gave the Baylands the boost it needed. A White House task force was created to speed the dredging and the Baylands project along. Local Corps staff, many of whom had long supported the project despite the reluctance at their headquarters, formed a partnership with the Conservancy that has since brought the project to construction.

Lessons Learned

The sonoma baylands is more than just a tidal restoration project or a creative answer to a port's dredging problem. It represents an ideal: the transformation of a situation in which animosity and conflict dominate to a peaceful and beneficial settlement, backed by a successful political coalition. In California, where divisions are often stronger than alliances, the Baylands is a unique victory, demonstrating the ability of diverse people to agree, cooperate, and accomplish great things together.

The Baylands also owes its success to the power of the individual to make a difference. It began not as a government-mandated program or policy directive but as the vision of two people. This vision was reinforced by an enthusiastic design team, and it became a reality through the hard work of many people in government and private organizations, all of whom were ready to embrace a new and useful idea and to combine efforts to achieve its implementation.

The inclusion of a large-scale marsh restoration in an industrial port dredging project has opened the door for other similar projects nationwide. When evaluated only as a dredged material disposal site, the Baylands costs slightly more (five percent) than disposal at the newly designated ocean site 60 miles outside the Golden Gate. However, this economic evaluation does not account for the value of creating a 300-acre tidal wetland. When the value of the habitat is included, the Baylands is the clear bargain compared to aquatic disposal, which produces no environmental benefits.

The port's dredging project was expedited by the inclusion of this environmentally beneficial feature. All involved agencies were willing to accelerate their efforts to make the Baylands project work. Without the marsh project, the port could well have faced many more years of litigation and delays.

Largely in response to the Baylands proposal, the Long-Term Management Strategy (LTMS), a 50-year blueprint for disposal of material dredged from San Francisco Bay, includes wetland creation as an option. The LTMS agencies—EPA, the Regional Water Quality Control Board, the Corps, and the San Francisco Bay Conservation and Development Commission—have all endorsed this new concept in reuse of dredged material.

On July 18, 1994, Vice President Al Gore presided over a dedication ceremony for the Baylands. He spoke enthusiastically of the project as a national model. "The environment wins, the economy wins because you get a better port with more traffic and you create jobs in the process, so employment wins. The fourth winner is the nation because the project sets an unusual example of business, labor, and environmental groups working jointly to steer this innovative project through the bureaucratic morass." How remarkably far a simple idea can go.

Laurel Marcus, Sonoma Baylands project manager for the State Coastal Conservancy, has initiated and coordinated numerous wetland and watershed restoration projects on the California coast.

Philip B. Williams & Joan L. Florsheim

Designing the Sonoma Baylands Project

The Sonoma Baylands project embodies the first large "second generation" design for a marsh restoration project on San Francisco Bay. This design approach was developed in light of experience and data gained from earlier, "first generation" projects. The project is important in its own right, because it restores 322 acres of tidal marsh habitat to the bay. In addition, however, its pioneering design approach will refine earlier lessons and help to guide even larger restoration efforts anticipated on this estuary.

Marsh restoration site with new levees and channels, before the addition of dredged materials. A natural marsh extends between the bay shore and the site at the mouth of the Petaluma River. To the right is Highway 37 and Port Sonoma-Marin.

Like much of the vast area of tidal marsh that was diked and filled for agriculture on the margins of San Francisco Bay in the last century, the Sonoma Baylands site had subsided five to six feet—well below Mean Tide Level and well below the level at which marsh vegetation can survive. At first glance the solution seemed simple: just fill the site with dredged material back up to the level of the original marshplain, which is about the level of the tide at Mean Higher High Water (MHHW), then breach the levee and walk away.

In fact, this was the very approach used in the first restoration projects on San Francisco Bay about 20 years ago. At Pond 3 in Hayward (in 1975) and at Muzzi Marsh in Corte Madera (in 1976) dredged material was pumped onto the site, and after the surplus water was decanted, tidal action was reintroduced by breaching the levee. Some major tidal channels were excavated by bulldozers, and some experimental plantings of cordgrass were carried out.

Now if you go out and look at these sites, at first glance they seem fine—they all are covered with salt marsh vegetation, mainly pickleweed. But a decade ago, these marshes looked different, and were the subject of intense controversy among academic researchers who disagreed on whether their restoration was a "success." One of the problems cited was that on portions of the sites dredge material had been placed at too high an elevation and remained sparsely vegetated for a long time. Now it is clear that if we were to use these projects as a model for Sonoma Baylands we would have to answer a key question: Twenty years later, how similar are these two sites to natural tidal salt marshes?

The design team for the Sonoma Baylands, seeking to learn from these early restoration attempts, was fortunate. The physical evolution (geomorphic and hydrologic) and performance of several restored marches—including Muzzi Marsh—had been monitored for the past eight years. Much of this work was sponsored by Save San Francisco Bay Association, supported initially by the San Francisco Foundation, later by the Marin Community Foundation, Marin Audobon Society, and King & Lyons, a development firm. These nongovernmental organizations recognized that, unfortunately, governmental agencies were not funding the kind of monitoring that would allow others to learn from early restoration projects. They stepped in to meet the need.

Thanks to the involvement of a number of individuals and institutions in the Bay Area who have developed a long-term interest in the success of marsh restoration efforts, we were able to locate original surveys of "first generation" tidal marsh restoration projects. For example, Tom Wakeman, of the US Army Corps of Engineers, had worked on the Corps' Pond 3 restoration project in 1975. With the help of Wakeman and Scott Miner at the Corps, the design team located the early surveys from what was the first post-project monitoring of a restoration project, back in 1976. With these, we were able to go to Pond 3 to resurvey exactly the same transects in 1991 to help us understand what had happened and guide the rationale for the Sonoma Baylands design. At Muzzi Marsh, we were able to resurvey earlier transects and understand the history of the site because Phyllis Faber, a wetlands botanist, the author of Common Wetlands Plants of Coastal California, and a co-worker in marsh monitoring efforts, had been tracking Muzzi's evolution since 1975.

Results of resurveying these marshes, which had been restored using dredged material, were very interesting. The surveys showed that both Pond 3 and Muzzi Marsh were not fairly close to the natural equilibrium marshplain elevation, which is at about MHHW for a mature marsh. The higher areas had subsided over time, and the lower areas had silted in with muds brought in by

the high tide. But there was actually an important difference between the formerly high areas and the lower areas. In the former high areas, there were few or no naturally formed tidal slough channels, while in the lower-elevation areas a dense, meandering slough system was evolving in newly deposited mud. These results showed that when dredged materials initially were placed at too high an elevation, tidal slough channels took a very long time to develop.

In restoration design, we now know how important it is to understand a tidal marsh as an evolving physical system that ultimately reaches a dynamic physical equilibrium. Tidal marshes evolve from mudflats and eventually reach a mature state in a dynamic equilibrium that involves tidal flows, sedimentation, rising sea levels, and land subsidence. Early marsh restoration projects attempted to replicate this equilibrium condition through precise grading or manipulation of tide levels.

We are now learning that usually we are better able to meet our ecologic goal by creating a "template"—a physical design that allows a natural marsh to evolve as rapidly as possible toward a mature state. Unfortunately, we still do not have an adequate physical or ecologic characterization of how long it takes to develop a "mature" marsh, but we are fortunate in San Francisco Bay to have remnants of the original ancient marshes, several thousands of years old, that can provide important insight into marsh evolution. Like the ancient forests, they may have complex physical and ecologic qualities not yet discovered.

Luckily for the San Francisco Bay Area, one of the few research projects on the physical evolution of salt marshes has been carried out locally, along the Petaluma River. During the past 10 years, Josh and Laura Collins and Luna Leopold mapped and analyzed the complexities of a natural marsh system for the first time in great detail. Josh Collins, now at the San Francisco Estuary Institute, is continuing to build on this work. We now know that an intricate tidal drainage system provides unique habitat for many species, from Benthic organisms to birds. We also understand how important the slough channel drainage system is in distributing water evenly over the marshplain during the highest tides and the effect of that distribution on the entire ecosystem.

Our monitoring of the first-generation sites at Pond 3 and Muzzi Marsh had shown that in the higher portions of the sites (where dredged materials had been placed), the tidal drainage system was evolving very slowly. So why use dredged material at all? The primary purpose of the plan was habitat restoration, and the design was driven by ecological, not disposal, goals. This fact distinguishes Sonoma Baylands from prior restoration efforts. Though this project is coming to be known as a creative example of the use of dredged materials to create an environmental benefit, the urgent need of the Port of Oakland to find disposal sites for such materials was not a factor driving the design plan for the Sonoma Baylands.

In fact, our exploratory studies had shown that marshes would form naturally if levees were simply breached, without any further intervention. We had seen this process at several sites where land had subsided and the levee had been breached accidentally. Salt marshes were now forming as estuarine sedimentation filled the site. On the basis of observations of the evolution of marshes in the White Slough area of Vallejo, where a levee failed in the late 1970s, and at the California Department of Fish and Game's Toy Property on the Petaluma River, where a levee collapsed in 1986, it seemed reasonable to expect that the Sonoma Baylands could also become a salt marsh from natural sedimentation after its levee is breached.

Natural sedimentation rates could be fairly high at the Sonoma Baylands site because the restoration site adjoins Port Sonoma-Marin, which is dredged regularly. The design team was, again, fortunate in that the staff of the marina kept good records and had retained Professor Ray Krone, of the University of California at Davis, to advise on siltation problems. The design team used Krone's data from Port Sonoma-Marin to predict the rate of sedimentation at Sonoma Baylands. We estimated it would take up to 35 years to get to the natural marshplain elevation we wanted if we relied solely on natural sedimentation.

Wave action, natural sedimentation, and tidal flows.

This slow rate meant that it was worth taking another look at using dredged material to speed up the evolution of the marsh to provide habitat for endangered species. The crucial question then became: How high could dredged material be placed without subsequently impeding the evolution of a complete tidal drainage system? Results of our surveys of Pond 3 and Muzzi Marsh indicated that the highest elevation to place dredged materials and still be confident that a functioning slough channel drainage system would develop quickly was 1.5 feet below NHHW, or about two feet above Mean Sea Level (MSL). This meant that if we placed about four feet of dredged material at the subsided Sonoma Baylands site up to a maximum elevation of two feet above MSL, it would speed up the evolution of the system, so that marsh vegetation would start to appear after about 10 years. Incidentally, it would also provide a place to put about 2.8 million cubic yards of dredged materials. We proceeded to explore this option further.

The physical design rationale was, essentially, to allow about 1.5 feet of natural sedimentation to occur on top of about four feet of dredged material, so that the natural tidal drainage would rapidly evolve. Another physical problem still had to be addressed, however, and that was wave action.

The northern part of San Pablo Bay is windy and exposed to both strong northwesterly sea breezes and southeasterly winter storm winds. At high tide, strong wave action will resuspend freshly deposited estuarine mud, which could then be carried away by the ebb tide. The shallower the water, the more intense the wave erosion. Eventually, an equilibrium is established at an elevation where sedimentation on a mudflat is exactly balanced by wave erosion—which, if the waves are strong enough, can prevent the formation of a salt marsh. This explains why the shallow broad San Pablo Bay is a bay, not a marsh, and why when the wind blows in San Francisco Bay you can sometimes stand on the Golden Gate Bridge and see a sharp contrast between the muddy ebb tide and the clear flood tide ocean water.

Two other restoration projects on the bay offered some guidance to the design team on the issue of wave action. At the 250-acre Warm Springs restoration site in the south bay, peninsulas were incorporated in the grading plan to limit wind wave fetches. (Fetch is the distance over open water that the wind can blow, and the longer the fetch, the stronger the waves.) Six years after completion of the Warm Springs project in 1986, monitoring of the physical conditions indicated that most of the site was evolving toward a marsh as expected, but some of the shoreline areas exposed to wind and wave action on the longest (2,000-foot) fetches showed evidence of erosion.

Meanwhile, at the Dickson property on Tolay Creek close to Sonoma Baylands, levees around a 90-acre field had been partially breached in 1982, allowing restricted tidal action and creating open-water habitat three to four feet deep. With wave fetches of about 2,000 feet, sedimentation rates were low, and there was no trace of emergent wetland vegetation anywhere on site. Steep banks surrounding the restoration site were eroding.

Review of these and other sites helped the design team to identify the maximum fetch length that would not significantly limit natural sedimentation and thereby retard the evolution of

(continued on page 21)

Questions & Answers from people who were keys to the success of the Sonoma Baylands Project

WALTER ABERNATHY, President of the Pacific Merchant Shipping Association, and former Executive Director of the Port of Oakland says:

According to the script, all dredged material would go into the water. But every time I've been involved with dredging, when we tried to follow traditional methods of disposal—even some that I thought were creative—we just couldn't get the overall consensus and environmental buy-in. So we determined we had to get some multiple disposal options so that the burden of dredging was shared by a number of different people, and for this we needed a realistic upland disposal alternative. So when we came up with one that was within reach—maybe it'll cost more money, but it was within reach—that brought everybody together. Laurel [Marcus] was just great in coming up with this project and bringing it to everybody's attention, and we played a helpful role in swinging a constituency that normally probably wouldn't have been allied with it but had vested interest to see dredging go forward.

Q: What was at stake for the shipping industry?

Abernathy: When we put BDAC [Bay Dredging Action Coalition] together, we knew it had to do with basic maritime survival of the Bay Area. This place is one of the biggest maritime centers in the world, the fourth biggest in the United States. It also has one of the shallowest ports in the whole world-wide system.

Q: The Port of Oakland's channels are too shallow?

Abernathy: One of them is down to 38 feet, the other is 35. Both will now go down to 42. These depths are measured at low tide. The deepest draft vessels have to time their arrivals to benefit from the tidal range, which is six or seven feet. They have a very narrow window to come in through the Golden Gate, cross the Bay, and come into that berth. That's very, very costly. Going out, sometimes the vessel operator has a choice: put a full load in and wait six hours for the tide, or leave some of the load behind. The ship might be costing him $4,000 an hour.

The 42 feet we'll get at Oakland will be a big help, but it will be inadequate the day you get it. It's still not the depth you need for an efficient harbor. You'll still be functioning at a penalty in terms of being efficient for transportation and competitive with other ports. I think everyone recognizes that.

We're working with the Coastal Conservancy, the ports, everyone else, to see if we can learn from this project. Sometimes we on the industry side are criticized for being project driven. We have pledged to see if we could fix the system so that in the future it doesn't take acts of Congress and lightning bolts to make things move—so that the process itself would facilitate this type of solution. We're looking at language in federal legislation. It's a miracle, really, all the things that had to happen to make possible something that makes good sense. The system worked against it.

CYNTHIA KOEHLER, Attorney with the Natural Heritage Institute, representing the Pacific Coast Federation of Fishermen's Association comments:

In this case the fishermen and environmentalists are for all intents and purposes allied. Dumping large quantities of dredged materials has potentially very severe impacts on marine mammals, seabirds, and other species in the ocean and the bay. Given the large volumes projected for ocean dumping and the risk of harm to these

Port of Oakland waterfront, with downtown Oakland in the background. Because the port will now be able to deepen a channel to accommodate large container ships, a job increase of up to 2,200 is expected. The Corps of Engineers projects a total of $135 million in economic benefits.

resources, we feel it's very important to identify and develop disposal alternatives. Sonoma Baylands does not solve this problem but it's a valuable demonstration project. It shows that you can use this material productively in a socially useful way; and it demonstrates that the costs don't need to be widely divergent from the costs of dumping in the water. In determining the "cost" of a project, it is important to subtract a positive benefit—if you dump it in the water you may produce negative impacts; if you use it for a wetland, or as a landfill cover, you produce something useful—those benefits need to be factored into any economic equation.

Q: *Fishermen prevented the Port of Oakland from using a site off Half Moon Bay. Right?*

KOEHLER: That was my original involvement in the dredging issue. From our perspective, the LTMS (Long-term Management Strategy) for disposal of dredged materials] was spawned by the Half Moon Bay litigation, which was brought by fishermen who had been left out of the process. There had been growing concern about dumping off Alcatraz and a compromise was reached that dumping would take place at a "temporary" ocean site 11 miles off the Half Moon Bay coast—right on the nearshore outer continental shelf, which contains some of the most productive fish habitat in the world.

The fishermen walked into our office and said: "We didn't know anything about this. This will destroy our industry and shut down our port." They were in a fairly advanced state of concern. We immediately filed a law suit and sought a preliminary injunction to halt the dumping. We lost the first round in federal court and refiled in state court, adding several new claims—in particular, that the Coastal Commission had not been consulted. We were successful in obtaining an injunction, which was upheld twice on appeal. Once that ended, there was a realization that to keep moving this problem from one back yard to another wasn't going to work, and that a comprehensive solution for the long term had to be developed, with the participation of everyone who had an interest and concern not only in the economic aspects of dredging and port development but also in the environmental effects associated with disposal.

Q: *So there is a link between that battle and the Sonoma Baylands?*

KOEHLER: Oh, I think so. I'm not confident that without the litigation LTMS would have occurred. One of our concerns in the lawsuit that has remained central in our LTMS participation is the need for alternatives to open water dumping of dredged materials. The Ocean Marine Protection, Resources and Sanctuary Act (also known as the Ocean Dumping Act) specifically requires that ocean dumping be minimized, that multiple ocean dump sites should be avoided, and that ocean dumping which must occur be kept off the continental shelf and away from productive fishing areas. On this basis, we insisted that agencies develop alternatives such as Sonoma Baylands.

Q: *Can we now hope for a qualitative difference in the way the issue of dredge disposal is handled?*

KOEHLER: The Sonoma Baylands project occurred after several acts of Congress and a Presidential order. We must have a fundamental change in the philosophy of the Corps in the way dredging disposal decisions are made. The next step is for Congress to direct the Corps to make the beneficial use of dredged materials its highest priority. Sonoma Baylands has not solved our problems. It demonstrates that without extraordinary—really extraordinary—political pressure, it's going to be business as usual.

OWEN A. MARRON, Executive Secretary-Treasurer, Central Labor Council of Alameda County, AFL-CIO says:

A number of years ago the organized labor movement in Alameda County became extremely concerned at the lack of progress in dredging the Oakland shipping channels. Thousands of jobs, many of which are good paying union jobs, depend on the maritime industry in the Bay. We were aware of the objections by many environmental groups and of the need to dispose of dredged material in an environmentally sound way. Our members live, work, and raise their families in the Bay Area, so we too shared their concerns. But over the years there had grown a communication breakdown over the issue. It was for that reason we helped form the Bay Dredging Action Coalition (BDAC), bringing together the various groups concerned with the future economic viability of the maritime industry while being sensitive to the environmental issue. With the help of such bodies as the Coastal Conservancy, the lines of communication with the environmental groups were opened up. We were able to openly discuss the economic concerns and the environmental concerns, and found we had more in common than we had thought. So, when BDAC was approached with the Sonoma Baylands project, it was a welcome contribution to solving the problem.

Q: *What was the key to making this project possible?*

MARRON: We all agreed—local government, the ports, organized labor, and the environmentalists—that dredging was a necessity if the major industry in the Bay Area was to survive and grow. We all agreed that dredged material had to be disposed of in an environmentally sound way if the Bay Area were to remain a place suitable to live and raise a family. Consensus brings results. The Coastal Conservancy played a leading role in developing that consensus.

These articles on the Sonoma Baylands project are reprinted with permission from *California Coast & Ocean* (Vol. 10, No. 2). Photos courtesy U.S. Army Corps of Engineers, Port of Oakland, and *California Coast & Ocean.*

this marsh for the Sonoma Baylands. Based on this review, a distance of 1,000 feet was determined to be the maximum desirable wind wave fetch, and the design plan incorporated low peninsulas, oriented across the predominant wind direction, to limit wave action.

The design also deliberately left a portion of the site without peninsulas to take advantage of the retarding affect of wave action on marsh evolution. The exposed area would create diversity by minimizing sedimentation in an "immature" portion of site. That portion would evolve more slowly than most of the site so that it would still be mainly colonized by cordgrass, while most of the site has developed into a pickleweed marsh. Over a few decades, the low peninsulas would subside into the marshplain and be barely distinguishable from their surroundings.

One issue remained in developing the geomorphic and hydrologic component of the design: How would tidal flows from San Pablo Bay reach the Sonoma Baylands site across 1,000 feet of existing marsh? Initially, the design team suggested enlarging an existing small slough channel. But at an interagency review meeting, the US Fish and Wildlife Service asked us to look into other alternatives to avoid disruption of existing clapper rail habitat by construction equipment. After examining data from other restoration sites, the design team concluded that there was an excellent prospect that the small slough channel would deepen and widen rapidly with the natural scouring action of the tidal flow to the new Sonoma Baylands marsh. At both Warm Springs and the Toy Property, small ditches eroded to major channels within a few years of increasing tidal flow. Nevertheless, as a precaution for the Sonoma Baylands, the design team incorporated a requirement in the monitoring plan to identify whether the channel is scouring fast enough. If necessary, provisions to deepen the channel will be made.

As well as being an important restoration project in its own right, the Sonoma Baylands project can be seen as a pilot project for even larger future restoration efforts in San Francisco Bay, such as the 1,500-acre Cullinan Ranch near Vallejo or the 9,000-acre Napa March (the former Cargill Salt ponds) in the north bay. A key part of the Baylands project will be the design and implementation of a monitoring plan to test our ideas and the analysis of the physical and ecologic evolution of the site. In this way, the "second generation" Sonoma Baylands design will quickly lead to a "third generation" design for other projects. Sonoma Baylands has taught us the importance and value of learning from past experience.

The Sonoma Baylands interdisciplinary design team consisted of Philip B. Williams, president, and Joan L. Florsheim, senior associate of Philip Williams & Associates, Ltd., consultant in hydrology;

Ted Winfield and Christie Robinson of ENTRIX, wetlands ecologists;

Rick Elejniczak of Gahagan & Bryant Associates, dredging engineers.

Laurel Marcus was project manager for the Coastal Conservancy,

Joan Vilms was project manager for the Sonoma Land Trust.

Longshoremen loading cargo at the Port of Oakland. The Port generates more than 10,000 jobs and is the fifth largest container port in the nation.

ROBOTS ARE NOW MADE IN THE IMAGE OF INSECTS AS WELL AS HUMANS. WHAT SHOULD THEIR ROLES BE IN OUR LIVES? ARE THEY ENTERTAINERS, WORK-RELIEVERS, EDUCATORS, JOB-DEPRIVERS, OR MIND-EXTENDERS?

FOLLOWING *STRANGE* MESSENGERS

DIANE M. CALABRESE

With an ardor that resembles acute biological passion, *Homo sapiens* has carved mirror images and stuffed them; and more recently, molded, articulated and wired them. The doll, which might be a universal artifact, long anticipated the wired robot.

Lately, these narcissistic representations have given way to versions of other species. But that was to be expected, since robots earlier designed to be high fidelity replicas of human action no longer necessarily even look humanoid (New Scientist, cover, 14 May 1994).

Robotic replication started quietly enough. In 1811, Henri Maillardet created an automaton, a "woman" who wrote and drew. Internal clockwork guided her benign endeavors. Acceleration of the industrial age brought other schemes to construct self-guided robot-machines to aid humans.

On another front, inevitably, a Czech dramatist, Karl Capek, soon conjured a sinister twist to the robot trajectory of development: a machine which had been designed to help, instead runs amok and menaces its makers. Capek's 1921 play, *Rossum's Universal Robots*, is the source of the word *robot*, which derives from the Czech word for serf. (Count on a person of letters to see the limitations of a feudal system.) Later, Fritz Lang's robot in the 1926 film *Metropolis* outdid Capek's. It (regrettably made a "she") surpassed malevolence—she was sadistic.

In the seven decades since *Metropolis*, robots gone amok have been balanced by robots too cute for words, e.g., R2D2 and C-3PO. Fast forward to the future and there is Data of *Star Trek: The Next Generation*, a 24th century android with no sense of irony but a keen interest in what makes humans so full of it. In all this time, there has been every permutation of good and evil, with robots controlled—and in control—constructed of imaginative combinations of organic and inorganic components. Functions have varied, but until recently, the form of robots has been distinctly human.

Now, however, crisscrossing the United States and Europe, and soon Japan, there are robotic arthropods—which I call robo-pods. The robo-pods, modeled after invertebrates with jointed appendages (the phylum *Arthropoda*), are very large, an attention-getting size. One exhibit travels under the name *Backyard Monsters*, a spell binding but unfortunate appellation. There is nothing monstrous or deformed; huge says it all.

In the collection, there's an endearing—at least to a limited circle of mantis admirers—eight-foot long version of the praying mantis and a twelve-foot long unicorn beetle. (The company that produced them also developed a paper wasp as an addition to its cohort of traveling robo-pods.) Four sets of the robo-pods—the mantis, a scorpion, a carpenter ant, and a black widow—have been traveling to museums and exhibit spaces since March 1, 1992. Creative Presentations (CP) of Valencia, California distributes the exhibit, which had many contributors. For example, the CP subsidiary, Creative Exhibits of San Antonio, produced the robo-pods, Arthur Evans of the Los Angeles County Natural History Museum provided entomological advice, and engineer John March, formerly of NASA, furnished technological expertise. The fiberglass and plastic robo-pods are as rigid as real arthropods, which have exoskeletons. The creators provided analogous sorts of membranes—in this case silicone bellows—for articulation. (Incidentally, making flexible suits of armor, humans had solved the articulation problem by A.D. 1400.)

The robo-pods get high marks for fidelity. Chicago's Field Museum curator in entomology, Margaret Thayer says, "The robots are well-executed, and their movements are reasonably realistic, but mostly meaningless [eye rolling, bodies swaying]. An exception is the praying mantis, which moves its front legs as if capturing prey, although almost in slow-motion. Naturally, the fact that they had to stay where they were [on the floor], limited the kinds of motion that could be incorporated." Five to six minute simulated routines, although computer driven, recall the repetition produced by timing devices in Maillardet's writing and drawing doll.

Scientists have long believed any robot's current lack of mobility will improve as the science of artificial intelligence (AI) advances. For example, Rodney A. Brooks of the AI Laboratory at Massachusetts Institute of Technology (MIT) wrote in *Science* (1991) that the "autonomous mobile robot" will appear when machines both pick up and react to information from their environment (situatedness) and sense their reactions (embodiedness). The robo-pods on tour do not have those capabilities yet.

The proliferation of robo-pods and other robotic species collections means some have been exhibited in unusual places. In the summer of 1993, Tim Schichler, program director at the Kansas City Museum, negotiated with Worlds of Fun, a Kansas City amusement park, to display the CP robotic arthropods because of space limitations at his museum. Schichler's reaction to the robotic arthropods is mixed. He says, "Anytime a subject can be made more accessible—like increasing size, that is a good thing. And I admit I saw tremendous numbers of people going to the exhibit." According to Schichler, 133,000 visitors came in the summer of 1993. But, as a museum program director, he worries that technology and not

educational outcomes are driving development. He cites a growing list of robotic animals such as bats, whales, prehistoric mammals, dinosaurs and others, being exhibited globally. He asks, "Is technology the best way to introduce the subject matter?" The answer?—his Kansas City Museum has no robotic exhibits scheduled on a calendar that takes it through 1996.

CuratorThayer doesn't disagree with Schichler's reaction. She watched many visitors at the robo-pod exhibit at the Chicago Field Museum. She says, "My overall feeling about Backyard Monsters is that it is good. But the robots are over-emphasized in the publicity and under-utilized as educational elements." Another research scientist at the Field Museum is less sanguine, claiming, when questioned, not to remember much about the exhibit, and wondering whether that says something about the educational halflife of the robo-pods.

Other robot-designers have been at work for other reasons. For some years, volcanologists have been trying to coax Dante, their eight-legged robot, to function in volcanic cones, in order to gather data under high-heat, potentially volatile conditions. Some robotic insects have even been made to scale, like a 35 centimeter one called Genghis which aims for precise simulation of insect activity, the creation of MIT's Brooks. Moreover, for decades, manufacturers like General Motors have fitted external rigging over human arms and legs. The apparatus amplifies the movements of a human, expanding the mobility, range, and strength of human appendages, but also producing the equivalent exoskeleton to make human-arthropods.

Throngs of visitors and industry's research and development demonstrate that critter-like robot building is garnering lots of attention, but how do we make sense of humans turning away from images of self to create insects and such? It might be a response to population pressure. (We are weary of looking at each other.) Or, it could be a way of nullifying the loss of other species. (We destroyed them; let's make some replacements.) Consider this: Perhaps an abundance of robots in the likeness of other species is the human way of timidly exploring the vexing next step in societal transformation. After all, 19th century intent was to create automated helpers, which today are less needed and possibly not even desirable. So scarce are jobs today that the most tedious task will be snatched up by someone as long as it offers a paycheck. But robots taking on human labors—if not human looks—are cropping up as competitors for limited jobs everywhere. Max Glaskin, a few years ago reported on the patrolmen robot built at England's University of Oxford (*New Scientist,* 29 January 1992). At L10,000 per year to lease, it's roughly one-third less costly to employ than a human security guard; and it can work around the clock. In a reverse twist on robotics, education prepares most of *us* instead to function like automatons: paper and disk shufflers, filers, number adders, key strokers, image scanners.

This self-assessment doesn't call for regret. But it does signal the urgency for reflection and reinvention. What's a displaced worker to do? The world's biggest ant and company suggest the answer is already out there. Humans ought to be putting talents to use in new ways. Adults do not play with dolls. Phylogenetically, *Homo sapiens* is about to recapitulate its ontogeny, putting aside crude representations of self in favor of refined replicas of other species. The majority of people might look at the robo-pods, say "wow" and move on. Yet we should begin to wonder how it feels to *be* an arthropod, to experience the world as one. If over-sized arthropods help put humans in touch with the intricacies of nature and the place of humans in the biosphere, they actually defy the most dire predictions about technology—that it will make most humans superfluous. For in this case, the robo pods will be teaching us—hinting at what is yet to be discovered and appreciated and pointing the way to what endeavors humans might undertake to fill their minds. The time is not far off when a probe configured as an arthropod—or any other creature—can be manipulated remotely by the human mind. Humans will soon be able to infiltrate the living world with probes that are facsimiles of arthropods and other creatures. When intimate experience supplants distant observation, understanding grows.

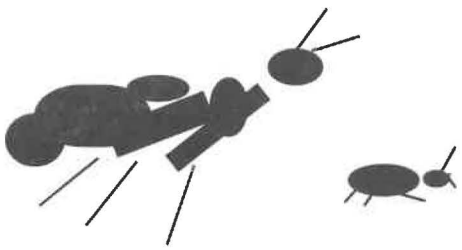
This kind of positive thinking needs to be encouraged because attitudes are important. As Barrie Sherman points out in *Working at Leisure*, the time when everyone can expect a life governed by the number 47—as in years of work, weeks of work in a year, hours of work in a week—is gone. Sherman laments educational systems that do not prepare us for a world of shared, human-centered remunerative work. Recently, in *The End of Work*, Jeremy Rifkin argued it's time for everyone to acknowledge technology decreases the number of jobs as we know them now. But that's not a reason to despair. There are more ways to bring meaning to life than working at tasks a machine could do, or a job that does not need to be done at all. The less-than-magical '47' hours might be replaced by '30' as Rifkin advocates, or even '20.' Society has two big challenges ahead. Devise a way to share the work that must be done to sustain (and nourish) civilization—and design an economy that recognizes many fewer hours of work than 47 as the norm—i.e. as the number needed to earn enough to buy a house, feed the human stomachs living in the house, save, etc.

Filling up the non-remunerative hours will not pose a problem for those who are self-directed learners and doers. But it will confound those who emerge from our educational system in the state Sherman fears most: literate, but not introspective or creative. There is, after all, always something to absorb doers: a research project to complete, a better solar collector to build, a garden to plant, a child to teach, a language to master, a play to write.

We must start by grabbing the attention of everyone and holding it. Then, we must convey how interesting life is beyond the traditional workplace. New technologies like robo-pods can help illuminate possibilities and encourage exploration. Let's shrink to the natural size of arthropods and follow them into the leaf litter of a tropical forest or find a way to fly with them to the canopy. After we travel with them, we can come back and depict the parts of the world new to us in paintings, songs, and essays. There will never be a shortage of things to engross us. When we begin to satisfy the mind on a regular and enduring basis, we will at last begin to transform our society to a sustainable one.

Of course, there are small liabilities. Playwrights will capture our robot assisted forays into the leaf litter and imaginative writers will produce some monsters (double-entendre intended) to confront us. Yet the conclusion will be inescapable: more robot development by humans is positive and potential outcomes far exceeds the familiar activities of trading currency for repetitive tasks—or of being passive and entertained. In other words, since they have a message or two we might want to decipher—why not run with ants?

Diane M. Calabrese, a Women in Natural Resources *editor, is an entomologist and a writer; she lives in Columbia, Missouri.*



INTERVIEW

ADELA BACKIEL

AN INTERVIEW BY DAINA DRAVNIEKS APPLE

WiNR: It seems appropriate to ask you first a question about your childhood and education.

Backiel: I was born and raised in Cleveland, Ohio. I grew up in the suburbs, very close to what is now the Cuyahoga Valley National Recreation Area. I spent a lot of time out of doors. I was the youngest of three girls and I loved being outside with my dad, fishing or working in our yard. I went to an all-girls Catholic high school, then on to college in Seattle where I majored in forestry at the University of Washington. My sister had moved to Vashon Island in Seattle a few years before that, and I had gone out to visit her when I was in high school—and of course fell in love with the place.

I graduated in forest science with an emphasis on soils. After that, I worked as a temporary for the Forest Service in Juneau, Alaska. I had always wanted to go to Alaska. I worked on timber sales and soils analysis for the regional soil scientist.

WiNR: Did you stay with the Forest Service?

Backiel: Yes. Eventually I got picked up as a permanent employee. It was a lot easier to do at that time. I was a soil scientist at Petersburg, Alaska, and worked there for about a year, again doing soils analysis. I worked on the first Tongass land management plan. This was in the mid-1970s, when the whole Alaska lands debate was just starting. I found myself thinking that undergraduate school hadn't really prepared me for dealing with public ideas or public perceptions of what we do, or how we communicate what we do. So I went back to graduate school for my master's at the University of Washington in public policy and public administration—from 1978 to 1980. I really liked combining my natural resources background with public policy. All of us who work for the federal government do link them in some way, but I don't think education-wise, there were too many of us tailoring our coursework for it.

The school required an internship to go along with the master's program. They were going to waive that for me, since I already was a federal employee but I thought that I would take the opportunity to use the internship to get experience at the Department of the Interior in Washington, D.C. So I spent six months in Washington, D.C., in 1979, working on the bill that then became the Alaska National Interest Lands Conservation Act. I worked primarily on the Native Corporations aspects of the bill, which again broadened my experience and my education.

WiNR: Where did you go after that? Did you go back to Alaska?

Backiel: No. I always thought that I would. I looked at Alaska jobs, but Washington intrigued me. I finished up my graduate work in Seattle then moved with the Forest Service back to Washington, D.C. in 1980 with the Policy Analysis staff. Then I transferred to the RPA staff. I was in the Washington office for about three years before I left the Forest Service and went to Congressional Research Service, which is a nonpartisan, objective research agency of Congress. It's a legislative branch agency. I was a specialist in natural resources policy, primarily forest and range resources. I was there for 11 years. Then I was asked by this administration to accept this job as Deputy Under Secretary. I thought long and hard about it, because I really enjoyed the work on Capitol Hill working for Congressional Research Service, but thought that this was not an opportunity that one passes by. I joined USDA in December 1993.

WiNR: Those of us who knew you, were really happy that Jim Lyons chose you.

Backiel: Jim and I have worked together for a long time, probably since 1983, when I started at Congressional Research Service and he was policy director at the Society of American Foresters. I had always done a lot of work with the Agriculture Committee of the House of Representatives, so when Jim joined

their staff, we continued working together. He talked to me about the possibility of joining him at USDA when he found out he was selected for the job. I still had to go through all the political processes and clearances. Exactly how all that took place, I don't know. It took a long time—seven or eight months.

WiNR: Exactly what are your titles and areas of responsibility?

Backiel: Jim Lyons is Under Secretary for Natural Resources and Environment. Our mission area covers both Forest Service and the Natural Resources Conservation Service, (formerly Soil Conservation Service) so Jim's time on the larger issues covers both agencies. I am Deputy Under Secretary for forestry and Tom Hebert is Deputy Under Secretary for conservation.

WiNR: You originally came to Washington as an intern in USDI and now are Deputy Under Secretary for USDA with several jobs in between. How many years ago did you start the journey?

Backiel: I came to Washington believing I'd be here for a year or two, thinking it would look good on the resume—and now it has been 16 years.

WiNR: There have been some major changes recently in USDA, mainly a new Secretary of the Department.

Backiel: Yes. USDA Secretary Mike Espy resigned on December 31, 1994. The President nominated Dan Glickman, ex-congressional Representative from Kansas, to be the new Secretary. He is awaiting his confirmation hearings. I feel that he will be an excellent Secretary and is very interested in our natural resource issues. I look forward to working with him.

WiNR: Could you describe what your job is and what your daily responsibilities are?

Backiel: Regarding day-to-day work, almost everything that comes to the Under Secretary's Office for the Forest Service is delegated to me—except for Pacific Northwest issues which Jim continues to handle. So I handle most of the day-to-day operations and policy decisions. But the major way I describe my job to people is that this office is the communication and policy link between the USDA Secretary and the Forest Service.

One task is the day-to-day running of the agency, for example, reviewing budgets, policy changes, personnel actions, strategic planning, or coordinating with other Departments. We either decide these items at our level, and/or then pass them on to the Secretary for approval. Then there are the outside issues. For example, requests for testimony at congressional hearings or answers to questions concerning the Department's position on various programs, and, of course, meetings with various interest groups. This part of the job entails communication between the Hill, the Department and the interest groups.

The third aspect is that we handle initiatives. Range reform, mining law reform, reinventing government, to name a few.

WiNR: Regarding the Forest Service, could you describe how an initiative originates and then is handled?

Backiel: Initiatives could take the form of direction from the White House, the Secretary's office, or from inside the agency itself. For example, the National Performance Review completed by Vice-President Gore was the impetus for the Forest Service reinvention process. The reforms we achieved in the Forest Service budget structure for 1995 began with the agency wanting to reduce the number of line items in its annual appropriations. We were successful in working with the congressional appropriations committees to consolidate some of these items and reduce them from 72 to 42. If we anticipate any more consolidation of line items we have to rebuild the trust between the congressional committees and the agency. We have to be accountable.

WiNR: Aside from the trust issue, what else are you looking to change?

Backiel: Four things come to mind. The first is establishing and maintaining good communications between our Under Secretary's office and the Forest Service. It is something that has to be constantly maintained, and it takes energy and attention, but we are well on our way, I believe. The second is to enhance women and minority representation within the Forest Service. I feel that is moving along very well. I know that this is one of the most important aspects of conservation leadership.

Another is to assist in implementing ecosystem management. At this level, that can be everything from making sure that we keep the

Adela Backiel is Deputy Under Secretary for the U.S. Department of Agriculture. Her area of responsibility includes the Forest Service.

philosophy of ecosystem management in mind in all our decisions—or in speeches that we give—where we represent both the Secretary and the Forest Service throughout the country and internationally. When we have policy decisions to make, we should be making sure that that philosophy is maintained, and internally, we ought to be showing support for that philosophy. That can be done in communication, in budget, in the reinvention process, in everything we do.

The fourth, is that the Forest Service has been, in the recent past, very much in the press, but with very negative connotations. There are so many good, productive, positive programs that we have—like the international Sister Forest Program, the actual progress that we have made in implementing ecosystem management, the Urban Tree House Program, the Forest Products Laboratory in Madison, Wisconsin—that I would like to find some way that we can get those items foremost in people's minds and in the press. If I can assist in any and all of those four things, I will be happy about my tenure here.

WiNR: What is your management style? How do you handle work, relationships, control of information? How much do you delegate?

Backiel: As I said earlier, my main objective when I got here was to establish excellent communication between our office and the Forest Service. One of the first things I did was to talk to the Chief and staff to say that when we talk about doing things with teams and having team management, we must include everybody who has a stake in what that decision is.

WiNR: Specifically, how do you do that with the Forest Service?

Backiel: I have been working very closely with the Chief Jack Ward Thomas and Associate Chief Dave Unger and the Deputy Chiefs on communication strategies, along with the Public Affairs and Legislative Affairs offices. When a new issue comes up and I need to get some judgment from the Forest Service people, I will go through either Dave Unger or Jack Thomas or a deputy chief to get a response—and vice versa—these people will also come to me. Once an issue has begun to blossom, or once we have started to communicate on it, then I'll work directly with the staff group whether it is in the field or the Washington office. On many of the larger initiatives, after that initial contact, it's pretty clear sailing between them and me. In meetings, I try to have as many Forest Service people participate as possible so I can get to know people and they can know me. I think that's important, too.

WiNR: Is USDA a *decision-from-the-top-then-sell-the-ideas* to the agencies kind of place?

Backiel: I don't view it like that at

all. More like working from the bottom up, rather than from the top down. Then the decisions really are made somewhere in between. The team approach requires us to look at it that way.

WiNR: You have watched the department from outside and now inside; what changes have you noticed in USDA over the years?

Backiel: The most obvious one, for all of us, is the attitude and philosophical difference brought about by ecosystem management. That, I think, is going to be the guiding change factor for a long time. Another big change for the Forest Service has been the movement toward cultural diversity over the years. It has been changing the agency in how it recruits and develops employees, and how the agency must change to respond to these new demands that cultural diversity places on it. I think that is having a big effect on the agency and a very positive one. Secretary Espy created the most diverse work place in USDA. It is a joy to work in it, and it is very encouraging. I thanked the Secretary personally for this and feel it has strongly influenced how USDA operates.

WiNR: Diversity seems to make a difference to you and how you feel about your work, I perceive.

Backiel: Yes, it does.

WiNR: You have been elsewhere as a woman in the minority?

Backiel: Haven't we all? We usually are in the minority. But in USDA it wasn't just women who were missing in large numbers, either. We're becoming more diverse ethnically. It truly is wonderful.

WiNR: I'd like to shift subject matter a bit and ask you about Forest Service direction. Our journal carried an article two issues ago on the Eastside Ecosystem Project which has to do with a natural resources *interagency* look at how best to handle the Columbia River drainage and the Great Basin public lands as an ecosystem. Can you tell us what it all means to the Forest Service for the future and what kind of signal it sends?

Backiel: For Forest Service employees, and for other federal and other public employees, I think the signal is really clear that we are going to be working together a lot more than we ever have in the past. Public lands are not just pockets of landscape managed by different public agencies any more. We are trying to look at systems in a much more holistic manner. To do that, we have to communicate. We have to approach all of this as teams and as colleagues, making sure that we keep the philosophy of ecosystem management in mind.

WiNR: Will ecosystem management also include the private sector?

Backiel: To a certain extent. In the final analysis, private landowners can do whatever they want with their lands. I would, however, like to see private landowners working with government landowners as colleagues in our approach to land management.

WiNR: What about the current state and private forestry programs, such as stewardship incentive programs, Forest Legacy, giving private landholders tax incentives or other benefits to help them do what we feel is good ecosystem management?

Backiel: I think that voluntary kind of approach is necessary, if we are going to succeed at some of this. Whether we find new ways to do it, or whether we enhance the ways you mention, we need to communicate and trust each other better than what we are doing now.

WiNR: You brought up the press a few questions ago and I'd like to pursue another question about them: does it seem to you that media attention has shifted away from the Forest Service? Not too long ago, President Clinton's Forest Plan came out and nobody was happy about it. Then there were the terrible fires of the summer of 1994 and the very reduced timber harvests which adversely affected many communities. Now it is quieting down. Is that good for the Forest Service?

Backiel: Certainly I think that people in the Pacific Northwest would say that it hasn't quieted down. Nationally, it probably has, which is what we in Washington notice. But, to answer your question, I think that the fact that our controversies are not always front-page news anymore is good.

WiNR: Why do you feel that is a good thing?

Backiel: Because the press has focused so much on what's wrong rather than on the good things we are doing. It relates also to public participation and public perception. The press picks up on the fact that some people in natural resource management resist the public getting more involved in what we do. To me, I think that public involvement is great! What's better than having people care about what you do? I wouldn't want it any other way.

WiNR: There are Forest Service employees (and non-Forest Service people who are allied with them) who are sources of grumbling to the press. From that one can assume there is a certain amount of unhappiness within the agency. From your perspective, is USDA doing anything to weave the disgruntled back in—or inspire them?

Backiel: I think that the best way to influence people is by example and by going out and doing what you believe is the right thing to do. You never are going to please everybody. Some people may be alienated about some aspect, other people will be alienated about other aspects. Any large organization is going to have that, whether it is government or private.

WiNR: Chief of the Forest Service Thomas is considered by many inside the agency to be very principled and not afraid to say what he thinks. A lot of employees are responding very positively to that. And just as you note, not all of them agree with everything, but at least they know where he is.

Backiel: Yes, I think you have to stand on your principles.

WiNR: You started in the Forest Service in the mid-1970s. Did you find it difficult to work in when you first started out?

Backiel: I had some problems, but they were few. I feel like I always fit in pretty well. That doesn't mean that there weren't changes that had to be made; sure, there were. A lot of changes *have* been made in the Forest Service and in the forestry profession generally. Part of that, I firmly believe, is because of the women who are in the natural resources professions. I think we have individually and collectively stood up and said, "This is the way we want to be treated, and this is the way we should be treated within the work place." It's been slow, but most people have responded.

WiNR: Over the course of your career, in the different jobs that you have held, what is the work that you are the most proud of, and enjoyed the most?

Backiel: Probably my work in range policy, for a couple of reasons. One is that it was new to me when I started in it. I hadn't worked in range at all when I went to Congressional Research Service, and range policy was one of my responsibilities. I had to learn it really quickly. In my 11 years there, I spent a lot of time tracking range issues, working with environmentalists, the professional societies, the agencies, and with ranchers to bring all viewpoints of range management together. Getting the groups to understand each other's difficulties has been very rewarding. I can't say it has resulted in specific items, like legislation. But I think it has moved understanding among the range community forward significantly.

WiNR: Even though it is still quite polarized?

Backiel: Yes, but rhetoric about grazing on public lands has been historically polarizing since the beginning of the Forest Service and the origins of the Bureau of Land Management. In many cases, we are still talking about the same issues that we talked about in the 1930s.

WiNR: What about some of your other work at Congressional Research Service that you recall as having been productive?

Backiel: There are a number of other things that I did that moved some things along the legislative track. I did a lot of work in air pollution and the National Acid Precipitation Assessment Program (NAPAP) and how forestry is treated in those issues— including hearing summaries, advising on draft legislation, and providing technical analysis to the House and Senate Committees. And the work I did on Alaska lands and resource policy, particularly the analytical work for the Committees that led to the Tongass Timber Reform Act was one of the most productive things I ever did.

WiNR: Are the things you are proud of the same work that got you promoted the fastest?

Backiel: That is a difficult question, but I would say yes, that is generally true. If you like what you are doing, you try harder to do it the best you can and it usually makes you shine.

WiNR: Weren't you also the youngest fellow ever elected to the Society of American Foresters (SAF)?

Backiel: I believe I was the second woman and the youngest fellow elected. I am very active with the National Capital SAF: I was on the executive committee from 1983 to 1993 in all of the elected positions. I represented them at two meetings of the House of Society Delegates (HSD), and I was elected Vice Chair of HSD in 1990. I served on one of SAFs strategic planning committees, and we hosted SAF's annual convention when I was Chair in 1990. Participating like that is an excellent way to get to know people and gain a lot of experience very quickly. I also worked with SAFs National Policy Committee, which I have chaired, and was a member of for four years. Not all women contribute to professional societies but I think my longtime contribution there has also helped SAF grow. It certainly has helped me.

WiNR: Were there any particular mentors who afforded you opportunities that were unexpected—or perhaps designed?

Backiel: I haven't thought much about that. I think one's bosses always have influences on you whether that experience is good or bad. I have had mostly good experiences. My first boss in the Forest Service job that I had in Juneau was Tom Collins. He is now with the Forest Service in Utah. He certainly taught me the ropes of what it was like working in the Forest Service. Another at Congressional Research Service was Bob Wolf, who was Assistant Chief of our division and who really helped me in my approach to policy analysis. He taught me how to look at issues—which was very critical for my job there. My sister, who is seven years older than I am, is another. She is an electrical engineer, also in a field that was dominantly male. Both of my sisters are professional women. I guess I never thought of them as mentors, but I must say that they probably were.

WiNR: We usually ask a question about the multiple pressures on the personal life of a fast-track professional.

Backiel: I'm married, we are a dual-career family, no children, and we are

a dual house-work family. We share everything, not just home responsibilities, but a profession as well. I probably couldn't do it any other way, nor would I want to. I don't know how women do it who don't have that. It seems to me that there is now more of a chance for a real balance in both women's and men's lives, because men are taking more responsibility at home for many things, and because women are taking more responsibility in the work place. That is a tremendous change and tremendous progress. The world really is changing with more accessibility to good jobs for both women and men. And it is liberating for men who are given the opportunity to spend time with their families, where that was not allowed them before.

WiNR: Do you bring the personal pressures of work home with you?

Backiel: I have had a lot of people ask me since I have been in this job: how can you do it? it must be overwhelming? You can let it become that, but you can also take control and try not to let it do that to you, too. You have to work at it. I have had to work at maintaining a balance in my life, but I am very committed to it. And it means a lot to me, as I think it should mean to everyone.

WiNR: If you could give advice to younger women on the way up, what would it be?

Backiel: I want to encourage people to take risks. Say what you think, what you believe. Make sure you believe it. Shoot for the stars. Never be just content with something that you might later think is not quite right. Always challenge yourself. Realize that your life is a series of making choices, and understanding what those choices will mean. You won't always understand for the long term, but recognize that you are making large choices for your life, as you are assessing risks in what you do.

Many people don't think that they really have control over their personal lives, of their selves, of their professional lives. They do. People do have control over what they do and feel and where they go and how they get there—both professionally and personally. You just have to realize it, and make sure that you are the one making decisions for your life, including a personal life. Don't settle for anyone less than your soulmate. Always have room for what you love to do. And you can only accomplish that by understanding that you have control over your life. Never compromise your integrity. Always act professionally, with pride and with integrity. That is most important and will get you further than anything else.

WiNR: Well said. You put the burden for success on each individual. You must believe that each of us has the potential for it.

Backiel: I do. I believe that each of us controls our own destiny.

WiNR: What do you do to relax?

Backiel: I like to quilt, but the problem now is finding time to do that. My dogs take a lot of time, and I love them dearly: a Cairn terrier, and a golden retriever. I love to travel. I haven't been to Africa or Australia yet, and I would like to go. I am very interested in archaeology and anthropology and in Native Americans and Native American culture including everything from art to reading. I have a collection of Inuit soapstone carvings, which I just love. I like to read mysteries and novels, but I'd say I read probably just as much nonfiction as fiction. My last best reads were *The Passion of the Western Mind* by Richard Tarnas, and *The Eight* by Katherine Neville.

Sports of all kinds interest me. I rowed some in college and did team sports in high school. Now it's much more individual-type things. I learned to scuba dive when I lived in Alaska, but I grew up fishing with my dad. I love to swim and taught swimming for a while. I both downhill and cross country ski. Right now, I golf when I have time.

WiNR: What does your future look like? You've just gotten well into your job so that's not a fair question—but I ask it anyway.

Backiel: I don't know. I wish I did, because it makes me tremble sometimes. I left a solid, secure job. I suppose I'm like everybody. Sometimes I want to change careers, do something different. At other times, I really feel that there is nothing else I would rather do than natural resource policy. I love it.

Interviewer Daina Dravnieks Apple works for the Forest Service. She is Project Manager for the Directive Reduction Project, with responsibility for implementing an Executive Order to reduce the number of Forest Service Hanbooks by half. Her previous position was Assistant Regulatory Officer, Information Systems and Technology Staff, Washington, D.C. Her 18-year career in the Forest Service includes serving as Management Analyst for the Regional Engineering Staff, Region 5, San Francisco; Regional Appeals Coordinator in Region 5, San Francisco; Economist at Pacific Southwest Research Station, Berkeley, where she published studies on public involvement in land use planning; designed administrative systems; conducted organizational analyses and developed organizational designs; and conducted strategic workforce planning.

Her B.Sc. in Political Economy of Natural Resources and her M.A. in Geography are both from the University of California, Berkeley.

She is the current Secretary of the Society of American Foresters National Capital Chapter, and has served as Chairperson of the Continuing Education Committee; she was President of Phi Beta Kappa for Northern California and served as National Secretary; and she is a member of Sigma Xi Scientific Research Society.

Photos of Adela Backiel these pages:
page 26, fishing in Alaska 1974;
page 27, speaking in Mexico at Mexico-US symposium on Sustainable Forest Management 1994;
page 28, hiking along California coastline 1994 and at Trees for Tomorrow Environmental Education Center in Rhinelander, Wisconsin 1994;
page 29, canoeing with her dogs in Michigan 1992.

THE WILDLIFE HABITAT COUNCIL, HEADED BY JOYCE KELLY, HAS MADE SOME IMPORTANT PROGRESS IN BRINGING CORPORATIONS, SCHOOLS, AND ENVIRONMENTALISTS TOGETHER TO BENEFIT WILDLIFE AND HABITAT.

CORPORATE LANDS: HEAVY INDUSTRY SIGNS ON FOR RESOURCE MANAGEMENT

ELLEN FURNESS

As environmental awareness increases, corporations are examining proactive opportunities to demonstrate environmental stewardship. Pressures from within the corporate structure, from consumers, and from the communities in which they operate, influence corporate policy and provide the impetus to seek alternative means of addressing environmental issues. As corporations look for ways to address these concerns, partnerships between industries, environmental regulators, conservationists, and local communities have evolved to provide a means to forge improved relationships with many of the corporation's constituencies. The interaction allows all parties to learn about issues and begin implementation before they become sources for contention.

Women are playing pivotal roles in bringing these stakeholders together to work on environmental issues. Joyce Kelly, involved in the environmental arena for over a decade, led the creation of a unique environmental organization, the Wildlife Habitat Council. A nonprofit, non-lobbying organization founded jointly by corporations and conservation groups in 1988, the Wildlife Habitat Council (WHC) was established to create opportunities for traditional adversaries to work together.

Below, Rhonda Batiste (Star Enterprise P&GA Associate) seated; Dr. Gordon Anderson, (School District Superintendent); Judy Odell (Principal), Bobby Hood (Star Enterprise P&GA Representative).

WHC seeks to increase wildlife habitat, assist companies in managing their lands to benefit wildlife, provide hands-on environmental education at the workplace, and encourage corporate environmental stewardship. It was up to Kelly, WHC's first employee and President, to put the flesh on the bones of the concept and build support for the value of pro-actively managing corporate lands for wildlife.

In seven short years WHC has grown from a concept to an organization. The Council works in six countries, impacting over 325,000 acres at more than 350 corporate sites. Over 100 corporate members and 19 conservation members participate. Including Kelly, 15 staff work to develop reports, educational materials, and serve as a resource to members.

Programs

WHC membership offers corporations access to a number of services and programs. Most companies initiate their involvement by participating in WHC's core program, *Wildlife at Work*. Since each corporation varies in the number of sites available and in the extent of their involvement, WHC's services are offered on a fee-for-service basis. For example, if a WHC biologist visits interested sites, he or she then prepares an analysis of the potential for habitat enhancement. This Opportunities Report gives specific habitat enhancement recommendations and describes educational programs that can be undertaken by the corporation.

The enthusiasm and excitement generated by employees developing and implementing WHC-projects often carries over into improved job satisfaction and worker morale. Therefore the success of the *Wildlife at Work* program at one site often results in multiple sites within the corporation initiating programs. The benefits multiply for the health of the habitat and the outlook of the employees. Overall, there is then an improved perception of the company by employees and the public.

Wildlife at Work is customized for each site's specific needs,

opportunities, and limitations. It provides corporations with a format to involve employees, community members, conservation groups, and government agencies in wildlife habitat projects and enables the corporation to engage appropriate groups on the project, limit access where necessary, and replicate programs at multiple sites. The successful involvement of corporations in *Wildlife at Work* led to the development of additional programs and extended services at WHC.

WHC's *Corporate Lands for Learning* builds on the relationships established between the site and the community and offers environmental education opportunities to school groups. The sight of bird boxes at a mine quarry may seem incongruous to some, but nest monitoring programs are just one of many WHC-sponsored habitat projects in place at companies today. WHC representatives attend meetings—involving the corporation, local school officials, land managers, and environmental regulators—to facilitate discussion and generate a consensus on a desired course of activity. Environmental partnerships result and the local community benefits. Students from kindergarten through high school learn environmental principles, practices regarding mine reclamation, land restoration, and revegetation. They might build nature trails and develop interpretive programs. It is an opportunity to demonstrate the meaning of sustainable development.

Partners in Education takes a similar program *to* the schools. Wildlife team members from sponsoring corporations provide the experience and resources to develop habitats on the school grounds, providing year round opportunities to observe wildlife.

Wastelands to Wildlands examines wildlife potential of degraded sites, remediated, and SuperFund properties. Often these sites can benefit wildlife and be adapted to serve as a habitat resource.

Waterways for Wildlife pulls together corporate sites and other landowners within a specific watershed to examine corridor-wide habitat issues in order to coordinate regional habitat management plans. WHC's role in the programs is to link resources and tap the potential of lands not currently managed for wildlife.

Specific corporate programs and key women in them

Women working as site managers, environmental specialists, teachers, and directors, in particular, have been influential in promoting WHC's environmental programs at corporations and in the community. In addition to enhancing natural habitat, corporate women are finding that the many hours spent outside their regular duties in planning meetings, trouble-shooting, and volunteering pay off in increased environmental awareness. These benefits are good for the corporation's image, and create a better working environment.

•*U.S. Steel's STEP.* One such effort is U.S. Steel's *Adopt a Wetlands* program at its South Taylor Environmental Park (STEP), a landfill for non-hazardous steel-making by-products, in West Mifflin, Pennsylvania, south of Pittsburgh. The 550-acre South Taylor site has been used for the disposal of iron- and steel-making by-products for local U.S. Steel plants for over 90 years. After almost 10 years of preparatory study and design, the STEP facility began opening under Pennsylvania Department of Environmental Resources permits in November 1993 with strict quality control and environmental safeguards.

Through the hard work and determination of U.S. Steel employees, teachers, administrators and parents, this landfill site became a hands-on environmental learning center for local school students. A new one-acre wetland is located adjacent to existing natural wetlands, fed by a spring near the operating landfill. Susan Kapusta, Manager-Recycling for U.S. Steel, and teachers like Joy Kretzler from Baldwin-Whitehall School District, have been influential in creating it. Kretzler's efforts not only initiated the *Adopt-a-Wetlands* program but also led to increased contributions from local companies, in-kind gifts, volunteer labor, and professional advice.

Jacquie Gabel, the landfill's manager, is primarily responsible for safety concerns and removal of potential hazards; the landfill only accepts non-hazardous wastes and all operations are carefully monitored. As the landfill manager, she is the on-site contact when the school children visit. "The four acre area is home to a wide variety of birds, reptiles, mammals, insects, grasses, and plants. The site is surrounded by dense woods; there is no hint of any commercial activity nearby, much less an operating landfill. It is an ideal spot to teach the value of environmental protection to our youth," says Gabel.

US Steel's South Taylor Environmental Park program has been successful in more ways than one. STEP provides a place for teachers to lead students in a variety of projects as diverse as environmental cleanup, construction of an observation deck at a pond, planting of a butterfly garden, Earth Day activities, and building bluebird nest boxes. Once a month, Joy Kretzler brings her Paynter Elementary students to South Taylor to identify birds, discuss waste cleanup, and teach the importance of wetlands. She uses the corporate site to demonstrate biological principles—ecosystems, pond water sampling, and monitoring bird populations. She brings in art, history, and music as part of the curriculum.

CERTIFICATION

Wildlife Habitat Council (WHC) certification is specific to each site, and qualifying requires a habitat management plan for the site, a year minimum of documentation of the project, a site visit by a WHC biologist, and photographic records. Qualifying sites must reapply every two years. Designation as a certified corporate habitat provides third-party credibility to the habitat projects, demonstrates commitment to the program, and sets a standard for monitoring and maintenance of their habitat enhancement efforts. U.S. Steel, for example, was one of the founding corporate members of WHC and has a close relationship with the organization through several active sites.

Certification of habitat sites is issued to corporate sites that meet specific criteria and submit documentation of their wildlife projects. Of the 350 plus sites in the program, 110 qualify for certification and are listed in WHC's *International Registry of Certified Corporate Habitats.*

The South Taylor Environmental Program has also promoted community involvement and communication between teachers, parents, and industry. Questionnaires were sent to the parents of students at Paynter and the feedback was highly positive. The overwhelming response was that "the program is a winner."

In addition to STEP, these women are actively involved in other community works including recycling programs, town clean-up, and other volunteer efforts. Kapusta, for example, works closely with the company's mills, purchasing, shipping, customers, others in the industry, and government groups to make recycling happen. She also actively promotes environmental awareness through educational activities, community service projects, and employee involvement programs.

•*Save the Dunes Council, Inc.* Grassroots environmental organizations led by women are also working with WHC to encourage environmental stewardship within industry. Save the Dunes Council, Inc. is striving to help save Indiana's remaining savanna oak dunes habitat. Savanna and dry habitats have come under the most disturbance from development and agriculture-related activities, and only patches of high-quality oak savanna (about 0.02 percent) remain throughout North America.

Charlotte Read, Assistant Director of Save the Dunes Council, has been repeatedly recognized for her efforts to preserve Indiana's Lakeshore Dunes. Her diligence resulted in the designation of the Indiana Lakeshore Dunes as part of the National Park system in 1966 and in the continued expansion of its boundaries over the past three decades. Much of Gary, Indiana is heavily industrialized and Charlotte's advocacy efforts brought her head to head against U.S. Steel over a small section of pristine savanna oak dunes along the Indiana lakeshore *within* U.S. Steel's Gary Works steel plant.

Joyce Kelly learned of the dispute through contacts at U.S. Steel; she stepped in to look for common ground for the two adversaries. Today, both groups are working at the table and in the field to preserve the dunes, and to protect a wooded area for endangered Karner's Blue Butterfly. All sides have gotten to know each other and now negotiate when they have differing perspectives to discover options that provide win-win solutions. Over 100 species of birds have been sighted at low-lying ponds between the dunes, as well as numerous plant and animal species such as wildflowers and butterflies. Peregrine falcons nest at the Gary Works facility and are monitored by the corporation's wildlife team and local bird watchers visiting the site. WHC has helped both groups in the implementation of habitat management and wildlife programs, including the locally acclaimed Peregrine Falcon Program.

Save the Dunes Council became WHC's first local conservation member and has assisted on a number of other WHC projects. Charlotte Read has spearheaded many of the habitat management activities in Gary, Indiana including monitoring of bird populations, erosion control, and enforcement of pollution controls.

•*Browning Ferris Industries and Katy Wildlife Habitat* Browning Ferris Industries (BFI) is one of the largest waste management companies in the country and has instituted wildlife programs at a number of landfills. These programs restore closed sections of the landfills as habitat.

BFI's Katy Wildlife Habitat varies from the usual application of WHC's programs. The 405-acre tract of unused land, situated 20 miles outside of Houston, is being restored by volunteers and BFI employees to recreate the original tall grass pothole prairie of South Texas. The majority of prairie habitat in North America has been converted to agriculture, and less than one percent of the original remains. Once heavily farmed and over-grazed, this WHC certified site has undergone major changes. The wildlife team, primarily women leaders and volunteers, are working to create and enhance natural prairie and riparian woodlands to provide wintering habitat for migrating waterfowl.

Joan Eckerman, BFI Marketing Programs Manager and Project Manager at BFI's Katy wildlife area, has taken the lead in promoting active management and enhancement. She supervises four project leaders and their wildlife teams. In addition to her regular job of promoting BFI's community projects and waste management services, Eckerman spends 20 percent of her work-time dealing with the Katy Wildlife Habitat, handling neighbor relations, budgeting, and resource deployment. "My responsibility is to oversee habitat management and to get volunteers out there," she says. Without an operating facility on the site, one of the biggest challenges is motivating volunteers to travel out to the tract. She hopes that through her efforts with BFI employees, and her environmental marketing in the community, she can establish cooperative relationships and promote sustainability.

In addition to volunteering herself, Eckerman coordinates four project leaders who are assigned to a specific area of the Katy Wildlife Program: nature trail management, prairie restoration, species management, and community partnership and education. Often, the team devotes entire weekends to trail maintenance, habitat construction, and education activities. Myra LaPierre, steers the nature trail committee, installing trail markers, cleaning up brush along the trail, and placing wood duck boxes. With the help of the Houston Audubon Society, a one-mile nature trail was created to encourage projects such as bird species identification, nest box installation and monitoring. A reforestation project in the outlying wet area provides an area for bird watchers, eagle scouts, and raptors to coexist.

Debbie Figueras, BFI Ground Water Analyst, is a highly motivated project manager overseeing the Partnership Program. Primarily, Figueras' work at Katy entails the development and design of the Katy Prairie Wetlands Mitigation Project for the prairies, comprising 367 acres. She works with the Army Corps of Engineers, Texas Agriculture Extension Service, and other agencies. The mitigation plan has involved four months of work to delineate wetlands, survey the area's archeology, and get the go-ahead for site preparation and tillage.

The upcoming grading plan to create potholes and restore prairie will involve more months of work followed by seeding with a variety of native prairie grasses in the spring. Figueras often spends several hours after work reviewing and organizing the program from BFI; she makes a few trips out to Katy, 20 miles away, several times a month to check on team projects.

•*Star Enterprise, wildlife and schools.* Star Enterprise, one of the first corporations to become involved with WHC, has demonstrated a long-term commitment to habitat improvement and wildlife programs. In particular, employees at the Port Arthur Plant along the coast of southeastern Texas have implemented a WHC-designed marsh/swamp management program to provide habitat for migrating birds and educational study areas for local school groups. The site, WHC

certified since 1992, includes a rookery for eight species of birds including little blue heron, yellow-crowned night heron, great egret, roseate spoonbill, snowy egret, and oliovaceous cormorant.

Rebecca Demeter, senior project chemist in the Environmental Health and Safety Division at Port Arthur, coordinates the wildlife team. Her primary duties involve maintaining water levels of marshy areas and encouraging the growth of vegetation preferred by birds like mottled ducks, bellied whistling duck, and blue and green-winged teals. Demeter also works to improve wetland habitat for birds, and most recently, conducts water quality assessments and studies to determine whether sludge is detrimental to birds at the site's Alligator Bayou. "The rookery has become a point of pride among the employees. The Texas coast provides critical habitat for migrating birds and our employees are enthusiastic about Star's commitment to maintaining this sanctuary immediately adjacent to our refinery," reports Demeter.

Employees and volunteers monitor bird populations and fledgling survival rates each year and pass this important research data on to Cornell's Lab of Ornithology to provide information on species recovery. Star Enterprise's accomplishments have received praise from the U.S. Fish and Wildlife Service, as well as visits from renowned ornithologist Roger Tory Peterson. Peterson visited in conjunction with WHC's Wildlands Conference March 1994 when the site was featured as a part of a field trip for conference participants.

Star Enterprise is not only an environmental steward on its own premises, it has expanded its commitment to include wildlife programs at nearby schools. Star initiated the first of WHC's *Partners in Education* programs in Houston. Lacking land at their corporate facility in downtown Houston, but driven by the employees interest in sharing the success of the programs at the Port Arthur facility, the company opted to take habitat enhancement to the schools by creating environmental education opportunities on school grounds.

Rhonda Batiste has been active in coordinating the environmental partnership between Star Enterprise of Houston, WHC, and the Spring and Aldine Independent School Districts. As public affairs associate for Star Enterprise, Rhonda is responsible for coordinating the efforts with the school districts. She holds workshops to help teachers develop proposals for the program, coordinates volunteer events, ensures that the proper materials are available to the environmental education centers, and is the central liaison between the schools and Star Enterprise.

Eight schools are participating in the programs. WHC developed the criteria for schools to qualify, reviewed curricula, and provided recommendations for enhancement habitat at the schools. Projects range from enhancing nature trails and creating wetlands to planting native wildflower meadows. Elementary, middle, and high school levels are involved in the program. "The children are thrilled with the projects, parents and employees have been working with them to plan and complete the projects and the enthusiasm is inspiring," says Batiste. Star Enterprises is working towards WHC certification for the schools through work days with teachers, students, and community volunteers, and by providing assistance with after-school wildlife management projects.

Vision 2000

The efforts of employees volunteering their services and reaching out to the community through wildlife enhancement and school programs are helping to create corridors for wildlife and restore habitats. WHC's vision for the next century is to work toward sustainable development with corporations playing a major role. Corporations' wildlife programs are continually earning WHC certification and expanding to encompass more habitat.

The women described in this article continue their environmental activism. Susan Kapusta is working to promote environmental education partnerships at other US Steel Facilities and school districts. As a WHC board member, Charlotte Read is an active proponent of WHC's habitat programs and continues to share the program with industry in Indiana. Joan Eckerman is recruiting more committed volunteers to work on projects. Rebecca Demeter tracks bird populations at Port Arthur in Texas and ensures that the data about them continues to accumulate while the habitat improves. With the help of Star Enterprise employees and Rhonda Batiste's leadership, the building of a nature trail and development of interpretative materials at Oak Creek Elementary and Dueitt Middle School in Houston have been completed.

The managers featured in these companies are a small number of the women helping to foster environmental stewardship in the corporate realm. Instead of environmental regulation and enforcement of wetland mitigation, the wildlife habitat enhancement programs discussed above are working to enhance larger habitat areas and promote sound environmental responsibility. Companies are now actively seeking ways to go beyond compliance and are becoming resources for the community and corridors for wildlife.

At the time of writing this article, Ellen Furness was a Research Assistant for the Wildlife Habitat Council. Her Master's is in Ecology and Conservation from the University of Colorado-Boulder and her Bachelor's in Biology is from Colorado College. She has worked at the Nature Conservancy, World Resources Institute, Defenders of Wildlife, National Institutes of Mental Health and La Selva Research Station in Costa Rica performing biology and ecology related research. Furness' projects include analysis of human impact on the foraging activity of riparian birds, sources of water pollution in the Chesapeake Bay, evaluation of water management projects in developing countries, and endangered species. Furness is currently at the University of Colorado doing research.

We provide information and ideas for, from, and about women professionals who specialize in fisheries, forestry, wildlife, range, recreation, soils and the social sciences as they relate to natural resources. Our contributing authors are women in management, in federal and state agencies, on faculties, in labs, and women who do consulting work. They write about themselves, their research, their jobs, administrative positions—and about getting ahead.

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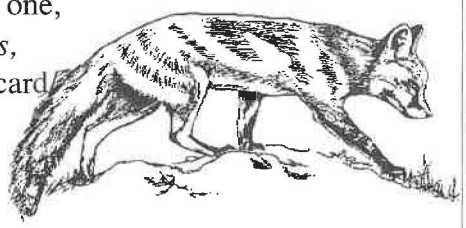

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ONE SECTOR OF THE FARM COMMUNITY IS *GROWING* SLOWLY. THAT IS THE FEMALE SECTOR. A NEW SELF-HELP ORGANIZATION ASSISTS NEWCOMERS TO THE BUSINESS END OF FARMING GET ACQUAINTED WITH IT.

NEW REALITIES: WOMEN & FARMING

MARLENE MUCHOW

When considering all the talk about the declining numbers of farmers and farms in the United States, it seems fair to remember that one gender of farmer is increasing. In 1992, the Census of Agriculture of the US Department of Commerce reported a small, steady incline from 1982 to 1992 of female operators and the acreage they operate on—and a steady decline of male operators and acreages. In some cases, women simply inherited the land to operate. (Personnel at the Missouri Agricultural Statistics office speculate that these figures could indicate that stress and overextension on credit since 1982 may have caused early death in males—perhaps some from suicide—at the same time that women enjoyed better health and lived longer lives.) But inheriting land isn't the whole answer.

Some women also developed a different attitude and chose to own/operate their farmland. A good 60 percent of the women in Montgomery County, Missouri, where I live, are involved with some type of tillage work. When asked a few years ago, most admitted to feeling comfortable driving the tractor and working the land. At the same time, they said did not want to deal with NRCS/ASCS offices. This meant that despite this increased participation in farm operations, the major decisions continued to be determined by males—tenants or operators.

How to counter this reluctance to deal with local officials intrigued a group of women in Missouri including NRCS District Conservationist Tammy Teeter and me. We began a new and innovative program called Women's Ag Awareness. By participating in the group, women are becoming more involved with soil and water conservation plans and compliance on their farms and they are less intimidated by government programs.

Many women admitted to us that they had extreme discomfort even when entering the doors of the NRCS office, much less asking what they considered to be confusing questions. They also confessed that many times, they felt they were being taken advantage of on decision making because they did not understand the terminology and the issues at hand. And there were other problems: when money was due to the female land-

Date	Operators	Acres Farmed
1982	Female 5,780	954,276
	Male 106,667	28,312,333
1992	Female 7,117	1,389,063
	Male 90,965	27,157,812

Data from Census of Agriculture, Department of Commerce (1992)

owner through cost-share for trying no-till, she was sometimes misinformed by her operator and told the money was due him because he had done the no-till and this would help pay for his equipment. Some women allowed their operators hunting and wood cutting rights only to find out that they had sold timber to others and rented out the hunting rights. Their knowledge of soil tests and fertilizer requirements was inadequate. Was their operator working for their benefit or his own when following certain practices?

By talking to other women at Women's Agricultural Awareness meetings, those who were intimidated by the system were able to understand some of the things they needed to know and do as an owner/operator and those which were not necessary. They learned about fertilizers, crop yields, conservation practices, no-till, and were exposed to other basic chunks of information. The women who learned these things first, regardless of age, acted as role models to others as time went on. Age does not make a difference to those who must pick up the decision-making load—it is the attitude "What does it take to get the work done?"

How WAA started and was organized

A letter of invitation was sent to 24 women asking if they would like to serve on a committee to plan quality programs and field trips for interested county women. These 24 women were selected to represent different parts of the county, different age groups, different professions, and those who we knew could get the job done. Twelve women met and formed a support group. They were teachers, school board members, bank officers, homemakers, ASCS, SCS, District and Extension personnel, and farm owners. All of them did not want to waste their time. They lead double and triple lives: raising children and tending the home, holding jobs, and helping with farming. The depressed farm economy has forced many men off the farm as well to work at a second job so the family stresses are many.

One reason for the success of the WAA Program is that we agreed to make it worthwhile for busy people to come out at night—it had to be educational (not just a social event) and at the same time, enjoyable. At the preliminary planning meeting, it was agreed to sponsor one program and gauge the success from a questionnaire entitled "Where are we heading?" It was also decided that WAA would be self-supporting and that members should be willing to pay a small fee.

As it has worked out, members of the committees take the fliers and post them in their own towns, then sell the $5 tickets for the dinner held usually in a no-cost public hall. The meetings move from town to town in Montgomery county. We have had co-sponsorship from NRCS to help with postage and fliers.

The programs

Dr. Bea Smith, Dean of Human Environmental Sciences from the University of Missouri, was the speaker for about 50 people at our first program held in November 1992. She is a senior Dean at the university and continues to manage her family farm near Sioux City, Iowa. So she lives the role she talked about: "Holding up half the sky while dancing on a tightrope." She matter of factly explained how to read and understand a farm plan and talked about other soil conservation methods. She reminded the women that agencies who talk only to men don't do the men a service if their wives are the ones doing the tillage.

Another well-attended talk by attorney Kurt Voss stressed living wills and trusts, and how to hold on to the family farm. As a young man, Voss had worked as a SCS coop student, so his knowledge of agriculture and law provided practical insight to those who face inheritance legalities.

The magazine *The Land* reported that in 1993, there were nine farm fatalities in Minnesota where a single study was conducted. Frustrated farmers all over this country work long hours to complete tasks on time. They are angry and stressed over delays and impediments. Since stress is so prevalent, ruining health and relationships, Jonathan Finck was asked to present a special program on "Stress and how to manage it." He is the

Director of the Columbia Arthur Center and author of the Helpline Advice Column in the *Farm Journal* magazine. He was also a counselor at the Montgomery County R-II School system. His advice: take breaks away from the farm, spend quality time with your family on a holiday. When feeling irritated or threatened, talk to someone who listens—a family member, a friend, or if it is very serious, a professional.

Women admitted they never felt very comfortable attending formal Field Days as they were geared to men. Now every effort is made to see that an alternate program for women is provided. Programs have been well attended for ones such as "How to attract wildlife to your backyard," and a first-aid for accidents program called "First on the scene." In another Field Day presentation, Dr. Brian Knowles, Principal of a local middle school and volunteer to the US Fish and Wildlife Service, explained how he participates in the USFWS breeding bird survey program featured in *National Geographic.*

The success of Women's Ag Awareness programs has earned the group a great deal of publicity throughout Missouri through articles in the *Missouri Ruralist* and the *Missouri Resource Review.* As a result of the success of the effort in getting women out and included, WAA members now tour with the men for the intensive grazing systems talks, the new fencing methods discussions, or warm season grass plantings showings. And men regularly attend the alternative programs originally designed for women.

To get started: simple suggestions

1. Identify a need for a Women's Ag Awareness group
2. Select a planning/steering committee
3. Identify support/funding groups
4. Have a trial meeting to gauge response.
5. Determine if there is sufficient interest to continue.

The affect on women in the county

Karen Clark, a homemaker/teacher/volunteer and now Chair of WAA, remembered giving her farming husband and son a lot of unwanted advice before she learned what a farm plan is and how to measure residue. She regularly attends field days and now her advice is listened to. Another WAA member, Muriel Kaiser, became a candidate for a position on the Montgomery County Soil and Water Conservation District board. She lost the first time by a small margin but feels she opened the eyes of many to the possibility of someday having a woman earn a seat on the board. Richard and Margaret Van Beek were partners in everything from putting up hay to the feeding and care of their livestock. This past year, due to increasing health problems, they have rented their land to a trusted neighbor. The future for them as they age will probably include relying more on the operator while still maintaining their rights as decision makers. Richard believes that more men should attend the WAA meetings to help married partners into these transitions.

According to District Conservationist Tammy Teeter, "Our NRCS office records reflect a steady increase in the participation of women landowners. We now see husbands and wives come in together to review their conservation plans and apply for cost-share assistance. Even though all programs presented through WAA are not entirely ag-related, I feel that we are building a rapport with women through WAA and opening communications. This makes them feel comfortable in asking any questions related to their farming operation."

Success spreads

Women and their families in Ag Awareness are not the only ones who have benefited from heightened awareness and these new sources of training and information. The community benefits, too. Women involved in the program volunteer as poster contest judges, resource persons at school tours, and as teachers' consultants for soils and related information.

The WAA committee members and NRCS staff who have been involved have been invited to other counties in Missouri to present programs on how to get WAA started. As a result, 15 other groups have been established. I have presented programs at the Missouri Association of Soil and Water Districts Training Conferences and a North Central Region Leadership Conference for eight states; the information has been enthusiastically received. Gary Hoette, University of Missouri-Columbia Extension Agronomist, feels the program provides a needed service and is very pleased to see women at Field Days. The local District Board has heartily endorsed our work, lending their moral and financial support ($300 at last count); they see it as a sensible community undertaking.

Marlene Muchow has been employed by the Montgomery County Soil and Water Conservation District for the past 17 years. She started as a part-time District Clerk, then became District Manager. During her tenure, there have been many awards: among them, the 1985 Missouri State Award for Environmental Conservation Education sponsored by NACD/Allis Chalmers; outstanding assistance to both SCS and the SWCD Board; Skills Development Task Force member; panelist on satelite video conference training on supervisor's responsibilities. With her leadership in conservation education, the District was grand award winner in the 4th Goodyear Conservation Awards.

Photos these pages: On the combine from left to right front row is Linda McCoy, ASCS ACP Clerk, author Marlene Muchow, Montgomery County SWCD Manager, Muriel Kaiser, farmowner/operator and past Chair of WAA. Top row, left to right, Tammy Teeter, NRCS District Conservationist and Gloria Leverett, farmowner/operator and co-Chair of WAA.

Ag Attorney Kurt Voss addresses WAA on how to hold on to the family farm.

PEOPLE

Betsy Rieke, Assistant Secretary for Water and Science, U.S. Department of the Interior, was instrumental in leading the effort to establish water quality standards and related Endangered Species Act protections for the Sacramento-San Joaquin Delta/San Francisco Bay. Most of the historical powerful interests were tired of fighting for the estuary water and agriculture and urban areas needed assurance about the supplies to their constituents. Fish & Wildlife Service, EPA, Bureau of Reclamation and National Marine Fisheries Service signed and so did California's powerful business community and recreationists.

Patricia L. Andrews, Fire Behavior Project Leader at the Forest Service's Intermountain Fire Sciences Lab in Missoula Montana received the Service's Superior Science Award. Andrews and her team have developed programs for computers that fire behavior analysts use to help combat big wildfires. The complex mathematical models inside computers help firefighters predict how fast fires grow and how dangerous they can become. Her Master's is from the University of Montana in mathematics and computer science.

For months, personnel decisions in the Washington Office of the USDA Forest Service have been on hold due to hiring freezes and deferments. But Chief *Jack Ward Thomas* recently announced assignments for new Forest Supervisors and Deputy Forest Supervisors, among them many women. They are: *Conny Frish*, Forest Supervisor (FS), Kaibab National Forest (NF); *Sandra Key*, FS, Bridger-Teton NF; *Janette Kaiser*, FS, Manti-LaSal NF; *Roberta Moltzen* FS, Mount Hood NF; *Louise Odegaard*, FS, Shawnee NF; *Debbie Austin,* FS, Beaverhead NF; *Karyn Wood*, Deputy Forest Supervisor, Shasta-Trinity NF.

In December 1994, U.S. Fish & Wildlife Service Director *Mollie Beattie*, and White Mountain Apache Tribal Chairman *Ronnie Lupe*, signed an historic Statement of Relationship defining government-to-government relations involving natural resources conservation on the Fort Apache Indian Reservation in Arizona. The tribe has sovereign rights to manage natural resources on reservation lands, including endangered species. The tribe will take an ecosystem approach to the management of natural resources that will consider its cultural, spiritual, and natural resource heritage.

The National Park Service has selected *Kathryn Cook* for the Bevinetto Congressional Fellowship for the 1995-97 term. She will serve as a legislative affairs specialist for the Park Service under the guidance of a professional staff member for the US Senate Committee on Energy and Natural Resources in Washington DC. Cook's most recent position was Chief of Resources Education at Apostle Islands. Last year's winner was *Sue McGill*, formerly Superintendent at Timpanogos Cave National Monument, Utah.

Kathleen Connelly is the new Deputy Chief for Administration, USDA Forest Service. She comes to the position from Acting Director of the Human Resources Division for the USDA's Consolidated Farm Service Agency. Prior to that, she was the Assistant Manager for Administration at the Federal Crop Insurance Corporation (FCIC) for three years. Connelly also worked in USDA's Office of Personnel and the Department of the Navy. Her Bachelor's is from Wheeling College, West Virginia.

BOOKS

Reviewed by Jonne Hower

Iron John
by Robert Bly

Men and the Water of Life:
Initiation and the Tempering of Men
by Michael Meade.

Books about heroes are a hot commodity. Books about "men finding themselves" by going into forest retreat settings and doing group-oriented work seem to be multiplying. In two books I read recently, men examine their lives in the context of myth and hero, symbol and symbolism, in an attempt to find meaning.

Both books are based on the two authors' expereiences while working with men in workshops and conferences. Michael Meade acknowledges his own work began when Robert Bly invited him to teach drumming at a workshop. "That workshop was one of the first gatherings of its kind....[M]ost of the men attending had little or no experience with drumming, myths and symbols, or initiation and ritual. But that was due to change," Meade wrote.

Iron John. Robert Bly. (Addison-Wesley Publishing Company, Inc. 1990.)

Iron John is the name of a fairy tale first written down by the Grimm brothers (of weird story-telling fame), but the legend itself, according to Bly, could be ten or twenty thousand years old.

The tale of Iron John, a "wild man" found lying on the bottom of a pond, his display in a cage at a local castle, his escape with the assistance of a young prince, and the young prince's lessons, trials, adventures, and ultimate return are related. Of course, along the way, the young prince has the support, advice, and funding of the be-friended wild man.

In seven chapters, Bly uses the ancient story as example, metaphor, or clarification for many points in modern men's growth and development. The final chapter of the book provides an overview of the "wild man" motif as it appears in ancient religion, literature, and folk life. An epilogue presents the complete Grimm fairy tale, from beginning to end.

Bly returns often to the theme of initiation as a "rite of passage" for boys and how modern society fails to provide it. He writes: "The boys in our culture have a continuing need for initiation into male spirit, but old men in general don't offer it... The fault of the nuclear family today isn't so much that it's crazy....[t]he fault is that the old men outside the nuclear family no longer offer an effective way for the son to break his link with his parents without doing harm to himself."

At his best, Bly uses the story of Iron John to illuminate the need for society to define the word "masculine" and what it means to be a man in this time. "Many men say...they literally don't know what the word man means, nor whether they are grown men or not." Although Bly doesn't provide a definition, he encourages each man to develop meaning for himself.

At his worst, though, Bly whines. "During the sixties.... many young men...tried to accept initiation from women. But only men can initiate men, as only women can initiate women. Women can change the embryo to a boy, but only men can change the boy to a man. Initiators say that boys need a second birth, this time a birth from men."

Men and the Water of Life: Initiation and the Tempering of Men. Michael Meade. (Harper San Francisco, 1993.)

In a foreword, Meade explains his choice of artwork: "The salmon on the cover represents the Celtic "Salmon of Knowledge" that gains wisdom while swimming in the sacred pool amid the nine trees of knowledge... [W]hoever could catch a Salmon of Knowledge would be flooded with inspiration by one taste of it." The wisdom of *Men and the Water of Life* is not yielded up so easily to the reader.

Some of the same stories and myths show up in *Men and the Water of Life* as in *Iron John.* It seems to me, though, that author Michael Meade uses the same technique of telling a story or myth and exploring how it might be lived out in men's lives with more subtlety. "Working with stories is like waking up over and over again in separate parts of the forest. As soon as we have glimpsed the treasures of one story, we wake up in another one. The orientation shifts...."

Each of Meade's book's six sections begins with a story or myth. The four or five chapters in each section provide explanation or illumination about the stories. Sometimes Meade distills large concepts into interesting turns of language. For example, in Part One: The Road of the Two Fathers, Meade writes, "On the road of the fathers, the task of the son is first of all to survive.... There are always questions about fathers and questions for fathers. Sons are always in quest of something and fathers are always in question."

Ranging between his own personal revelation and generic examples, Meade examines initiation by both fire and water. Both, he maintains, are necessary. "Initiations by water may precede or follow those by fire. Men go back and forth between the two in the tempering process.... In the shadows of the bright, burning stories of accomplishment and direct powers lie the waters of self-reflection."

I have long resisted reading these types of books. After reading two, I now wonder if men resist reading "feminist literature" as strongly. And, if they react as strongly as I did. These are books to read, ponder, and discuss with both men and women. The reading, pondering, and discussion could illuminate the similarities of both gender's experience.

Jonne Hower is a Women in Natural Resources *editor.*

"WHEN YOU TREAT SURPRISE AS A FAILURE, YOU NOT ONLY DON'T LEARN ANYTHING, BUT YOU KEEP PULLING BACK, GETTING MORE CONSERVATIVE—TAKING LESS RISK, DOING LESS INNOVATION, AND SOLVING FEWER PROBLEMS."

NATURAL RESOURCES CONSERVATION SERVICE: INTERESTING PAST, GREAT FUTURE

R. NEIL SAMPSON

There is a simplistic Confucian notion that says, when one sets out to do the impossible, one nearly always fails. Agencies like NRCS (formerly SCS) sometimes embark upon the impossible at their own initiative. At other times, they are sent on impossible missions by others—usually Congress. In still other situations, agencies, as well as people, embark on plausible courses of action, only to have the surrounding environment turn nasty and inhospitable, at which point they must either have the good sense and flexibility to change courses, or run the risk of failing. To the extent that history teaches us how to evaluate failure, perhaps we can use those lessons to successfully avoid similar situations in the future.

Further thinking about this topic led me to divide some of these lessons into three categories—political, technical, and failure to adapt to change. Nearly all of these are impossible to judge in the present sense, but maybe some lessons from history will at least sharpen our senses.

Political

In looking for an example where the agency set out to do the politically impossible, one does not need to look far from the very beginnings of the NRCS as an agency within Agriculture. Here, as part of the standard soil conservation district act sent out from USDA and President Roosevelt to the states, was the idea that states should enact, and conservation districts *should enforce*, land use regulations as part of the new conservation program. The result, as we know, was that very few states accepted that part of the suggested legislation and, in those that did adopt the idea of regulations, none really survived any serious attempt at implementation. Land use regulation as part of the early soil conservation district program wasn't politically feasible, and it didn't fly.

Since that time, a variety of efforts have been made to adapt some kind of mandatory or regulatory approach as a backup to the voluntary soil and water conservation program. Most have been resisted by the agricultural constituency of the agency, and controversy has made many of these efforts difficult. That continues to this day.

But at the heart of the matter lies some elements that are hard to dispute. A voluntary program, even with economic incentives, never works 100 percent. There are "bad actors" in virtually any situation who can, like bad apples in a barrel, spoil the effects of an otherwise good program. Their actions can result in soil erosion and water pollution sufficient to foil local goals, and their intransigence can send the signal to otherwise-willing people that its really OK to ignore the local conservation program. Thus, it seems difficult for even the most dedicated advocate for education- and incentive-based programs to totally avoid the need to consider a regulatory element. The trick is, how do you make that element politically workable? Some recent ideas seem to me to be taking a plausible track.

First, to the extent possible, make the regulation truly a "bad actor" control. Where possible, don't penalize good people for doing good things, and don't hassle them either.

Second, where possible, have the regulation adopted and enforced by local, state, or federal general government. There is a role for peer oversight, such as can be provided by a soil conservation district, but the record isn't very positive where farmers on district boards are charged with designing and implementing regulations on themselves. Its better to get the basic legislation out of the general law-making body, and to let the general government and courts have the final say in enforcement proceedings.

Third, where possible, keep the role of NRCS and the conservation district as that of the neutral, third-party measurement and verification service. Here, the local officials as well as the local technician can work to adapt to local conditions, provide some common-sense leavening to the effort, and work to assure both the regulated people and the public that a fair and impartial effort is being made.

Now, it is easy to find examples where other approaches have worked, and are working. I simply offer these ideas as a framework that might have a better-than-average chance.

Technical

You also do not need to look far, in my opinion, to find good examples of where the agency was set off on an impossible mission because it lacked the technical tools to do the task. The early years of swampbuster provide a recent example. In 1985, as the consideration of the Farm Bill neared its close, the conservation coalition that had formed around such ideas as sodbuster and conservation compliance was experiencing considerable success, and growing in confidence. With little time for preparation and consideration, the swampbuster program was proposed and adopted as an extension of the sodbuster logic into the issue of wetland conversion. To many of us working with the Farm Bill effort, it was a serious mistake, but the momentum was so great it was virtually unstoppable.

The problem didn't lie with the goals—by then, it was impossible to find

anyone who did not recognize that the conversion of wetlands was a serious issue that needed to be addressed. Nobody, at least in the circles with which I was familiar, was advocating continued wetland conversion. What gave some of us problems, however, was the knowledge that the technical definition of wetlands was still a matter of very serious dispute.

In addition to a definitional problem came an equally-serious identification problem. Methods were not available that would support an NRCS field person when they were charged with making a field identification in many kinds of situations. The potential was plain to see—serious conflicts and problems at the field level that could harm the agency's credibility, not just on the wetland question, but on virtually all technical matters. But Congress, prodded by environmental advocates, accepted the swampbuster program as proposed. Unfortunately, programs designed by idealists are not always possible to administer, and where they're impossible to do, the agency tends to fail. There was one meeting of that conservation coalition that I remember vividly. Of about 25 people in the room, all vigorously engaged in debating and shaping the programmatic details that SCS would end up administering, only two had ever had any field experience of any kind! Norm Berg and I anchored one end of the table, and periodically tried to point out what could and could not be done by the agency and its partners, but we were a minority, and too seldom won the debates. And then, almost inevitably, the agency will suffer intense criticism from those people and organizations who set it upon the course of certain failure. As I watched the next few years of controversy swirl, I felt sorry for my SCS friends. They had been handed an impossible task, and the inevitable backlash occurred with great frequency.

Failure to change

I'd like to switch now to some ideas about failure to adapt to change, or failure to seize opportunity. This is where, it seems to me, a strategic planning effort based on a historical context can be most helpful.

Let me start with an axiom that you may dispute, but which I suggest holds true. As organizations get bigger, and older, they tend to become less flexible and adaptive, and less likely to recognize and seize opportunity. This can hold particularly true for federal agencies, which have many more outside constraints placed upon them than the average private business or organization. It is only through exceptional efforts in leadership, organization, and management that a federal agency can maintain its agility, adaptability, and mission focus.

In the 1980s, I read extensively about SCS while doing research for my books. What emerged is the picture of a young, brash, bold, risk-taking organization that was mission-driven and dedicated to showing results. In the 1930s, SCS marshalled skilled people, set up CCC camps overnight, and tackled problems on the land for which there were few, if any, instruction books. They tried things, and if those things worked, they tried them again. If they failed, they either changed or abandoned them. Out of that early experience grew not just an organization, but a technology—soil and water conservation—that had not previously existed. Another important result was an organizational culture—a problem-solving, can-do attitude that fortified both internal morale and external reputation.

But that changed over time, as might be expected. As the organization matured, and both society and technology changed, the approach began to be more and more risk-averse. Where people innovate, they fail a certain percent of the time, and if failure is no longer tolerated within the organization, innovation ceases. At that point, "standards" begin to take over, and there's a "right way" to do everything, and that "way" is in some technical guide or policy somewhere. Whether it fits the land, or solves the problem, may become less important in the agency's culture than whether it avoids messy situations. Increasingly, as this trend grows, the agency changes, both in terms of its relevance to its customer base, and in terms of its own self-image.

I believe that this happened to SCS, and that its effects are still felt today, and that it poses one of the most serious challenges to successfully changing the agency's culture and to developing a vision for the 21st Century.

Historical perspective

Let me drop back for just a minute and explore some ideas about how and why this happened, and how we might learn what it would take to help change it. (If you want a far more serious and scholarly insight into many of these ideas, I would recommend *Compass and Gyroscope*, by Dr. Kai N. Lee.) The Soil Conservation Service, and the entire soil and water conservation program in the United States, developed almost simultaneously with the development of the industrial era in natural resource management, and this has had enormous importance. I have been doing a good bit of research and writing recently—mainly about forestry—that convinces me of the validity of categorizing our North American natural resource history in four eras. I call them the Native, Pioneer, Industrial, and New Eras. They are not just different periods of technology in my view, they set apart very different sets of relationships between humans and the environment. They are characterized by different cultures, driven by different basic paradigms, informed by different primary sciences, and utilizing different tools and tactics. The transition boundaries in time between them are fairly broad and fuzzy, and many aspects of each era can be found in later ones.

- In brief, the *Native Era* was based on the central principle of subsistence. Ecology was the key science base, and fire was the most powerful tool. Lacking the ability to mechanically or chemically restore land where fertility or other factors had diminished, most of these cultures simply picked up and moved to different lands, and let forest or grassland restore the soil. Fire was widely and intentionally used, and was one of the main factors in dictating the shape of the vegetative cover.
- *The Pioneer Era* was based on the central principle of development, and engineering held enormous importance. New methods and machines to till soil, move heavy logs, kill game, and do other natural resource manipulation flourished, even while much of the energy was provided by humans, animals, or water power. Natural resources were there to be used in the development of a new nation, and a culture driven by visions of manifest destiny eagerly found new ways to harvest and use those resources, seldom seeming concerned that the endless bounty might some day run out.
- *The Industrial Era* emerged largely in the early decades of the 20th Century, and accelerated with increasing speed after World War II. The central principle was productivity and efficiency. Petroleum-powered machines grew increasingly larger and more sophisticated, and human input per unit output dropped steadily. Maximum productivity was sought through reducing ecosystems to the simplest, most output-oriented components. Producers wanted one strain of wheat, one kind of pasture grass, one breed of hormone-accelerated cattle, one species of fast-growing straight trees. All the other species that could compete for water and nutrients were to be controlled and eliminated if possible. So, too, were the pesky biota that inhabited the place. From bacteria to bears, if it competed with the producer's goals, it was to be controlled or eliminated. Enormous sums poured into research to find magic materials or methods, and tons of chemi-

cals—some not so well tested as to side effects—found their way onto America's fields and forests.

•That era, of course, is still with us, but in many ways it is rapidly being replaced. In the *New Era* (so called because I can't think of a better name), the central organizing principle is clearly becoming sustainability. Titles like sustainable agriculture and ecosystem management are more than new words for old ideas—they are distinctly different approaches to the relationship between humans and the natural world. In these approaches, a new term appears—adaptive management. This signals a willingness on the part of land managers to understand the natural system and capture as many of its inherent tendencies as possible. It suggests that people will more finely "tune" their management approaches to individual soils and sites, instead of trying to force-fit one kind of management on every piece of land. Far from being done for altruism, this approach is being done for the most pragmatic reasons—it may be the only way we can successfully continue to productively manage these lands for much longer.

Vision for the future: information management

The science that will be key in this New Era will be information management, and the most powerful tool will be the computer. Adaptive ecosystem management is information-driven, and the amount of information available, and needed, vastly outstrips the capacity of the individual human mind. It requires a large set of basic data, arrayed in manageable layers in a Geographic Information System. It demands working models, so we can test different ideas and options, and see how the system is likely to respond. It needs intensive monitoring, and feedback data loops into our information systems, so that we can tell what actually happened in response to a management effort; we can use that experience to improve our models and our knowledge base. All of this is available, and increasingly in common usage, today. That can only accelerate, in my view.

This shifting technological and cultural map holds critical importance for NRCS, in my view. First of all, it means finally—after almost 60 years—the agency will have both the tools and the cultural attitudes to actually implement SCS founder Hugh Hammond Bennett's basic idea of the 1930s. His notion of using every acre according to its capability and treating it according to its needs was hopelessly in conflict with the basic paradigm of the Industrial Era.

This becomes apparent when we consider the essential difference between the "control model" associated with the Industrial Era, and the "adaptive model" that is emerging. In the control model, the basic focus was on changing the land to respond to the demands of the producer. If you want an interesting view from that platform, go back and re-read a series of booklets published by USDA in the early 1960's, entitled "Agriculture 2000." If that vision had held true, we wouldn't be worrying about a conservation program today—everything would be under total human control. That, of course, did not and will not happen.

One characteristic of the control model is that it had a hard time tolerating surprises. If the environment didn't perform as predicted, if the grass didn't germinate, or the streambank structure washed out, or the dam overtopped, that was seen as a failure. When humans are in total control, you shouldn't get that many surprises. Of course, what we know is that humans were never in as much control as they imagined, and surprises were fairly common. But when you treat surprise as a failure, you not only don't learn anything, but you keep pulling back, getting more conservative, taking less risk, doing less innovation, and solving fewer problems. Thus, I would argue that, in addition to an agency that matured and had become more risk-averse over time, was added the cultural pressure associated with the idea that our goal as resource managers was to exercise control over as many aspects of the natural world as possible. Nobody, particularly those who were supposed to be "experts," wanted to see themselves failing to meet that goal very often.

In the adaptive mode, by contrast, you treat all management as part of an ongoing experiment. You apply your best science, monitor the results, feed the information back into your planning model, and adjust your next move accordingly. Instead of treating a surprise as a control failure, you treat it as a learning experience. It enlarges your knowledge. If you monitor it right, it produces new data for your information system and makes your model better. As a result, people become more prone to experiment, to innovate, to take risks, and adapt to unusual or unforseen outcomes. If that sounds a lot like many of the leading conservation landowners you've encountered over time, that should come as no surprise. Those people know intuitively how to do adaptive management, and one of the most common things you'll hear them say is, "Come on over here. I want to show you something I'm trying out." Instead of growing stodgier and less creative, their approach encourages them to grow more innovative. That same potential exists for a federal agency.

The opportunities for the Natural Resource Conservation Service to be innovative in this New Era seems boundless to me. Let me suggest some ways.

•The idea of a comprehensive farm plan should be *abandoned*, as quickly and gracefully as possible. That is an artifact from the "control mode," and it never worked very well for anything but the construction and system elements of the farm. Those plans vanished into the farmer's house seldom to be seen again, for excellent reasons.

•Now, instead of a plan, give the landowner a *planning tool*, and teach them how to use it, so that they can become skillful resource managers. First, soil surveys, along with topographic information, water features, roads, buildings, field boundaries, etc., should be entered into a GIS system that forms the basis for a farmer's planning tool. Its like the difference between giving a starving kid a fish, and teaching him to fish. Massive. So, the GIS software, with the basic data entered and some models ready to be tested, needs to be given to the farmer, to be run in his or her computer, at his or her own time. He should be able to evaluate and compare conditions, histories, and options. He should be able to run alternative strategies, and see the associated natural resource risks and impacts as well as an economic evaluation. She should be able to plug in her own data such as fertilizer inputs and yields, and update the economic module with current prices. He should see how the decisions made on his land may fit in with the larger landscape in which it exists.

•He or she should be able to input additional information. He should be able to hire overflights of the land with an ultra-light airplane that takes videotape and other sensing, and gives information on moisture stress, plant health, canopy cover, and a host of other factors, in order

to download that information directly into the computer to improve a personal planning model. He should be able to dial up a source for nearby weather records, and add that to the data base. And she should be able to get a lot of this software, technical data on natural resource facts and conditions, and periodic monitoring and update advice, from the experts at the Natural Resource Conservation Service. Maybe she will even have a hotline to the local office to get technical advice when she gets herself stumped.

Fictional, you say? Maybe. But except for the part about getting service from the agency, it is all available today. I've seen it in action, although it is still largely in separate pieces. But bringing it together into a consolidated, user-friendly, practical system is less than two years away. And the costs, both for software, hardware, and monitoring, are dropping like a stone. This need not be the tool of the rich—it can be the tool of all who seek to manage land skillfully. And that can be achieved most rapidly, and equitably, if the federal government's conservation agencies lead the way in development and implementation, as well as technology transfer. It won't happen overnight, and it won't abandon many of the good tools and techniques that have come down through history. But for those who have studied the past history of this agency and its cultural context, and looked hard at where our culture and technology is headed today, it doesn't need to be a surprise.

Neil Sampson has been Executive Vice President of American Forests since 1984. Prior to that, he was Executive Vice President of the National Association of Conservation Districts for six years. Between 1960 and 1978, he spent 16 years with USDAs Soil Conservation Service (now Natural Resources Conservation Service) in jobs ranging from soil conservationist in an Idaho field office to Acting Director of the Environmental Services Division in the Washington DC headquarters office. He is author of two books on soil conservation; co-editor of three books on forestry, natural resources, and global ecosystems. He chaired the Congressionally-established National Commission on Wildfire Disasters and was the primary author of its 1994 report. His degrees are in Agronomy from the University of Idaho and Public Administration from Harvard University.

This article was originally Sampson's presentation at The Pinchot Institute for Conservation held at the Forest Service's Grey Towers National Historic Landmark, Milford, Pennsylvania (October 12, 1994).

NEWS & NOTES

Administrative change means combining parks

The National Park Service will merge its North Atlantic and Mid-Atlantic regions by 1998 and drastically reduce the number of administrators. Marie Rust, a 21-year Park Service veteran will oversee the merger. (See *Women in Natural Resources* interview of Marie Rust in Volume 14 Number 3.) The new Northeast Region will include New England, New York, New Jersey, Pennsylvania, West Virginia, Virginia and Maryland. The headquarters will be in Philadelphia.

Rust noted that there will be no cuts at the park level, but others have estimated that there could be up to 1,100 layoffs, mostly at administration levels. Boston, currently the headquarters of the North Atlantic Region, will become one of three satellite branches of the Philadelphia office. New York City will be the second, and the location of the third has not been announced. Nationwide, the Park Service will shrink to seven regions from 10. The plan is subject to approval by the Senate.

To compensate, NPS will seek more private contributions and volunteer labor under the reorganization plan. The North Atlantic Region has experience with fund-raising, having collected more than $300 million for the renovation of Ellis Island and the Statue of Liberty. Rust said, "We've already proved that the only way you're going to improve the icons of the Park Service is through significant fund-raising." Rust will be overseeing Acadia National Park in Maine and Shenandoah in Virginia plus 79 of the 305 other units run by NPS. Overall, NPS has about 4,000 employees in the merging districts.

Associated Press, February 21, 1995.

Dynamics of catching a meal with threads

Using a computer model to study the behavior of spider webs, researchers say they have discovered the solution to what one of them described as a crucial problem for the spider—how to stop a relatively massive insect moving at a fast speed. If the web were too stiff, said Loraine H. Lin, a structural engineer at Oxford University and author of a new study on spider web dynamics, "the insect would bounce back out like hitting a trampoline and if there was too much give, the threads would break." With other researchers, Lin built a computer model of a web using a customized version of a structural analysis program that is mainly used for automobile crash simulations. The simulations indicated that while the stiff supporting threads of a web dissipated energy from the impact of an insect, this reaction was not enough to account for all the energy absorbed by the web. Only by including the air resistance, or drag, caused by the rest of the net could the behavior of real webs be reproduced.

George W. Uetz of the University of Cincinnati, a biologist who specializes in spider behavior, said the new research was significant because new technology is studying ancient biological structures first evolved 400 million years ago. Orb webs emerged 180 million years ago as spiders left the ground to hunt in bushes and trees. Orb webs are made of two types of thread: a framework of dry, radial threads that radiate from the center like spokes on a wheel, and overlaying these is a spiral of flexible, wet, glue-covered strands. While the radial threads are taut and under a slight tension when the web is in its resting state, the spiral strands are elastic and expand or contract their length as conditions change. The glue on the spirals helps entangle insects and absorbs ambient moisture. This water forms droplets along the thread and the surface tension of the water in the droplets pulls the elastic strand into little bundles to keep it from sagging when not under pressure. This droplet mechanism rapidly reels the thread in and out to keep it straight, depending on the load (sometimes wind) pulling on it. The researchers found that the presence of these glue droplets increased the wind resistance of the web and enhanced aerodynamic damping by about 35 percent. The web's support threads also transfer vibrations to the spider so it can detect prey, a damping effect that localizes vibrations and helps the spider locate a meal quickly.

Warren E. Leary, *New York Times*, January 17, 1995

Mothers of Invention and riches, too

If you made drip coffee for breakfast, poured pasteurized milk on your cereal, put your lunch in a brown paper bag or used your windshield wipers on the way to work, you were using discoveries or inventions made by women.

Women have invented everything from the disposable diaper and chocolate chip cookie to things seldom associated with women—ship signal flares, drugs that stop the rejection of transplanted organs, a method of separating out gold, and the synthetic Kevlar—five times stronger than steel—that makes bulletproof vests so tough.

Ethlie Ann Vare, a Beverly Hills journalist, wrote a book *Mothers of Invention: From the Bra to the Bomb, Forgotten Women and their Unforgettable Ideas.* The US Patent Office estimates eight percent of its 5.3 million patents were issued to women. That would mean more than 400,000 inventions by women since 1836. In the book, Vare cites many examples of women inventors. Among them: Bette Nesmith Graham invented Liquid Paper, the white stuff secretaries use to cover typing errors. Graham was a typist for a Texas bank when she got the idea from watching sign painters cover their mistakes with white paint. She got fired for cheating, but other typists loved the idea and she built the white stuff into a multimilliion-dollar business.

Vare credited the original prototype of the cotton gin to the Georgia plantation owner, Catherine Littlefield Greene, who hired Eli Whitney as a tutor for her five children. Whitney got the credit. In 1870 Margaret Knight invented the machine that makes brown paper bags. She had to fight in court to prove she was the inventor, after a man claimed he originated the idea and argued a woman couldn't have created such a machine.

Vare notes that women inventors have become very rich, very happy and very successful. But they have not become very well known. That is the reason for the book

Associated Press, in *Spokane Spokesman-Review,* March 5, 1995.

Frustration is a powerful political force, but it is not a political program. Civility is desperately needed

The *Journal of Democracy,* published by the National Endowment for Democracy, devotes its fifth anniversary issue this month to a consideration of democracy's future in this country and the world. The spread of democracy—celebrated last year particularly in South Africa—is one theme of the articles. And the decline of civic mindedness is the other. Robert D. Putnam of Harvard university develops the latter theme in a brilliant essay titled Bowling Alone. He puzzles over the fact that some 80 million Americans reported bowling at least once in 1993—a 10 percent increase over 1980—but league bowling declined 40 percent in the same time span. The decline of communal participation at the neighborhood lanes, he shows, is not an isolated phenomenon. Membership in a wide range of community organizations has been dropping in recent decades. Labor unions, parent-teacher associations, women's clubs, fraternal organizations all have seen membership decline. Groups like the Red Cross and the Boy Scouts too, have found it harder and harder to recruit volunteers.

Surveys of social behavior, Putnam says, also show people finding fewer friendships among their close neighbors. And, as we all know, fewer Americans take the time to vote. It is no coincidence, Putnam argues, that this depletion in "public capital," the term he uses to measure the quantity of civic life, has been accompanied by a decline in trust in our public institutions and in each other. Without a healthy supply of public capital, the institutions of self-government become brittle and can easily break. True, membership in organizations from the National Rifle Association to the Friends of the Earth—is up, but writing a check is no substitute for working through a problem with fellow citizens. And self-help and support groups, which have proliferated are focused on the individual, not the society.

Putnam's conclusion seems to me irrefutable: Unless more Americans start working with each other on shared civic enterprises, and learning to trust each other, the formal government of this nation will probably lurch from one credibility crisis to the next. The coarsening of the public debate damages the dialogue that ought to be the essence of democracy. Scorn and riducule are the common coin of political argument and commentary. Campaign ads impugn the integrity of opposition candidates and feed the climate of distrust. Individual and group grievances are celebrated and legitimized, whatever their basis. But none of these leads to the reconciliation of real needs and interests. They are barriers to agreement, not solutions.

David Broder, *Washington Post,* January 1, 1995

Defenders of Justice or merchants of law?

Sure, the Japanese can sell their cars in the US—if they promise to take our lawyers in exchange. This bit of American humor expresses the common malaise that Americans feel about the vast numbers of lawyers in their country. Fully 25 percent of the world's attorneys are American. Critics often cite this overwhelming number as one source of the sand in the gears of the US economy. In Japan, however, people generally hold attorneys in high esteem, even as many confess that they want nothing to do with them. The Japanese term for petty quibbler is sanbyaku daigen, which originally meant unlicensed attorney, and now is used to deride disreputable attorneys. The number of lawyers in Japan is small, and relatively few people ever come into contact with them.

Japanese lawyers usually represent people who have been victimized. In so doing they satisfy their mission—as laid out for them in the Attorney at Law Act that defines and regulates the legal profession—to protect human rights and social justice. The same law restricts the use of advertising by lawyers, and prohibits them from going into business with non-lawyers or even

opening more than one office. These measures are all designed to keep lawyers from putting profit before justice.

As economies expand beyond national borders, demand is growing for legal services. Many US law firms have entered the Japanese market under the banner of market-opening deregulation. This new competition will force Japanese attorneys to wear a new hat: that of the merchant of law as opposed to that of the defender of justice.

Kinko Sato, *Look Japan*, November 1994

Making kids aware of the financial benefits of work ain't all bad

Doing all you can do to stimulate that can-do, business-minded spirit will help your children to be stronger and more successful—even if they never have to draw on the experience.

In place of a weekly allowance, give your children money for completed household chores. You can start this process as early as age five. Their ages will dictate how many chores are appropriate and how much you should pay them. Your child is learning responsibility and may end up hiring other people. Using money as payment for activities will teach children the importance of work and completing chores correctly.

Paying your kids to do chores does not mean that you should ignore birthdays and holidays. Give generously on these special occasions. People get gifts because they are loved—and not every acquisition has to be earned.

•Praise your children's entrepreneurial efforts. I told friends, neighbors and relatives in their presence how hard they worked. If one of them bought a new bike with earned money, everybody heard about it. I also told them privately how proud I was and how I admired their initiative. Your children have to hear you say it. It gives them confidence, self-esteem and a sense of accomplishment. To keep from spoiling them with praise, however, you can blend compliments with doses of reality. If your children suggest any offbeat ideas—ones that you know won't fly—praise their creativity but show them why a trip back to the drawingboard is probably necessary.

•Teach them financial independence. Children as young as age 4.5 should have total control over the money they earn. Of course, this does not mean they should be permitted to use their money to buy items that you have forbidden, such as candy. But in most cases, let them spend the money they have earned the way they want to. Let them make mistakes. If they squander it on snacks, then they won't have it for bigger things they might want.

•Encourage capitalism. All kids want something material, whether it is a new toy or game when they are young...or a special sweater or bike when they are older. My 4.5 year-old son started earning 10 cents a day by getting my morning paper, a four-minute walk from his room. If you have teenagers, point out that they can get the items they desire by creating a business that serves the community such as painting or hedge trimming. Ask your children for their ideas about profit-making services that they would like to provide. Help them understand exactly why one idea might be better than another. Talk often about business at the dinner table or in the car. Let your kids know that business can be exciting and fulfilling, as well as profitable. Tell stories about entrepreneurs you admire and why you respect them.

•Establish a joint venture with your children. It is a great way to help get a child's business off the ground and to teach real-world lessons. For example, if your children are using your lawn mower and gasoline to tend other people's lawns, don't let them reap all the profits. Split the money—or take a cut. After all, you're providing the capital—in this case, the mower and the gas. The more formal the business structure, the better. Hold regularly scheduled "board" meetings in an "office-like" setting to discuss the business and divide the profits. You and your spouse can sit on the boards of directors, but remember that your children are the CEOs. Encourage them to bring agendas and oversee the meetings. When your kids make suggestions that you know won't fly, discuss them gently until they understand the flaws.

•Open bank accounts. Give children checking accounts as early as age six or when they can add and subtract. When a six-year-old writes a check—even if you have to co-sign—he or she feels serious, grown-up and important. It's a solemn occasion, in the best sense of the word. If the check-writing privilege is abused, your child's account will dry up—another lesson learned.

•Charge interest if you lend money to them. There's nothing wrong in giving a child an advance on next month's earnings, but do it in a real-world way. I charged my kids interest—the prime lending rate at the time plus one or two percentage points. Be sure to collect, even if it is 17 cents because it is a good way to learn about the cost of capital and the penalty for buying now and paying later.

•Attitude is more important than profits. One of the biggest mistakes parents make is taking some of these ideas too far. By encouraging entrepreneurship, you don't want to turn your children into money-crazed workaholics. To keep this from happening, tell your children how entrepreneurship is consistent with your family's values...that entrepreneurs serve their communities...that the good ones sell good products or services at fair prices...and that total integrity is good for your soul and business. And to keep your kids from becoming too materialistic, mix entrepreneurial lessons with spiritual lessons. Talk about families that are less fortunate. Suggest that your children might want to give some of their earnings to charity. And finally, you can communicate what my father told me: Running your own business isn't about power and money. It's about freedom, fun, creativity, and new challenges.

Wilson L. Harrell, *Bottom Line Personal,* January 1, 1995.

Why does everyone hate to read academic books?

Here's a question that has brought down countless intellectual movements, kept any number of would-be graduate students out of school, and generated a scourge of unparsable articles that, in attempting to answer it, simply add to the mystery: Why are academic books so deeply unpleasant to read? Well, one reason may be that university press editors have come to view the line-editing part of their job—the part where they turn jargon into English—as something akin to pro bono work. Says Liz Maguire, senior editor at Oxford University Press: "Most editors think, 'Well, if this is an academic monograph for this author's peer and about 400 research libraries only, is it really going to benefit from my editing?'" Maguire and her peers agree that only the few works that seem likely to sell between 3,000 and 10,000 copies get serious attention from senior editors. And in postmodern disciplines, whose cachet is impenetrability, editing may be beside the point. "There is a moment where you just say, 'It's dense and, in a sense, it's supposed to be dense,'" admits Maguire.

Rachel Too of Duke University Press insists that editors do labor to ensure "that the language won't be an impediment." But, she adds, that's "not the same as Max Perkins rewriting every page." Besides, there's another reason why academic prose is so stultifying: even Scribner's legendary Perkins probably wouldn't satisfy the professorial ego, which tends to view each word as some sort of seminal utterance. Plus there's the bottom line—the additional business pressure to fill a university press's list has meant increasing in-house "specialization." That is to say, senior editors woo and confer with authors to acquire texts, and then copy editors, often freelance, edit the manuscripts out of house.

Despite authors' indignation over the say that underlings ulti-

mately have over their work, the contributions of copy editors ought not be slighted. "In a number of cases, manuscript editing has saved the book, saved the author from embarrassment, saved the house from disgrace," says John Ackerman, director of Cornell University Press.

Lingua Franca, November/December 1994

What does former Texas Governor Ann Richards say about having power?

I don't know. I've never thought about feeling powerful.... The people who are truly powerful are the ones who give it away, not the ones who hang on to it and are conscious of it. I know people who have power where the power itself is important to them, and they're some of the unhappiest people I know—truly miserable. Because all their time is spent hanging on. I just never think about that. I think about the job being governor, although it intrinsically had power, as a job. There are problems to be solved, consensuses to be built. I'm not just an empire builder.... The whole notion of power is so silly. What does it mean? That your office is bigger? That you have more people working for you?

The frustration of these big jobs is trying to do something and not being able to accomplish it. That's very, very difficult for me. I have a tendency to just keep on, keep on, keep on. And there are times when you simply are not going to be able to get the deal done.

Gail Collins, *Working Woman*, March 1995

Eau Claire, Wisconsin, home of writers and a University of Wisconsin branch

This is an active writing community," says Mildred Larson, director of the L.E. Phillips Public Library in downtown Eau Claire, Wisconsin. "Each year there seems to be somebody getting a book out, or winning a prize or a fellowship," Larson continues, proffering a copy of *A Bibliography of Local Authors*. It contains 88 entries.... Much of the writing activity Larson refers to is rooted in the complementary efforts of the public library and the university. The university is a rich source of poets and writers; it also sponsors readings that frequently involve as many community members as students.

The public library also holds numerous readings and workshops of its own. The workshops attract writers representing a wide range of age and ability and are often led by members of the university faculty; it is exactly this sort of interaction that seems to foster a respect among local writers of all levels. Professor and poet Bruce Taylor, a 1993 Bush Foundation fellow in poetry, has been teaching a poetry class at the public library for five years. "The reason I do it is that there is this hardcore group of folks who are just wonderful. To see an 84-year-old couple coming out Thursday nights in February to sit down and talk about John Ashbery or Rita Dove is fantastic. And people of all ages just keep coming back for these things.

A lot of the success of these programs has to do with Mildred Larson. She is committed to turning that library into something more than just a warehouse for books... It's just a matter of energy and personalities. You could have the most welcoming environment, but if you don't have certain people or certain personalities, you have nothing....

Shortly after his arrival, Taylor and professor Richard Kirkwood organized an open reading series... Today the monthly readings frequently attract crowds of over 100 students and community members. "Sometimes you can't get in there to read," says Taylor. "If you don't sign up half an hour before the reading, forget it. In bigger cities you can often go here or there and hear a lot of poetry, but there are just very few places where you know once a month that there's going to be an open reading where anybody can get up and read. That's real unusual....

You know that just writing something is a monstrous risk. But then standing up there and reading it...when you see that kid, that 18-year-old getting up there and reading that first poem they've ever written maybe, certainly the first one they've read out loud, there's just a chill—as bad as the poem may be—there's just a chill that goes through you because you know what's going on there and what it takes to *do* that."

Michael Ryan, *Poets & Writers Magazine*, March/April 1995

Ms. Moneybags: Women in campus financial administration

When it's time for qualified women to move up to influential financial administrative positions on college and university campuses, many women move up *and* out. Rather than climbing the ladder at their institution, they move out of the university into for-profit businesses, or to some other school. Why don't many women take places in financial administration, even in the private sector?

Lack of visibility. Women historically lack access to the typical male-controlled power centers.

Lack of mobility. Women, more often than men, are unwilling or unable to disrupt their husbands' careers and children's lives to relocate.

Failure to join a management training career path. Cultural factors make women less likely to follow a traditional, planned-out, career path to management.

Despite these limitations, real and perceived, there are ways that women can move into high-level financial administration.

Being Seen. In male-dominated institutions, women have a hard time being identified as accomplished administrators. The office of Women in Higher Education at the American Council on Education (ACE) seeks out women with the right credentials to move into power. The ACE Fellows program identifies and trains women administrators. The National Institute for Leadership Development in Phoenix conducts more than a dozen leadership training and development workshops, primarily for women in two-year colleges. It's leader, Carolyn Desjardins, recently was chosen to receive a special award from the American Association for Community Colleges. The HERS Institutes, at Wellesley and summers at Bryn Mawr, offer administrative leadership training for women.

Women need to get involved in professional societies and associations. Since women are often excluded from the power centers within their own institutions, it is essential for them to ally with colleagues outside.

Breaking through stereotypes is important. Many men still believe that women really don't take their careers seriously. They feel that even the most competent women will leave their positions, due to pressures of the work itself, their natural desire to have children, or their inability to supervise men on the job.

In financial administration, women are often assumed to be financially cautious and prone to "math anxiety." So a woman who aspires to be in a top-level financial position needs to be technically competent with developed problem-solving capabilities, a good understanding of how to get and use power, a commitment to her career, and a good command of femininity. She will still face obstacles. So she needs to take risks, be assertive about salary and promotions, base decisions on complete information, pay attention to office politics, speak out and up, and most importantly, not make excuses for others.

In the 1990s, where the bottom line has become the tail that wags the dog, financial leaders are gaining a disproportionately strong voice in campus leadership. These leaders have a key voice in decisions and achieve the power to contribute to making their campus communities better places.

Mary L. Fisher, *Women in Higher Education* , March 1995

Evil ants at last vanquished?

Finally, a solution to the dreaded fire ant problem. These stinging South American insects, which invaded the southern

United States more than 50 years ago, are powerfully attracted to electric currents. They prefer exposed circuitry, but will gladly chew through insulation if necessary. (Some die in the process.) Junction boxes, sockets, and fuses are all on the fire ant's menu. If that traffic light you pull up to in Georgia is not working, there may well be fire ants nearby. The problem, according to one expert who has been hired by a Texas utility company, is much worse that the utilities are likely to let on.

Enter Sanford Porter, an entomologist with the Federal Agriculture Research Service. Porter is marshalling an assassination squad of parasitic South American flies called Pseudacteons, whose females are rather fond of the fire ant. With a needlelike ovipositor, the fly injects an egg into the ant. The egg develops into a maggot, which eventually produces enzymes that decapitate the ant. Porter hopes to unleash his killer flies within two years. Fire ants are said to recognize their enemy, and either flee or prepare for battle. Place bets now; Pseudacteon is a 3-to-1 favorite.

The *New York Times Magazine*, January 8, 1995

Nature Conservancy buys Big Horn Ranch

The Nature Conservancy of Wyoming has purchased a 4,200 acre ranch near the Big Horn Mountains, west of Sheridan, with hopes of selling the parcel to a buyer willing to accept a conservation easement on the land. The sale of the Widener ranch was the catalyst for eight other area ranchers to donate conservation easements totalling 10,223 acres to TNC. With the donation of other easements, TNC has the potential of protecting up to 42,000 acres in the area. Ranchers who place their land in conservation easements retain private ownership and the right to continue ranching, while protecting the land from further development.

Environmental News Briefing, January 1995

We need to break the false sense of entitlement boys have

When my daughter was 11, I realized that as much as I'd written about what happens to girls in schools, in their homes, and in the culture at large, I had no idea what I could do to help my own daughter. I have spent the last four years researching what happens to girls, and I have come to a number of conclusions that bear directly on today's welfare-reform debate. Perhaps most critically, I concluded that we will never change the outcome for girls until we change the way we raise boys. We need to break the false sense of entitlement—at the expense of girls—that boys have, and we need to break the equally destructive cycle in which we raise girls to be "nice," submissive, and deferential.

This cycle of entitlement and submission plays a powerful role in a range of problems plaguing American society, including teen-age violence, teen-age pregnancy, wife battering, and costly sexual-harassment suits that haunt the business community.

The irony for conservatives who have fought a rear-guard action for 20 years against women's rights is that the surest way out of the welfare state they rail against is to raise girls with the same range of opportunities and possibilities that boys have. This is the best inoculator against teen-age pregnancy that we know of, the best vaccine against welfare dependency we have.

Teenagers are not all sex-crazed. In fact, it's more likely that the culture is sex-crazed and teen-agers are trying to resist it. Almost universally, they tell researchers they wish they had waited until they were older to have sex. In one study, nearly a quarter of the teenagers—boys as well as girls—said they believed in abstinence before marriage. But the emphasis we place on feelings in girls, on their interpersonal skills, and on their ability to care for others is precisely what sets them up to succumb to sexual overtures by boys. They usually regret it later. Proof of this is found in a study by Marion Howard and Judith McCabe, who asked more than 1,000 sexually active girls 16 years of age or younger what topic they most wanted to have information about. Abortion? Masturbation? AIDS prevention? None of the above. Instead, a whopping 84 percent of the girls checked this item: "How to say no without hurting the other person's feelings."

Parents can help their daughters through the messages they give about what they value in their families. If we stress the importance of boys and being popular, that tells our daughters that we value the social agenda. If we praise our daughters' school efforts, instead, that helps establish a different priority. Parents can also help their daughters by coaching them to set boundaries. This means giving girls the sense they are entitled to question boys' behavior and to say things such as "Why do you think it's all right to do that?" or "how do you think that makes me feel when you do (say) that?" or "no, stop, it's not all right."

The goal is nothing short of changing the image in boys' minds of what is appropriate behavior toward girls and women and to make them more reflective about their own sexual desires. This is where mothers, who can remember *very well* what it is like to be a teen-age girl, can make an important contribution by talking to their sons about the need to respect girls and women. Mothers need to tell their sons what it feels like to have to cope with the double standard in which boys who are sexually active are looked up to for being studs and girls are looked down on for being sluts.

There are some other things we can do to promote mutual respect... Girls should feel entitled to ask boys to do things for them and to develop in boys the capacity to do things for girls, as opposed to expecting girls to wait on them. Encourage boys to be...socially and interpersonnally sensitive and responsible. Men who cannot express their emotions can turn to violence. Encourage boys and girls to be friends and to do things together, but keep a wary eye out for both to fall back on stereotypes. Don't cosset daughers. Encourage them to be rough and ready and independent. Expect girls to do well in math and science... Encourage girls to form study groups with their pals. Encourage your schools to treat boys' and girls' athletic endeavors equally.... Teach sons that promiscuity is equally debasing for boys and girls.

Judy Mann, *Washington Post*, March 12, 1995

KIOSK

The Fourth North American Agroforestry Conference will be held in Boise, Idaho, July 23 to 26, 1995. The theme is Growing a Sustainable Future. To receive conference materials, contact Linda Hardesty, Dept. Natural Resource Sciences, Washington State University, Pullman WA 99164-6410 (509-335-6632).

A symposium to address planted forests as a sustainable resource will be held June 28 through July 1, 1995 at the Portland, Oregon Convention Center. Contact conference co-chair Kathleen Kavanagh at 503-325-7910 or Oregon State University College of Forestry at 503-737-2329.

The annual meeting of the Society for Ecological Restoration will be held in Seattle, September 14-16, 1995. The theme is Taking a Broader View with an emphasis on Pacific Northwest environments and beyond. It will explore the importance of scale in affecting meaningful restoration and the scientific and social basis for decision-making. For information, contact SER Conference Registration, 1207 Seminole Highway, Madison WI 53711 (608-262-9547).

The conference Fire and Forest Meteorology, will meet in Lorne Australia on October 27-31, 1996. Preliminary information on papers and accommodations can be obtained from International Association of Wildland Fire, PO Box 328, Fairfield, WA 99012.

The annual New York State Outdoor Education Association conference will be held October 6-9, 1995 in Waterloo, New York. Waterloo is the home of the Women's Rights National Historic Park. The focus for the conference will be Women in the Environment. For information, contact Steve Melcher, 43 Reservoir Avenue, Rochester NY 14620-2726 (716-256-3928).

Greening of the Campus is an international conference to be held at Ball State University, Muncie Indiana on April 4-6, 1996. The subject matter ranges from physical plant management, environmental curriculum development, and green-utilization of campus resources. For information on papers call 317-285-2385.

The Midwest Oak Savanna and Woodland Ecosystems Conference will be held in Springfield, Missouri on September 26-29, 1995. The objectives are to develop public support and provide direction for the preservation of oak ecosystems throughout the midwest. For information contact chair Ken McCarty, Missouri Department of Natural Resources, Box 176, Jefferson City MO 65102 (314-751-8660).

Government agencies, utilities, private contractors, and landowners often find themselves involved in litigation from incidents relating to trees. The National Arbor Day Foundation will hold a conference Trees, People, and the Law May 21-23, 1995 in Nebraska City, Nebraska to focus on those issues. Contact them at 100 Arbor Avenue, Nebraska City NE 68410 (402-474-5655).

The first International Exhibition of Environmental Technology, called ENVIRONTECH 95 will be held in Rio de Janeiro Brazil June 19-23, 1995. For information, contact Estrada Miguel Salazar M. Moraes, 680 Jacarepagua, 22770-331, Rio de Janeiro RJ Brazil; +55-21-445 6969.

Because of the popular demand for copies of *Presenting Nature: The Historic Landscape Design of the National Park Service,*

1916-1942, by Linda Flint McClelland, the National Register of Historic Places, Interagency Resources Division, has made arrangements with the Government Printing Office to reprint it at $20 each. Write Supt. of Documents, PO Box 371954, Pittsburgh PA 15250-7954 (Stock # 024-005-01140-4).

An Oceanic Society Expeditions brochure of lineups for the remainder of 1995 can be had by calling 800-326-7491.

The Soil and Water Conservation Society meeting will be held in Des Moines, Iowa August 6-8, 1995. They are celebrating 50 years of partnerships. For information, contact them at 7515 Northeast Ankeny Road, Ankeny, Iowa 50021-9764 (515-289-2331).

The Nature Conservancy offers 1995 Internships and Seasonal Employment Opportunities in Oregon. There are various deadlines, so call Lynn Gooch at 503-228-9561.

The Second Canadian Urban Forests Conference is scheduled in Windsor, Ontario on July 16-19, 1995. Sponsored by Canada's National Community Tree Foundation, the Department of Parks and Recreation in Windsor, and the Canadian Forestry Association. The theme is Trees for Urban Survival. Contact Patricia Dolan Lewis at 519-255-6877 or fax 519-255-7990 for registration information.

Alaska Wilderness Studies is the academic, outdoor education arm of the University of Alaska-Anchorage. For information about internships with them, contact Todd Miner, 3211 Providence Drive, Anchorage AK 99508 (907-786-4066: fax 786-4069).

MANUSHI offers a set of two volumes (a Proceedings and Success Stories) which resulted from a followup conference in Nepal to the Global Assembly of Women & Environment held in Miami in 1991. The two volumes cost US$15 payable to them and sent to Surekha Palungwa, Gyaneshwar, PO Box #2682, Kathmandu, NEPAL (fax 977-1-220215).

A symposium Nonindustrial Private Forests: Learning from the Past, Prospects for the Future will be held in Washington DC February 19-20, 1996. Submit paper and poster abstracts by July 31, 1995. For more information contact Mel Baughman, University of Minnesota, Dept. of Forest Resources, 1530 N. Cleveland Ave., St. Paul MN 55108 (612-624-0734: fax 625-5212: e-mail mbaughma@forestry.umn.edu.

Business Kids is a company that sells a package of booklets and audio cassettes to show kids how to start businesses and put together business plans. Send $49.95 to them at One Alhambra Plaza, Coral Gables, Florida 33134 (800-282-5437).

Urban ecosystems will be the focus of the National Urban Forest Conference, September 12-16, 1995, in New York City. The theme is Inside Urban Ecosystems. For information, contact American Forests, PO Box 2000, Washington DC 20013 (202-667-3300 x 227: fax 202-667-7751).

Girl Scouts of America sponsors Wider Opportunities for young women to learn about possible future careers. This year, there is one called Women in the Natural Resources to be held near Traverse City, Michigan. Girls (who have already been chosen) will be taught by Forest Service personnel and other workshop leaders about professional careers in forestry, wildlife, fisheries, archaeology and soils. The individual Scouts now look for funding support to help with the $660 fee. For information about donating, write Fair Winds Girl Scout Council, 2029 S Elms Rd, # C, Swartz Creek, Michigan 48473-9728.

Women in Natural Resources will have three upcoming focus issues. If you have ideas for an article on rural development, environmental organizations, or the 10th anniversary of the Women in Natural Resources meeting in Dallas, call Dixie Ehrenreich at 208-885-6754 or fax a query to 208-885-5878.

To order back issues of the journal, send $6 each for under 10, or $5 each for 10 or more to PO Box 3577, Moscow ID 83843

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

TO ADVERTISE A POSITION OR PRODUCT in a flyer or journal, send text by FAX (number above) for an estimate of cost. WiNR sends out twice-monthly job announcement flyers. The journal is quarterly. Price for a full page (8 1/2 x 11) in the journal or the flyer is $900; half page is $450; one-third page is $300; quarter page is $225; the smallest is one-eighth at $115. We format at no extra charge, or accept camera ready copy sent to our address (see below).

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