

women in
N A T U R A L
R E S O U R C E S

Volume 17, Number 3 March 1996



A black and white photograph of a woman wearing a wide-brimmed hat, a plaid shirt, and a backpack, standing next to a trail sign. The sign is a dark rectangle with rounded corners, listing distances to three locations: Holua (3.9), Kapalaoa (7.7), and Paliku (10.2). The background shows a hilly, brush-covered landscape under a bright sky.

Holua	3.9
Kapalaoa	7.7
Paliku	10.2

In this issue

***NPS Women: Polly Welts Kaufman's
Book Excerpt***

***Atlantic Salmon Health Management
Watershed Analysis and Cultural Resources
Adaptive Management Area in the Cascades
Women and Science: The Glass Wall***

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

What was the Dallas Symposium?

To those of us who attended in 1985, it was inspiring and energizing. Not the first of its kind, nor the last, but for the several hundred there it was an important statement of support for women by the Society of American Foresters, the key sponsors. And it was another milestone in a few key events (beginning perhaps with the Forest Service conference almost 18 years ago which also launched this journal) that firmly—and publicly—endorsed women who do natural resources work. The conference papers were reprinted in this journal in March 1986. Our next issue of WiNR will contain a look back—and forward—from attendees. If you were there, you are invited to contribute your thoughts to that issue. Below are excerpts from just a few presenters at Dallas, 10 years ago.

Mary Jo Lavin

I want to recall for you how the concept for having a symposium was first developed. In 1984, a group of women attending the International Forest Congress in Quebec introduced a resolution "...to incorporate women in policy making positions and in the leadership of the profession..." This resolution was moved by Janet Ades from Canada and seconded by Geraldine Larson from the United States. The resolution was presented to Ron Christensen, Executive Vice-President of the Society of American Foresters and given by him in turn for implementation to Richard Zabel, SAF Coordinator for Continuing Forestry Education. As an initial step, Richard chaired the first meeting of the Women in Forestry Steering Committee in January 1985.

The Symposium Steering Committee was composed of Mary Cockerline (International Paper), Orville Daniels (Forest Service), Sally Fairfax (University of California-Berkeley), Ruth Muir (Forest Service), Margaret Shannon (Resource Policy Analysis, Ltd.), Albert Vogt (University of Missouri-Columbia), Al West (Forest Service), and Mary Jo Lavin (State of Washington DNR). The original intent had been for this group to plan the first of a series of annual conferences for women. The group very quickly—very definitely—decided that women had been isolated long enough.

Ronald R. Christensen

It is important to me that we assess the integration of women into the formerly male preserve of natural resources management and understand the profound personal and professional consequences of challenging traditional gender and work roles.

According to SAF membership records, in 1977, 2.2 percent of working foresters were women. Today, eight years later, it is 10 percent. Forestry school enrollment levels now include 25 percent women; 20 years ago it was almost zero. More women foresters are expected to be employed in this decade than were employed in all previous years combined.

Wendy Herrett

Without taking risks we are not going to move very far through an organization. An-

other lesson we are learning is the need to be flexible. Without flexibility, we will miss opportunities and put tremendous stress on ourselves when things do not go as planned. Another very important lesson we have learned is that we have to understand the organizations we are working in.

Denise P. Meridith

Before working in natural resources, there are many hurdles to hurdle. (1) *You can't possibly want to...* These are discouraging words a young girl starts to hear at an early age. (2) *There must be some mistake...* These words are whispered when they were expecting (or hoping for) someone else. (3) *But there are no women's accommodations...* This hurdle includes no women's lockers, or bathrooms or... (4) *We have one...* First of all, it could mean stay out as in "We've met our quota" or "we don't want women taking over" and "if you get more than one woman in an office, there'll be trouble." (5) *We don't want any...* In January 1973, like most college seniors, I sent letters of inquiry. Most didn't answer. NPS replied they didn't hire women for natural resource work, the Forest Service offered clerk-typist, and BLM was the only one to offer me a technical position. (6) *You don't need it...* Sometimes used to discourage women from requesting new assignments, training, and promotions. (7) *You're not ready...* This is a euphemism for you're too young, black, Hispanic, and/or female, followed by tales of how long it took the speaker to move up.

Ann Forest Burns

I chose forestry precisely because there were so few women foresters, none practicing as far as I knew. Being a woman was, in my family, something you *overcame* to achieve something important. I suggest to you that most of us are like this to some extent. We are drawn to nontraditional careers because we chafe at the confines of more traditionally female pursuits. In overcoming the barriers to these careers, we risk leaving behind the company of other women. If we do, we lose touch with an ancient and valuable part of ourselves.

Joyce M. Kelly

Women understand the limiting realities of food, space, shelter, and money. They see the resource in its interrelationship with life and have long served as managers of fixed resources. Women everywhere can respond to these resource issues with compassion.

Mollie Beattie

I do not intend to address those who have learned to fit comfortably into bureaucracies, who have a detailed job sequence and income expectation plan for the next decade, who have been successful at segmenting their personal and professional lives, and who know how to "dress for success." I am here to talk to those of you who generally feel as if they are participating in a game for which everyone but them has a copy of the rules; who have resumes that would stump a quiz show contender; who wonder why it's not respectable

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WOMEN IN NATURAL RESOURCES

March 1996



Volume 17, Number 3

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Woman's Voice: A History

Polly Welts Kaufman

An excerpt from Chapter 5: "Women in
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forthcoming book.

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Polly Welts Kaufman

Nine years of research and writing to
tell the story.

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Adaptive Management Area

Jean Nelson Dean

AMA's are small, selected blocks of land
where new ways of doing things can be
tried and evaluated. There are 10
AMA's in the Northwest Forest Plan and
this is one of them.

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Run AWAY! Run AWAY!

Elaine Zieroth

It used to be a lot simpler to fight fires.
You brought in a bunch of guys with
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tried to put the thing out.

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Women and Science: Where Does
the Glass Wall Come From?

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After a National Science Foundation
Conference, this author continues to
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exist in her field of physics.

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Reprints from the March 1986
issue featuring the
DALLAS CONFERENCE

The cover photo
is of

Polly Welts Kaufman

Author of

*National Parks and the
Woman's Voice: A History*

FEATURES

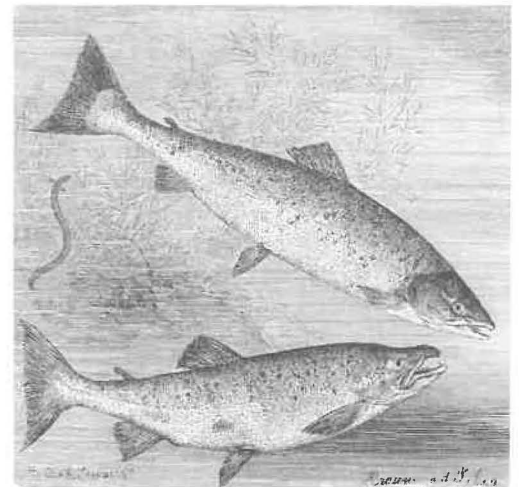
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The coordinated efforts between
state, federal, and private agencies are
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This Pennsylvania gardener is in the busi-
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ers. At home, however, comfort and beauty
come first.

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Watershed Analysis and
Cultural Resources: Tribal
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Treaties signed between the United States
and each of the peninsula tribes in 1855
guarantee each tribe's right to resources
within defined treaty areas.

I am retiring from the university in May 1996 and will no longer be subscribing. I wish to thank you for your efforts in helping us establish a WiNR program and encouraging our women undergraduates to continue in their education.

Kenneth G. Watterston, Nacogdoches, Texas

In the Kiosk section of the December journal you mention that there will be a focus issue of *Women in Natural Resources* on the 10th anniversary of the Dallas Symposium: Women in Natural Resources. What was that event? Was the conference WiNR's conference? I'm confused.

Nancy Colusco, Indianapolis, Indiana

Editor's note: We had several calls and e-mails about that same notice. In order to make it clearer to those who weren't subscribing at that time, we decided to reprint from the March 1986 issue (which essentially was the proceedings from the conference) short excerpts from articles that will shed some light. They can be found on the editorial page, inside cover. We hope that attendees to the Dallas conference in 1985 who have something to contribute will send their articles to WiNR. Send them by fax to 208-885-5878 and an editor will respond quickly. If an attendee has anecdotes, photos, or personal observations to make about the event, let us know so that we can include them.

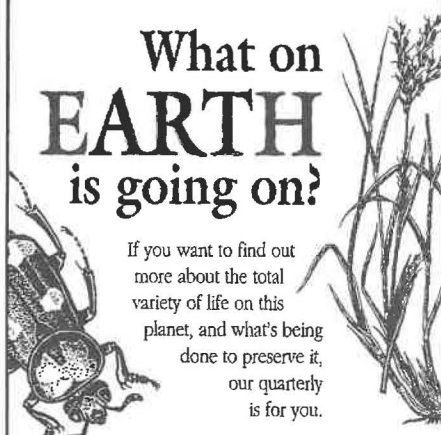
CORRECTION: The December 1995 issue of WiNR had an error in the Publications section. The information regarding the *New Complete Guide to Environmental Careers* should read that it is published/available from the Student Conservation Association at P.O. Box 550, Charlestown New Hampshire 03603.

Nina Roberts, Arlington, Virginia

I really enjoyed the articles in the agroforestry focus issue. The connection among the disciplines is so obvious. Why are Americans so slow to pick it up?

Janet Black Sampson, Denver, Colorado

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Moscow ID 83844-1135 (208-885-6536; fax 208-885-6226; e-mail kmallory@cedar.csr.v.uidaho.edu.

The committee will begin reviewing applications April 12, 1996 and continue until a suitable candidate is found. AA/EOE

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Submit letter of application, statement of teaching philosophy, resume, academic transcripts, and names and addresses of three professional references to: Larry A. Nielsen, Director, School of Forest Resources, 113 Ferguson Building, Dept. WOM, The Pennsylvania State University, University Park PA 16802 (814-863-7093). For detailed information about the Wildlife Technology program and the position, contact Dr. C. "Hoagy" Schaadt, Program Leader, Wildlife Technology, at 814-375-4747. **Closes April 30, 1996 or until position is filled.**

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NATIONAL PARKS AND THE WOMAN'S VOICE: A HISTORY

POLLY WELTS KAUFMAN

Women Park Service Rangers: An Assessment

Entering the ranger force gave women their greatest opportunity to pursue nontraditional careers in the Park Service. In just twenty-five years from the time the first women became fully fledged park rangers, the proportion of women rangers rose to nearly 30 percent. The change in women's occupations in the service is striking: in 1970, nearly 70 percent of Park Service women held clerical positions and only 3 percent were park rangers; in the mid- 1990s, 28 percent of Park Service women held clerical positions and 19 percent were park rangers. Progress for minority women park rangers, however, was slow. They represented only 13 percent of women rangers and 4 percent of all park rangers.

A breakthrough improving the status and grade level of all park rangers implemented in 1994 positively affected the future of women rangers. In the past, one of the reasons women were able to enter the ranger ranks was that, despite the high quality of people attracted to the job, it was a low-pay position, for both men and women. The *Ranger Futures* initiative, crafted by members of the *Association of National Park Rangers* (ANPR) working with OPM, succeeded in raising the status of park rangers. Reflecting the Park Service's core mission—protection and use of national parks, it redefined the job as a generalist field position responsible for protecting a park's natural and cultural

resources and educating the public about the value of a park's land, wildlife, vegetation, and cultural groups. The service upgraded the knowledge, skills, and abilities required, including new educational requirements in the natural sciences or cultural history, and removed positions formerly included in the park ranger series that properly belonged in such other areas as biologist, historian, or dispatcher. A special appropriation funded immediate increases in the grades of the more than three thousand individuals who qualified to continue as rangers. Park rangers, who can choose to specialize in resource protection or resource education, can now progress up a career ladder to a GS-9 from a trainee grade of a GS-5 in two years, if they meet the new standards. Rangers selecting protection must earn the basic law enforcement commission.

Women profited from the new definition of park ranger in both a specific and a general way. Women and men will continue to receive exactly the same increases in grade from a GS-5 level up through at least the GS-9 journeyman level. Perhaps most significant are possible long-term effects of the change. By placing an equal value on education and protection, the Park Service took a major step toward reducing the influence of the Park Service's male-dominated military culture. Although women now earn nearly one-quarter of Park Service law enforcement commissions, it is still in the field of interpreta-

tion that women have shown their greatest strength. By increasing the value of educating the public, the worth of women's particular skills and experiences has been increased.

There are, however, still several areas that could hinder women's progress toward reaching equity as park rangers. Only 35 percent of newly hired rangers have been women, and the Park Service has been slow to appoint women as park superintendents, one of a ranger's traditional means of advancement. Veterans' preference in hiring and sexual harassment, two issues from the past, could still have an effect. A gifted naturalist who proved herself as a summer seasonal at Isle Royale came in second for a permanent position because a less experienced veteran had to be selected. Single women faced the expectation that they were available for affairs with both unmarried and married men. On the other hand, within ANPR itself, women are fully accepted: many members are Park Service dual career couples and, in 1995, ANPR elected Deanne Adams president, supported by officers and a board of four other women and three men.

Park Service field women worked so hard to gain equity in jobs and uniforms that many of the pioneers accepted what amounted to a male-oriented model, adopting the male definition of park ranger instead of finding their own voices. Over and over again in interviews, field women declared that there was no difference

between successful female and male rangers. Some were reluctant to marry, but even more were afraid that having a child would make them be seen as different and hurt their careers. An exception was at Independence in Philadelphia, where a large female ranger force offers an informal support group. An analysis of questionnaires from 536 Park Service women in 1985-86 revealed that, although half of women rangers were married, only one quarter had children. Women in the more traditional administrative and clerical jobs cited having to move from park to park as their most difficult problem, but women rangers most often cited the balance between marriage and career. Individual comments pointed up the conflict. One woman ranger simply said that if "you start a family . . . you have to leave the Park Service." Another said, "I need to establish my own independent career before marriage," and another commented, "I fear I'll stay single because of my career."

Expressing Difference

Even though many pioneer uniformed women believed a male-defined model would bring them the most success, it is when they express their difference that they made their greatest contributions. It is important to have women in the field because it enlarges the talent pool from which to draw workers, is more representative of the public, and presents role models to the next generation. Equally important are the differences women bring to the role. Women's socialization as nurturers and carriers of culture, their smaller size, and their experience as outsiders with new perspectives on traditional institutions also contribute to the changes they bring to the Park Service. Women working in protection make it clear that if a woman holds that position, she should perform all the attendant duties, including night road patrol, backcountry patrol, search-and-rescue, and making arrests. But several supervisors believe that women also bring special strengths to law enforcement. As superintendent of Denali, Robert Cunningham found women in protec-

tion to have "different sensitivities" from men, making them especially valuable in certain situations. Noting that rangers usually check concession bars late in the evening, he said: "It is not uncommon to send a male through there and wind up with a problem, whereas you can send a female through there and not have a problem [because] the female doesn't provide the same threat."

Supervisors mentioned women's judiciousness and expert use of "voice judo." One male chief ranger said of one of the women on his staff that he "was always amazed at how she could talk people into jail." Jane Marshall's major tool in police work has been her sense of humor. As field commander in the patrol branch of the Park Police in the District of Columbia, one of her main goals was to help the officers she supervised protect themselves from escalating situations by being too macho. Partly a holdover from the time she was a training officer at FLETC, Marshall thinks of her officers as sons and, more recently, daughters, to be developed and protected. Valerie Fernandez's style is similar to Marshall's: "Women don't feel they have to prove themselves in . . . fights," she said. "I don't feel I have to

fight with the people who are already engaged in assaulting one another."

Women have also changed the field of interpretation. Few women engage in the old-style interpretation, used by some male rangers in the past, that bordered on entertainment and often began with finding out where people came from. Women interpreters assume visitors are interested in the park's resources and tend to act as educators, usually including a preservation or environmentalist message.

Four women interpreters have received Freeman Tilden Awards for excellence in interpretation; each developed environmental education programs. Sandy Dayhoff shared traditions of the Miccosukee tribe at the Everglades; Carol Spears encouraged visitors to assist in resource management activities at Cuyahoga Valley National Recreation Area in Ohio; Sylvia Flowers developed a discovery lab at the Ocmulgee National Monument's visitor center in Georgia; and Kimberly Valentio brought interpretive programs to an Arctic community in northwest Alaska.

In urban areas, women rangers have reached out to children. At Lowell National Historical Park, Marjorie Hicks developed a Junior



Ranger Naturalist, Herma Albertson at Mammoth in 1929. She was the first woman in the NPS to be selected as a ranger naturalist from the Civil Service register (1931). She served at Yellowstone 1929 to 1933.

**National Parks and the
Woman's Voice: A History**
by Polly Welts Kaufman
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Ranger program that involved 450 young people over a five-year period. Not only did students assist with park projects, but their positive attitudes about the park reduced vandalism. The staff at Edgar Allan Poe National Historic Site invited neighborhood children to write and publish poetry in a park magazine and to be trained as Junior Rangers.

Women bring a different point of view to interpretation in battlefield parks. Betty Gentry, retired superintendent at Pea Ridge, an Arkansas Civil War park, explained that most male rangers concentrate on military strategy, but "a woman looks at it in terms of the suffering and the impact upon the community around where the battle took place that men don't always look at." Gentry told visitors to the park's Elkhorn Tavern about the family who lived there and retreated to the basement during the battle. "The troops and the fighting were all around with bullets going through the house," she said. "They brought the wounded in and the blood dripped through into the basement where the family was." Becky Lyons developed a Women in War program at Gettysburg and plays the role of a soldier's wife who served as a nurse. She emphasized the cost of war by describing conditions in a town with 24,000 wounded men and quotes Kate Cumming, a young confederate nurse: "The War is certainly ours as well as that of the men. We cannot fight, so we must take care of those who do." At Appomattox Court House, Cynda Carpenter portrays Mary Hicks, a resident there during the Civil War, to show the profound changes the war brought to the lives of Confederate women both during and after the war.

When Pat Lammers was not allowed to portray a soldier or participate in cannon demonstrations using explosive black powder at Antietam, she researched Civil War history and found that four hundred women had been documented as serving as soldiers in disguise. She sued the Park Service and accepted a compromise that uniformed women could fire a cannon but could not dress as soldiers.

Women interpreters have been instrumental in bringing interpretation of their racial and ethnic cultures to parks. At

Yosemite, Julia Parker, a Pomo Indian, continued the basket-weaving tradition begun by Tabuce and Lucy Telles decades before; and at Bighorn Canyon, besides presenting Crow Indian culture in her programs, Theo Dean Hugs, a member of the Crow nation, conducts seminars on Native American issues and serves as a liaison between the Crow people and the park, which borders the Crow reservation.

When Althea Roberson, the first African-American woman ranger at Yosemite, presented the history of African-American park employees, she shared the information that an all-black cavalry unit protected the park at the turn of the century. At Martin Luther King National Historic Site, Barbara Tagger described the strong community of African-American business and professional women on Auburn Avenue near King's birthplace. Rose Fujimori, retired site manager of Puukohola Heiau National Historic Site on the island of Hawaii, developed the park's story by introducing native Hawaiian culture. Fujimori believes visitors would like to hear the park story from a Native who "will speak from his/her heart and . . . give a little more cultural experience to a visitor."

Two Park Service interpreters who are disabled have introduced their perspectives to visitors. When she was an interpreter at the White House, Erin Broadbent displayed a sign on the back of her wheelchair that said: "I may not be totally perfect, but parts of me are excellent." Catherine Ingram, who is hearing impaired, demonstrated crafts at the Old Stone House in Georgetown, D.C. At Yosemite, Jennifer Jacobs, a hearing person, developed the deaf services program and interpreted in sign language.

Although there are several parks devoted to a famous woman or to women's history, women interpreters in other historical parks have made special efforts to bring women's history to students. At the Arch, in St. Louis, Barbara Consolo switched tours with a male interpreter when Girl Scouts arrived expecting a tour about women in the West: "It was a great feeling to know they learned something about women's roles." At Boston National Historical Park, Lynne Dubiel developed a Rosie the Riveter talk for the Charlestown Navy Yard. Schoolchildren board a destroyer and learn about the eight thousand women who did "men's work" during World War II. Vivien Rose, historian at Women's Rights National Historical Park, believes that when you add women's history "you completely change the perspective on the past." A recent survey found that at least one hundred national parks include women's history in their programs.

In natural parks, women interpreters found historic women to portray in living history presentations. Lucia Perillo was one of the women to play the role of Fay Fuller, the first woman to climb Mount Rainier, using Fuller's own words. At Denali, Jane Anderson chose the role of crusty pioneer and miner Fanny Quigley, and at Sequoia, rangers presented Elizabeth Grant White, who explored the Sierras with her husband in the early 1900s.

Women often present a fresh point of view in solving park problems. Robert Kerr, a former regional director, thinks women are more impatient with decisions based on the past than men. Sandra Key explained that women do

not value tradition because they were not part of it. When Key was superintendent at Bryce Canyon, she wanted to reroute a trail that disrupted a rare plant colony and the men on her staff opposed her. Robert Kerr also believes that women are more apt to work with the landscape, rather than to dominate it. A woman seasonal convinced him not to hire his usual contractor with big equipment to remove trees from a campground; instead, he allowed a park crew, more sensitive to the environment, to do the work and preserve the trees. Lisa Lee Smith made a similar point: a wall on a trail is not completed until "mother nature . . . put[s] her finishing touch" on it with "grass and wild flowers growing in between the rocks or lizards living among our work."

Some women have been more willing to speak out to preserve the environment than the traditional male ranger. While serving as a seasonal ranger in the North Cascades, Edie Dillon received a letter of commendation and a letter of reprimand in the same mail. She was reprimanded after the press reported that she dressed as an outhouse at a staff costume party to protest recent Interior Department decisions she believed would endanger the natural resources in parks; she was commended for saving the life of a neighbor who slipped on the ice and broke her hip on a very cold night. Dillon heard her cry out, dragged her inside on a blanket, radioed for help, and kept the woman warm with her own body heat until help came.

The male-defined culture of the Park Service was constructed by white men anxious to preserve their hegemony and their masculinity. Although the service as a whole was not aggressive in seeking diversity, training opportunities and a new emphasis on education in parks helped women achieve opportunities for field positions. The strength of the male-oriented culture, however, influenced the first Park Service field women to seek a male-defined model and not value their own different voices. As women moved up in the hierarchy, becoming park superintendents and administrators and branching out into such new professional positions as historic preservation and resource management, they began to search for their own voices, often unconsciously, and to find their own places.

Annie Barrett Boucher found her place on the Yosemite trail crew: "I stop work sometimes and look down at the valley, and across at Sentinel Dome and Glacier Point, and think how insignificant I am in this wilderness.

But then I realize that I do have a place and a significance in it. If people were not here would these mountains and waterfalls be really here? It is the experiencing of our world that truly makes reality. . . . So I'm helping to make the experience both possible and real. After me others can come, to love it as John Muir did. . . . And as I do."

Top: National Park rangers Kristen Britain and Betty Lyle approach the top of Cadillac Mountain in Acadia National Park in Maine. Below: Gina Muzinich, ranch manager at Point Reyes National Seashore (California) breeds and trains horses for horse patrol. Here, she gives instruction on how to cross bridges.



Polly Welts Kaufman talks about writing the book.....

The nine years I spent researching and writing *National Parks and the Woman's Voice: A History* represent a coming together of my professional and personal lives. The project called on my skills and experiences in both areas.

The area in women's history that has interested me the most in my 20 years in the field is the study of women who decided to enter a male-defined domain who also share characteristics that define them as a group. Although I pay attention to the individuals involved, I am most concerned with their combined identity and especially with their "search for equity," as I titled one of my books. The concept translates to mean women's collective efforts to gain power in space controlled by men. I am also interested in understanding the women's

motivations and goals as well as how they changed the male world they entered.

My first study (my dissertation) was of women who entered city politics in Boston 50 years before the 1920 suffrage amendment when male citizens elected them to the Boston School Committee. Among their goals was improving the life chances of young women students and teachers. Next I traced members of a group of 600 New England and up-state New York teachers who journeyed West, as single

women to separate locations, over a period of 10 years in the 1840s and 1850s. Sponsored by the National Popular Education Board, the majority of the women stayed in the West, becoming pioneer settlers. Concurrently with my Park Service research, I planned and edited a series of essays on the history of women at my alma mater, Brown University, in celebration of 100 years of women students. The chapters demonstrated that every gain for women including the first opened door, came because women organized to make their demands.

It is my personal life that propelled me to choose women in the national park movement as my longest and most complex study to date. As an amateur

naturalist and enthusiastic hiker, I had been tuned in to national park issues for a long time, but always influenced by an underlying assumption that the National Park Service was entirely a male preserve.

A series of events in June 1981 jolted me out of that belief. The first was at the Berkshire Conference on the History of Women at Vassar College where two groups of Park Service women made what seemed to me then astounding presentations. They shared the news that two places in New York State of great significance in women's history were about to become national parks: the site at Seneca Falls of the first women's rights convention and Val-kill, the retreat and home of Eleanor Roosevelt in nearby Hyde Park.

The second group of events occurred the following week on a trip with my

husband to the Four Corners Region in the Southwest. At Canyon de Chelly, Kayci Cook, who, as a well-informed uniformed volunteer, was beginning her Park Service career, took us on an extensive walk, explaining that although she was a fourth-generation Park Service daughter, she was the first woman in her family to hold an official position. A few days later, at Mesa Verde's 75th anniversary, Lorraine Mintzmyer, the first woman regional director, chaired the program. What is more, a commemorative newspaper reported that women had founded Mesa Verde in 1906. All these events convinced me that women's roles in national parks had a past, present, and future and I knew I wanted to tell the story.

It was not until 1985 that I was able to begin the research, and by then Ed Bearss, then Park Service chief historian, had found funding for my travel expenses to national parks and regional offices in each of the then 10 regions in order to tape interviews with 340 Park Service women employees and 40 wives. Each region also arranged for me to meet with women as a group and distribute questionnaires. I received answers from 536 Park Service women, more than 10 percent of the women employees.

Earlier I learned that a study of professional women in the Park Service has been started by the late Dorothy Boyle Huyck who had gathered archival and manuscript resources and taped 140 interviews before her untimely death. Her daughter, Heather, and husband, Earl, encouraged me to undertake the study and arranged for me to use Dorothy Huyck's papers.

I decided to expand the scope of the book to include women national park founders and environmentalists, explorers, visitors, naturalists, and mountain climbers. I wanted to begin at the beginning and continue to the present. Extensive research in the Library of Congress, partly guided by Hazel Hunth Voth's two volume *Bibliography of National Parks and Monuments* (US Department of the Interior, 1941), led me to scores of articles written by women describing their roles in national parks going back to 1857. The research libraries at Yosemite and Yellowstone national parks, the personnel files in the National Archives, and the collection at the National Park Service library and archives at the Harpers Ferry



Center were filled with primary sources. Individual Park Service women and men provided important memos they had squirreled away because of their significance and a few Park Service women and men played the key role of keeping me informed about current issues throughout the entire study.

The research for the two chapters on the nearly 50 women or groups of women who founded or protected specific national parks, most of whose stories had never been published before, began with a list of national park advocates supplied by the National Parks and Conservation Association. I interviewed each living woman and used library research, generally at the park level to find the stories of the others.

What is most significant about my method of researching National Parks and the Woman's Voice was my choice to do time-consuming grass roots research and to develop a large network of concerned and knowledgeable individuals both within and outside the Park Service. The reason historians of the American environmental movement leave out these important women park founders is that they do their research from the top down. Because the Wilderness Society has had only one woman president (Celia Hunter from Alaska), the Sierra Club only three (most recently: Susan Merrow and Michele Perrault), and the National Audubon Society none, for example, most environmental historians have found few women to write about.

Somehow I amassed 12 26-inch file drawers of material and photographs, four 4-foot shelves of books, in addition to the taped interviews (now on file in the National Park Service Library at the Harpers Ferry Center, Harpers Ferry, West Virginia) and the questionnaires (now on file at the Schlesinger Library on Women's History, Radcliffe College). My final job was to select the most significant stories (I probably chose only 10 percent of the filed material), identify key concepts, set the study in context, and decide what it all meant.

But the story of Park Service women has not stopped with the publication of this book. In my acknowledgments I compared the process of bringing the study to closure to riding a storm wave to shore in a small boat. You think you have landed safely, but before you catch your balance, another wave is upon you. Eventually you must jump out into the unsettled sea, pull the boat in, and tie it up.

Polly Welts Kaufman is a visiting associate professor of history at the University of Southern Maine in Portland where she teaches, among other courses, American Environmental Movements and Pioneer Women in the American West. She teaches women's history at the University of Massachusetts-Boston (eight years). She lives in Harpswell on the Maine coast.

In addition to National Parks and the Women's Voice, she is the author of: Women Teachers on the Frontier (Yale University Press, 1984) and Boston Women and City School Politics, 1872-1905 (Garland Publishing, 1994) and editor of The Search for Equity: Women at Brown University, 1891-1991 (University Press of New England, 1991) and Apron Full of Gold: The Letters of Mary Jane Megguier from San Francisco, 1849-1856 (University of New Mexico Press, 1994). Kaufman holds an M.A. in history from the University of Washington and an Ed.D. in educational leadership and American studies from Boston University.

Publications

The American Fisheries Society has published a handbook (\$10) designed to help potential employees find jobs in fisheries work. Edited by Tracy D. Hill and Robert M. Neumann, it includes professional development topics as well. To get one, write Mike Cyterski, Student Chapter AFS, 803 Claytor Square, Blacksburg VA 24060.

Oregon State University has a new marketing guide to help consumers find Oregon products and services dealing with wood. The guides cost \$22.75—or will soon be on computer. Contact them at 1134 SE Douglas Ave, Roseburg OR 97470 for ordering information.

An important book of the feminist movement in 1969 was *Our Bodies, Ourselves*, written by eleven women in Boston who could not find good medical information about women—and when it could be found, it was patronizing. Now there is *The New Our Bodies, Ourselves* which expands and updates the old. There is missing, however, the sense of optimism of the early one—that women physicians were going to humanize the profession and that some kind of floor level health care would be available in the near future.

The *Academy of Management Journal* published in July 1995 Mark A. Huselid's study (Rutgers) which measured firms on how frequently they used various high-performance practices. He then looked for statistical correlations between human-resources policy and financial performance. He found that high performance perks such as skills training, mentoring, performance appraisals tightly linked to compensation, merit-based promotions, cross-functional teams, job rotation, and quality circles paid off handsomely and quickly in sales, profits, and market value for the companies. Huselid's conclusions underscore the facts that production techniques and marketing strategies, for example, can be easy to reproduce, but the workforce cannot. The data are useful for agencies and public entities as well. Bigger investments in human capital pay off immediately and last a long time.

The *New Interview Instruction Book* underscores the shift in current thinking away from hiring "by personality" to hiring based on the ability to do the job. An interview should be a hands-on, at-work meeting between an employer who needs to get a job done and a worker who is fully prepared to do the job during the interview. The interviewee should be asked to present a broad outline of a solution to the employers situation. The book, by Nicholas Corcodilos (order by calling 908-236-8440), helps both sides improve the odds of an interview success.

Rosalind Wiseman wrote *Defending Ourselves*, a book that has just gone into a second printing, with the theme that we must teach young girls and young women how to save their own lives. She runs the non-profit Empowerment Program in Washington DC and teaches and writes of self defense plus skills to prevent girls from being targets for sexual violence.

Real Gorgeous: The Truth About Body and Beauty by Kaz Cooke (Norton) debunks beauty and being skinny myths and gives girls some assistance in navigating puberty.

Answers is a bimonthly magazine for adult children who are caring for aging parents. Since it is usually women who do that kind of work, too, it might be worth looking into. Call 800-750-2199 to order.

What I Hope to Leave Behind: The Essential Essays of Eleanor Roosevelt was edited by Allida M. Black (Carlson Publishing) and documents Roosevelt's evolution from a novice to a progressive and practical politician. There are 126 essays organized into nine focused sections. She's a good storyteller—and was an important and early champion of many of the liberal ideals now under attack.

Jessie A. Micales

Brazil's Oilseed Processing Industry 1970-1993

Joyce Cacho
University of Missouri



Research

In

Progress

Focus on:

ECONOMICS



Many people ask me "why Brazil?" and "why soybeans?" It started with my interest and studies on food marketing, distribution, and trade. I found that policies play a significant role in gaps in food availability, particularly in developing countries.

At the Master's level, I had analyzed the impact of differences between United States and Brazilian soybean grading standards, a policy tool, on market share of Japanese oilseed imports. I then accepted the offer for doctoral studies in Agricultural Economics at the University of Missouri because there was a clear opportunity for field research in Brazil about the economics of soybean production. Over the last 20 years, Brazil has become a major player in soybean complex trade.

I traveled in Brazil from May through September, 1995. The purpose of the trip was to collect oilseed processing industry and public policy descriptive data. My research builds on previous agricultural production research that shows that the 'tropical' soybean variety was pivotal to bringing cerrado land into production within the last 25 years.

The cerrado (photo left) is located in the high plains: in the Centerwest region, and in the western areas of the Northeast region. Agricultural production in the cerrado requires extensive application of nutrient supplements. Monocropping of soybeans in the Centerwest has caused concern for soil erosion because the crop is rain-fed.

Identifying and analyzing factors critical to Brazil becoming the largest exporter of soymeal in the world are at the core of my research. From background reading on Brazil's economy, I realized that there was extensive government management of the economy over the 1970-1993 study period. Because of these government controls, public policies would be a critical factor in the rapid expansion of their soybean processing industry. Diversification of the cerrado region's economy and reduced subsidized financing of production may lead to the abatement of expansion of soybean production.

In Brazil, I was a Visiting Graduate Researcher with the Program of Agroindustrial Business Studies (PENSA) of the University of Sao Paulo. During May and June, I worked on determining the sources and availability of information about the industry. It became clear over that period that a planned industry survey from a centralized location with already organized documents would not be feasible. I would have to substitute on-site data collection methods.

At the end of May, I rushed to Brasilia to meet with the outgoing Secretary of the Oilseed Processors' Association (ABIOVE) before they moved to Sao Paulo. Unfortunately, available data was limited to the previous year and I was informed that companies reported aggregate statistics for all plants. Since I was also interested in policies, I traveled to Rio de Janeiro to meet with Dr. Lopez, Director for the Center for Agricultural Economics at the Getulio Vargas Foundation. She fully understood my research objective and directed me to published data on the marketing program payments to processors. This gave me renewed hope that published data existed.

My professors and I agreed it would be beneficial to extend my stay. I still had to visit with lending institutions and management of plants in the geographic regions where investment has occurred. It would take the entire month of July to confirm meetings for the required extensive travel. On July 21st, I flew from Sao Paulo to Rio de Janeiro — the first leg of five weeks of non-stop traveling. A description of this part of my field trip follows.

On the Road

In Rio, I combed through numerous documents at the Development Bank of Brazil (BNDES). I also collected price and quantity data of various crops at the farm gate, wholesale, and retail levels, and monthly inflation from the Getulio Vargas Foundation.

From Rio, I flew to Curitiba, Parana in southern Brazil. This is the traditional region for soybean production. The terrain is hilly and is well suited for the small land holder doing low technology farming. While in Curitiba, I went by bus to spend the day at the processing plant at the Paranagua port owned by the COAMO producer cooperative. In addition, I searched libraries at the Southern Region Development Bank (BRDE) and the state Planning Secretariate, and attended a day of the annual meeting of the Brazilian Society of Rural Economics (SOBER).

I flew from Curitiba, Parana in the South to Salvador, Bahia in the Northeast. Salvador was the first capital of Brazil. It continues to be the cultural center of Brazil's sizable population of persons of African descent. Brazil's first School of Medicine and the Museum of Afro-Brazilian History (see photo) are in the upper part of Salvador. Currently, the tourist aspect of Bahia's rich culture is being promoted — nationally and internationally. The poor economic condition of Salvador is a stark contrast to cities in the South, whose wealth and infrastructure are often compared with New York.

After four days, I left coastal Salvador for Barreiras in the western interior of Bahia. I traveled during the day so that I could see the terrain. From the bus window, the land

looked rocky and there was very little vegetative cover. Drought is one of the challenges of agriculture in the Northeast. Historically, an estate production system — with large landowners and low wage labor — has dominated the state's agriculture. Western Bahia is the soybean planting area most recently brought into production — the novo cerrado.

I arrived in Barreiras at midnight — 14 hours after leaving Salvador. I spent two working days in Barreiras touring a processing plant and visiting a large, modern farm. As had occurred in the Centerwest, soybeans here are farmed by families from southern Brazil. The taxi driver told me that growth in soybean production in the area around Barreiras, has resulted in improved infrastructure and increased employment opportunities. Traveling in Bahia provided me with a historical perspective. I also started to gain an appreciation for regional geographic differences.

At 11pm of my second day, I left Barreiras for Brasilia, Distrito Federal, the capital of Brazil. Since I was traveling south during winter, the temperature became cooler as I traveled through the night. In Brasilia, I met persons with government agencies and libraries as I continued my search for data. Frequent changes in government ministries and personnel means that consistent quantitative data are not available. However, in government libraries, I found Portuguese-language literature that describes rural development policies focused on the Centerwest region, and lending policies to support industrialization.

I flew from Brasilia to Cuiaba, Mato Grosso, the largest state in the cerrado. The Cuiaba airport is very busy since it is one of the gateways to the Pantanal, a swampland with a multifaceted ecosystem that changes its alluvial face every six months — much like the Florida Everglades. The soybean fields were fallow and the factory was undergoing maintenance. However, this was an opportunity to interview factory management about



the factors that motivated the investment in 1990 that established that plant. I was told that state tax incentives which made it cost effective to locate a plant within the 'new' soybean production area was a major factor.

For a long weekend, I traveled by road to the Pantanal. Suffice it to say, the sights were beautiful, alligators and all. I endured a ride in the back of truck with the sides open, over a dirt road with single lane wooden bridges.

When I returned to Brasilia, I completed interviews and continued collecting research documents. Within five days, I boarded the bus to Sao Paulo. In the last three weeks of my stay, I gathered materials, participated in PENSA's International Agribusiness Seminar, and presented a seminar on my research to PENSA colleagues.

Lessons Learned

By conducting economic development research in the country that is the location of the research, I gained an enormous appreciation for factors that constrained or assisted the development process which may not be evident from statistical analysis. Consequently, results of my research are complemented by quantitative economic analysis.

Throughout my travel in Brazil, I was constantly reminded of human kindness. My respect for Brazilian culture meant that people extended themselves to help me. I spoke Portuguese, rather than English, whenever possible. My Portuguese proficiency improved significantly during my stay. This is particularly important as I read research documents I brought back.

The aspects needing improvement were: (1) Budgets of time and the corresponding funding were underestimated. To conduct field research overseas, I recommend making larger contingency allowances than for research in the United States. The costs for accommodations, food, and finding transportation and communication networks, e.g., telephone lines, within the country were expensive and increased the overall cost.

(2) Access to the subjects of research could have been enhanced by establishing

an exchange relationship with a leading institution in the country.

Identifying funding and institutional linkages are lengthy, time consuming processes. Funding is particularly difficult for research where the private sector is the subject. Industry information may be a definitive factor and could be used by a competitor for domestic and international markets. As persons related to Brazil's oilseed processing industry questioned the source of my research funding, I could honestly say that it was not financed by a competing firm.

Research Results and Outlook

Two distinct policy frameworks are important to the development of Brazil's oilseed processing industry: (1) soybean production benefited from Brazilian government rural development programs for a targeted area — the cerrado; (2) investment in processing plants was supported by policies which had the objective of import substitution. I am beginning the task of analyzing the interdependence of these policy frameworks. Assessment of the influence of Brazil's participation in the Southern Cone trading block (MERCOSUL) will be included.

In further research on public policy and agribusiness development, I plan to conduct comparative studies across countries and industries. Research results would contribute to policy formulation in developing countries. The increasing importance of the policy coordination is anticipated as countries move to private sector-led growth. The role of public policy becomes that of providing 'bridges' between sectors.

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AMA'S ARE SMALL, SELECTED BLOCKS OF LAND WHERE NEW WAYS OF DOING THINGS CAN BE TRIED AND EVALUATED. THERE ARE 10 AMA'S IN THE NORTHWEST FOREST PLAN AND THIS IS ONE OF THEM.

CENTRAL CASCADES ADAPTIVE MANAGEMENT AREA

JEAN NELSON DEAN

Because human understanding of nature is imperfect, human interaction with nature should be experimental. Adaptive management applies the concept of experimentation to the design and implementation of natural resource and environmental policies.

Compass & Gyroscope, Kai Lee, 1994

In the spring of 1993, President Clinton held a Forest Conference in Portland, Oregon to seek a solution to the ongoing controversy surrounding Northwest old growth forests and species associated with these forests, such as the Northern Spotted Owl. Based on presentations during that conference (and a scientific report that followed), a Supplemental Environmental Impact Statement was developed that covered the management of all federal lands within the range of the Northern Spotted Owl in Washington, Oregon, and California. This plan is often referred to as the Northwest Forest Plan.

The plan caused major changes in federal land management in the Pacific Northwest. Many of these changes were concerned with integrating healthy forest ecosystems with stable rural communities—but there wasn't a simple answer to how this could be achieved.

This is where Adaptive Management Areas (AMAs) entered the picture. The rationale behind AMAs is to use small, selected blocks of land where new ways of doing things and working together can be tried and evaluated to improve the management of those selected areas—and ultimately the management of similar areas. Based on the concept of adaptive management, AMAs furnish opportunities for land managing and regulatory agencies, other government entities, nongovernmental organizations, local groups, landowners, communities, and citizens to work together to develop management approaches. Initiating new research, both biophysical and social research, and then monitoring this research leads to evaluation, synthesis, and distribution to all con-

cerned parties in order to adjust current practices. AMAs are expected to contribute to designing the future forest management in the Pacific Northwest.

The 10 AMAs identified in the Northwest Forest Plan include 1,521,800 acres of both Forest Service and Bureau of Land Management administered lands and represent six percent of the federal land within the range of the Northern Spotted Owl. These areas vary in size from 92,000 to 500,000 acres. The Central Cascades AMA (CCAMA), to be described here, is one of four designated in Oregon (see sidebar).

Each AMA has a different emphasis. The emphasis of the CCAMA is to take a broad view, through research, of what occurs at the watershed and landscape level. The CCAMA also will focus on finding approaches for integrating forest management objectives with stream management objectives; looking at the implications of natural disturbance regimes; and experimenting with the management of young and mature stands of trees to accelerate the development of mature forest characteristics.

To guide themselves in moving forward with the CCAMA, the federal land managers developed a vision statement: "To bring together research, communities, and resource professionals to guide a future for natural resource management." My duties in the CCAMA are focused on public outreach and involvement with the communities. So far it has not been easy.

CHALLENGES TO THE VISION

We, the federal agencies, are challenged by the AMA designation to design ways for people to have access into, and contribute to, the adaptive management process and our land management. So far, in the CCAMA, we have struggled to figure out what we expect of the public, what we can do differently to bring diverse groups together, and how to seek out those who may want to be involved—but with whom we have not yet connected.

We also struggled in the beginning to find out what the public's expectations for the AMA were. What we heard from many people is that they wanted a consensus-based decision-making group.

What constitutes consensus-based decision making? The Applegate Partnership formed in Oregon in October 1992 prior to the Northwest Forest Plan. The partnership was a community-based project that involved industry and conservation groups, natural resource management agencies, and residents, cooperating to encourage and facilitate the use of natural resource principles to promote ecosystem health and diversity. This partnership was one of the forces behind the development of Adaptive Management Areas. A major component of the group was developing consensus-based agreements to manage the federal forest lands. The Applegate Partnership was achieving some success in relationship building and project development and was viewed by many as a possible model for bringing diverse values into the management of forests and for overcoming entrenched conflict over forest management issues.

However, many things changed after the concept of AMAs was first developed. One of the biggest changes was clarification of how the Federal Advisory Committee Act (FACA) would affect opportunities to develop partnership groups, like the Applegate Partnership, within the AMAs. FACA, which was passed in 1972, regulates how federal representatives and nonfederal individuals or groups can interact with each other, and how federal representatives can obtain advice and recommendations from nonfederal individuals or groups. FACA was passed in order to ensure equitable access to the federal decisionmaking process. Prior to FACA many individuals felt that special interests were allowed undue influence into federal decisions.

FACA has many different aspects, but what it has meant for AMAs is that local partnership groups, like the Applegate Part-

nership, cannot become preferred sources of advice or recommendations to federal officials—and that federal officials cannot regularly sit with any group to develop options for managing the federal lands unless they are a formally chartered group. This changed many public and federal individuals' pictures of how the public could be involved more fully—as partners—in managing AMAs.

Though the CCAMA had not developed a partnership group with Forest Service and BLM members involved, many members of the public were expecting a type of Applegate Partnership to evolve and it was a major blow to their enthusiasm for being involved in the AMA once it seemed that it would not occur. The Forest Service and the BLM became the focus for their disappointment. Once again, it seemed to members of the public, they had been led down a promising path only to hit a bureaucratic wall.

Location and Cultural Differences

Even before the clarification of FACA occurred, it was clear that the location of the CCAMA would make a partnership group a difficult proposition.

The CCAMA boundaries include portions of two different watersheds, the McKenzie River and the South Santiam River. A mountain ridge divides these two watersheds and limits access between the communities associated with the AMA. It takes nearly two hours to drive from one side of the CCAMA to the other. The Applegate Partnership for much of its early development met once or twice a week and members of that group felt that meeting often in the beginning was a key to their success. For some interested public CCAMA members, the distance to drive would prohibit them from meeting with frequency.

The communities affected by the CCAMA are also structured very differently. One community is a diverse metropolitan area consisting of two cities with a combined population of some 225,000 people. This metropolitan population has strong interest group representation and community structures such as universities and a community college, libraries, multiple schools, city councils, and city managers. These structures help individuals in the communities have access into decision making processes at the federal level and the knowledgeable members help other members of the communities get information about activities.

Another affected community is a town of about 7,500 people, traditionally dependent on forest products for its economy, that has community structures such as schools, a mayor, a town council. In addition, there are several unincorporated rural communities. These latter communities are spread out

with their main focal points being a gas station or store, or possibly a church. They have few community structures or elected representatives to assist them with getting community grants or to work with federal or state agencies. Also, people in the unincorporated communities have very diverse values, incomes, and lifestyles. The population ranges from commuters who work in the metropolitan area, to commercial tree farmers, loggers, or artists.

An initial social assessment of the communities surrounding the AMA found a wide range of concerns and values. These differences in the communities have made it a challenge to create public participation/involvement efforts that meet all their needs.

Multiple Management Units In the CCAMA there are a number of management "units" or groups. These include three Forest Service Ranger Districts; one BLM Resource Area; the H.J. Andrews Experimental Forest that is a partnership between the Willamette National Forest, the Pacific Northwest Research Station, and Oregon State University; and the Cascade Center for Ecosystem Management, which includes the same partners as the H.J. Andrews Experimental Forest as well as other stakeholders. These multiple management units each have individual, distinct relationships with their interested publics. This is a strength when it comes to contacting and encouraging public members, but makes it a challenge to come to

Central Cascades Adaptive Management Area (CCAMA)

Location and Size: In Lane and Linn Counties, northeast of Eugene, Oregon. 155,700 acres

Involved Participants: U.S. Department of Agriculture Forest Service: Willamette National Forest (Blue River, McKenzie, and Sweet Home Ranger Districts); the Pacific Northwest Research Station. U.S. Department of the Interior Bureau of Land Management: Eugene District (McKenzie Resource Area); Oregon State University.

Goals: The overall objective for Adaptive Management Areas, as designated in the federal Northwest Forest Plan (1994), is to develop and test new management approaches to integrate and achieve ecological and economic health, and other social objectives. Each area has a different emphasis, such as maximizing the amount of late-successional forests or improving riparian conditions through silvicultural treatments.

Emphasis on Research, Learning: The emphasis of the CCAMA is to take a broad view, through research, of what occurs at the watershed and landscape level. The CCAMA is expected to increase our understanding of the technical means for managing forests on an ecosystem basis through small and large scale experiments. The CCAMA will also focus on finding approaches for integrating forest management objectives with stream management objectives; looking at the implications of natural disturbance regimes; and experimenting with the management of young and mature stands of trees to accelerate the development of mature forest characteristics.

Features: The area is dominated by forests of Douglas fir and western hemlock. Forest types include large, relatively intact mature and old-growth forests, natural stands remaining from fire that occurred 125-150 years ago, and harvested areas that are now young seedling/sapling stands of various ages. Wildlife species include those types dependent on interior old-growth habitat and those species using highly fragmented cover types. Fishery resources of the area include anadromous fish, and native and hatchery stocks, as well as brook, rainbow, and cutthroat trout.

Timeline: The CCAMA is an ongoing land use designation in the Northwest Forest Plan for both the BLM and the Forest Service. It will continue as long as the plan is in effect.

Expectations: It is expected that having the BLM and Forest Service work together there will be changes in behaviors and actions that will lead to better ecosystem management, better distribution of scientific information, and increased linkages with members of the public to activities occurring on the federal lands.

decisions on how to involve these publics in the AMA.

Currently, a project is being undertaken to assess how the agencies could involve the publics with greater satisfaction for both public members and the federal agencies. In this effort, all the public outreach and participation planned for various projects on the units in 1996 and 1997 will be described for a small public group to review. This group will meet for a one-day session to provide a reaction to the current public outreach and participation and then describe for the federal group what could be undertaken for increased—or more quality—public involvement. They will identify gaps, inefficiencies, and opportunities. The federal group will make any changes possible to the 1996 efforts with the main goal to change the 1997 outreach and participation. Using the model of adaptive management these changes will be monitored and evaluated and this information shared.

WHAT IS WORKING WELL

Agencies Trying Together One of the expectations of AMAs is that federal agencies will explore alternative ways of doing business internally, with each other, other organizations, local and state government, and private landowners. Early in the development of the CCAMA it was decided an AMA coordinator with Forest Service experience should be stationed at the BLM office. It was thought that having a person with connections to Forest Service activities and personnel and placing them where they would develop relationships with BLM employees to learn about BLM activities would improve coordination between the two agencies.

Diana Bus, CCAMA coordinator, a Willamette National Forest employee, has been stationed at the Eugene BLM office for over a year. Her full-time position has been dedicated to the development and coordina-

tion of activities in the CCAMA. With this type of commitment she has been able to facilitate many changes, large and small. She has opened many avenues of communication between the agencies by connecting individuals for projects, training, and field trips. She has increased the on-the-ground individuals' knowledge of on-going research at the Pacific Northwest Research Station. And as relationships between others develop in the different agencies, it seems that the impact of having Bus in this role will only continue to grow exponentially. She says, "One of the benefits of working with more than one unit or one agency is that I have more options. That is, if one unit can't do something I can always try another one. This definitely comes in handy when your objective is to try new things and new ways of accomplishing work."

Coordination with Other Groups Because Diana Bus can represent the Willamette National Forest, the Eugene District of the BLM, and the Pacific Northwest Research Station, she can also more effectively coordinate and cooperate with other groups. These groups include local watershed councils, rural development groups, community strategic planning groups, community colleges and universities.

Bus has been very active with the two watershed councils whose boundaries are included in the CCAMA. These watershed councils developed out of legislation establishing a watershed management program for Oregon. Their purpose is to provide a forum for ongoing coordination, cooperation, conflict resolution and citizen involvement; to develop a comprehensive watershed management program, and to evaluate the implementation of the program. Included are representatives from agencies, interest groups, elected officials, and interested citizens.

Though rural development groups are interested in developing a variety of programs outside the scope of the Forest Service and BLM, Diana has been able to help them when possible. For example, one group was interested in developing an old fish hatchery into a tourist information center and a place for their chamber of commerce. Diana, along with others, helped the group find resources in the BLM and Forest Service to assist them, such as landscape architects and public affairs specialists.

Another aspect of rural economic development that the CCAMA has been able to assist with is called the Ecosystem Workforce Demonstration Project, which began in 1994 on the Sweet Home Ranger District of the Willamette National Forest. The workforce crew, consisting of 11 to 12 members, works four days a week doing projects on BLM and Forest Service lands and trains one day a week to develop a varied skill base. The crew members' backgrounds include displaced timber fallers, mill workers, equipment operators and seasonal agency workers. The goal is to develop skills into permanent, full-time working situations. The crew also takes courses on ecosystem management (forest and stream ecology) and forest management skills (survey and monitoring techniques). The goal for 1996 and beyond is to develop more crews and to provide opportunities on AMA lands and other lands that are mutually benefit the agencies and workers.

Research and Learning Assessment

It was realized that before the agencies considered new activities in the CCAMA, they needed to know what activities were already occurring. John Cissel, a researcher with the Cascade Center for Ecosystem Management, developed a research and learning assessment for the CCAMA that covered biophysical and social research and land management activities. The purpose of the assessment was to provide organization, focus, and context for understanding how existing and potential future research, development, and education could contribute to the technical and social learning objectives of the CCAMA.

The assessment describes over 100 ongoing research and demonstration projects to land managers, citizens, policy makers, and scientists and helps them make decisions about how to best use the information available from them. It also assists in identifying opportunities and priorities for new research and demonstration projects. It shows how and where researchers can be brought together with land management agencies and community members to improve research activities and facilitate the



Diana Bus, AMA Coordinator and John Cissel, Cascade Center for Ecosystem Management describe the Central Cascades AMA Research and Learning Assessment to community members.

agencies' consideration of the social implications of their activities.

From this assessment it became clear that the agencies needed to set priorities for research, monitoring, and learning projects in the CCAMA because of limited funding and personnel. One specific activity that was identified as a priority following the assessment was the need to know what learning opportunities were available in the CCAMA from different providers. The identification of this turned into an education assessment.

Education Assessment Learning involves both acquiring knowledge of the social and ecological world, and in our context, sharing and exchanging that knowledge throughout the interested community. So in addition to the research and learning assessment, an education assessment found the strengths and weaknesses of the current resource education efforts. This education assessment considered the varieties of natural resource education occurring within the CCAMA. The agencies support education activities already occurring and fill in gaps where needs were discovered.

New Outreach The CCAMA also initiated new outreach activities by the three main partners beyond their traditional circles and processes: a joint newsletter, field trips, nature talks, student internships through the University of Oregon, and attendance at an international environmental law conference.

The newsletter, for example, contains information about activities occurring in the CCAMA whether they are activities generated by the agencies or not. The field trips included showing prescriptions for thinning in young stands, attending presentations by local public members, and native Americans explaining traditional uses of the area. The field trips have been used to mix researchers, community members, and land managers together and to allow relationships and networks to develop.

Prior to the AMA, student internships with the University of Oregon did not exist. Now internships help these students meet with a variety of people working in the natural resource field and with students from a sister university, Oregon State University. Diana Bus noted that "It's great working with these interns. They bring such energy, flexibility and optimism to the table with them. That helps me during these times of agency downsizing and incredible change."

In addition, Bus attended the international E-Law (Environmental Law) conference at the University of Oregon spring 1995. It was the first time a Forest Service or BLM official representative had been at the conference and so surprised some people that it was remarked about in the local newspaper.

A LEARNING SITUATION

The AMA process is like the entire Northwest Forest Plan or any other land management plan, a complex set of issues and ideas. It will take a great deal of fine tuning to get the process running smoothly. Bus, in looking ahead said: "It is all about behavior change and because 'old habits die hard'—that makes it a slow process. We need to institutionalize these changed behaviors and relationships both inside and outside the agencies or it won't work no matter how much we've done."

In the CCAMA, we have experienced our greatest success in bringing the land management agencies and the research community together. We have made our coordination with other groups more effective and beneficial to those groups. We have had success creating a better understanding of what we know about the CCAMA and how we are sharing what we know with others. And, though we are still struggling with how we will be truly successful with the public and the communities surrounding the CCAMA, we are slowly finding the way to move forward with new efforts and "experiments."

At the personal level, I have learned many things as I have struggled with the ideal of bringing researchers, communities, and natural resource managers together. I have learned that sometimes these things need time to evolve because they depend on the formation of relationships; no matter how many ideas you place on the table you may have to wait until the relationships are ready to take on these ideas. (The public and the media, however, do not want to wait for these relationships to form.)

I have also learned that definitions are the key to working with a diverse group of people—the same words do not always mean the same thing to different people. In addition, I have learned that it takes managers making a personal effort to contact individuals to get them involved in the process. And finally, I have learned that we have many questions to answer—both on the biophysical level and the social level—if we want to continue to improve the management of our forests. We can make adaptive management and AMAs successful if we continue to struggle with these questions.

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Dallas Conference, 1985

(continued from inside front cover)

to bring personal values to professional life; and who believed Henry David Thoreau when he counseled to beware of all enterprises for which one must buy new clothes. I am not here to help you out of this latter group and into the mainstream. I would rather keep you with me out on the fringes because together we can make some changes in the world.

Elaine Enarson

The sexualizing of interaction between women and men as they begin to work together is one response to token integration, and is a kind of closing of the wagon circle in the face of women's claims for acceptance as work partners in the natural resources. Here I remind you of the relentless jokes, the casual flirtation, the subtle and not-so-subtle workplace hustle, the harassment, and all the jealousies and rumors which so often attend new women workers. Women may find themselves identified as "the new blond on the district" long before their first day of work, and some men still consider marital status and appearance when making crew or job assignments.

Anne LaBastille

The most pressing ecological issues in 1985 are nuclear wastes, toxic wastes, and acid rain. We had a close call with the Adirondack Park, where I live and work, being number one on the list for a high level nuclear waste repository. If Barnwell, South Carolina, and Hanford, Washington, are closed in 1986, there are a list of six or seven other potential sites. The Adirondacks were an alternative because of the deep crystalline rock deposits. We finally got those mountains eliminated because they are in the largest state park in the United States. National Parks were already excluded. My point is, that no matter where you are—it could be some remote forest in Idaho—somebody might try to put nuclear wastes there. That necessitates a new highway system, huge parking and storage areas of cement, safety systems, patrol and law enforcement, not to mention the danger due to radiation.

It's Our Time

Barb Springer Beck

Good news! The natural talents of women as leaders are finally being recognized for what they are, valuable! Being born and raised female may just provide you with an advantage.

While generalizations about male and female leadership styles are illustrative, each individual is unique. The leadership style of any given manager will fall somewhere along the continuum between "traditional" management and what is being referred to as the female system, or women's ways. Although certain values and personal styles are more frequently chosen and utilized by women, men who have long found themselves outside the traditional management model have experienced some of the same frustrations we have, as well as effectively used the methods now called women's ways. Alternately, some women prefer and have found professional success operating in the traditional management framework. For whatever reasons, because of genes or our socialization, women do share an orientation with each other which is now able to help us make positive contributions in the world of leadership, and in time I believe, in the leadership of the world.

The Evolution of Women in Management—The Early Days

When women first entered the ranks of management in government and business some 20 years ago, the environment was less than welcoming. The prevalent thinking held that women's ways of behaving were a liability to be overcome. These behaviors included; supporting, caring about, and teaching others, soliciting input, communicating openly, and enhancing others' self worth. Amazingly, a particularly limiting trait was that women were "influenced by others." In the mid-1970's I worked for a man whose personal style was very confrontational. At my annual performance rating with him, I was marked down, much to my surprise for "not seeking and causing enough controversy." A low rating was the price I paid for having a smoothly running program where I interacted effectively with others. That these behaviors were considered undesirable speaks volumes about the management environment, and can help us understand how truly difficult it has been for the female management pioneers.

The most optimistic men believed that despite our significant liabilities, it was possible for women to succeed. The path to success was simple: imitate men. Men's ways set the standard for normalcy in management. Women, being different from men were a deviation from the norm, thus abnormal. In the resource agencies, women were initially limited to support positions, they made real contributions, but didn't work directly with the resources. The first women professional resource managers faced a different situation, being "closer to the action." Many of us watched as these talented women felt forced to adopt men's career paths, ways of thinking and acting, even dressing, to receive promotions and greater levels of responsibility. While the majority of people in the work world have progressed beyond this attitude, change comes more slowly for others. As recently as 1991, as a District Ranger, I was asked to don woolen jodhpurs and march in a community parade dressed as Gifford Pinchot, father of the Forest Service. Until I suggested to my supervisor that he march in the parade in a dress, I'm sure it never occurred to him that I might not want to dress up as a man, albeit one of stature, in front of my employees and neighbors.

In *Megatrends for Women* (1992), John Naisbitt and Patricia Aburdene, illustrate the flaw of trying to turn women into men with a twist on a familiar saying, "If the shoe doesn't fit, you should wear it and walk funny." Everyone who has tried this knows that walking in shoes that don't fit ensures one will limp along at best, and at worst, trip and fall. In the early 1990's, I was admonished for handling a difficult issue using a different approach than my supervisor would have used. Upon questioning him for clarification, (which I later found out was considered "disloyal") I learned that the fact that I had successfully resolved the situation was irrelevant to him because I had used an approach he would not have chosen.

Women in non-traditional roles at all levels have felt forced to choose between being true to themselves, and achieving success as it was traditionally defined within their organization or agency. How would this sincere compliment from a male supervisor after a meeting make you feel: "Mary, you were great! I don't even think of you as a woman." No matter the good intention, I'm

afraid I'd find it hard to feel flattered. Try as we might, many of us learned that "do it like men do" just wasn't effective or comfortable for us, and in many cases created more problems than it solved.

The Evolution Continues

Attitudes change slowly, and at different speeds for different individuals. For most, there was a progression in the thinking about women in management. Success, it was now believed, could be achieved by women understanding and playing by the rules of the traditional white male system. Real progress had been made in that we no longer had to try to become men. The basic principle was that mastery of the system in power was essential to operating in it successfully. Women in male-dominated fields such as natural resource management, felt and at times still do feel, that they are operating in an alien world. Understanding and mastering the formal and unwritten rules of the system, when it is foreign to how we would choose to operate, requires great investments of emotional energy, and we have exhausted ourselves in this pursuit.

Well-meaning men made themselves available to help us as mentors, to better learn the system. (As an ironic aside, the first mentor, Athena, the Greek goddess of wisdom, took the form of a male tutor named Mentor to coach the son of Odysseus.) When I had opportunities to enter into mentoring relationships, my idea (once again deviating from "the norm") was that my mentor would guide me in the ways of the organization, while encouraging me to develop my unique strengths. Several male mentors "adopted" me over the course of my career in the Forest Service. Never did I have a woman offer to assist me in making my way, and I think in hindsight it was because they generally weren't in positions of power in the hierarchy, and didn't feel confident to offer advice about operating in a world that was somewhat foreign to them. At one point, desperate for another woman's perspective, I selected a woman and asked her assistance. She was receptive and a long term friendship was formed. The bulk of my experience, however, was that my well-intentioned male mentors viewed the relationship as an opportunity to make me over in their likeness, and to instruct me about "the" career path

ON THE GROW

A Management Column

available. R. Roosevelt Thomas, Jr. in *Beyond Race and Gender* (1991), points out that "no amount of mentoring will result in a woman becoming a man." Thank goodness!

As far as the career path, the message was loud and clear, any deviation from this one and only way would mean certain failure. The accepted Forest Service path was to spend several years in the position of a Resource Assistant, a staff position on a Ranger District, and then progress to a District Ranger. Consistent with career progression in the agency, I saw the District Ranger position as one through which I could utilize my talents, and make a positive contribution in the agency. I rejected repeated suggestions to consider staff positions. As a female social scientist, I chose a goal which heretofore had been the providence of male foresters. After setting my sights, I realized that I knew of no woman role model yet occupying that position. In addition, the path by which a Ranger position was reached, through the chair of Resource Assistant, was strewn with barriers. My application efforts for Resource Assistant positions were met with failure, because in the late 1980's these positions were by and large not open to women. I learned that the "old boy" network tightly controlled these selections since they were the future line manager pipeline. Seeing that my effort to obtain a Resource Assistant job was not yielding results, I set quietly about creating my own path, remaining convinced that my work contributions would not go unnoticed by those with the ability to select me. I attained the equivalent level to a District Ranger by working my way up as a Forest specialist, then working in appeals and litigation. From there I was able to move across to a Ranger position. My career path and selection were still very atypical in 1988, and my abilities were circumspect as a result. But, being offered that first Ranger job was proof that my instincts were on target, and there was more than one path to reach my goal.

From the Industrial Age to the Information Age

So what has changed? Why aren't traditional methods working anymore? Out of the industrial age rose bureaucracy and management founded on rigid hierarchies. The goals of these large organizations were to command and control employees, and thus maximize production. It was believed that employees needed to be motivated and closely controlled through direction from management. Although largely impersonal, bureaucracies and corporations with impressive track records were built during this industrial age. "Traditional" male management assumptions and chain of command were very effective for mobilizing this effort.

In the 1980's, our economy made a transition from the industrial age to the information age. Employee's expectations, and the products of the information age differ drastically from those of the industrial age. Assumptions upon which command and control management were based have changed, rendering those methods less effective. In contrast to directing employees and the wheels of production, future leadership will need to facilitate the flow of information, tap the best ideas of all employees, and adapt quickly to changing situations. The ability to foster cooperation and collaboration will determine the successful leaders of the future.

Women's Orientation: The Key Difference

So, what contributions can women make in this new age? I believe the area of most consequence in how women leaders differ from the traditional model is our basic orientation. By basic orientation I am referring to how we view organizational structure, the primacy of relationships, the importance of process over task, and our holistic focus. This orientation guides the methods by which we lead, how we address conflicts, how we negotiate, how we interact with others, how we solve problems and make decisions. Women leaders prefer to make problem-solving and decision-making democratic or participative efforts.

Let's look at organizational structure. Unfortunately, few women have had the chance to design their organization of choice. One woman who has done this is Frances Hesselbein, National Executive Director of the Girl Scouts U.S.A. Her organization is designed as a series of circles constructed around each other. She sees circles as inclusive, and the circles as interconnected and extending outward. This organization facilitates the all-important flow of information both to and from Frances. There is no top to strive for, the critical position in this and other web-like organizations is in the center.

"Web management or networking continues to be women's prime modus operandi in the work world" according to Aburdene and Naisbitt. Web organizations encourage communication by providing a loose structure, and many points of contact and interconnection. This connection to people in the web gives authority, rather than authority being gained by distance above others in the hierarchy. Sally Helgeson, in *The Female Advantage* (1991), observes that as women attain positions where we can design organizations, we "are participating in an institutionalizing of the web."

Reflected in the web design is the primary importance of relationships to women leaders. Women tend to consider what is important to them and other people when

they make decisions. This characteristic, previously considered a fatal flaw, is now decidedly an asset. Women believe in teaching, coaching and leading by example. They see their leadership as an opportunity to bring out the best in people rather than simply to exert control over them. Searching for win/win solutions implies collaboration, and collaboration builds trust and relationships. Naisbitt and Aburdene in *Megatrends 2000* (1990), give women the advantage since women don't have to "unlearn" authoritarian ways to care about those around them. They go on to say, "To be a leader in business today, it is no longer an advantage to have been socialized as a male."

Anne Wilson Schaefer, in *Women's Reality* (1985), introduces us to the concept of "being peer," another key to nurturing relationships. In the traditional hierarchy, everyone was either "one up" or "one down" in relation to each other. Equality was not a relevant concept. Women, on the other hand are much more likely to consider their co-workers at all levels as peers. Peer as opposed to superior-subordinate relationships will result in a freer flow of information and exchange of ideas. Individuals having spent careers in traditional agencies and organizations often have difficulty dealing with this type of a relationship and more ambiguous structure, but there are tremendous potential benefits. In this environment, people for better or worse, will be judged on their attributes rather than their position.

By contrast, the traditional management approach emphasizes competition and winning over collaboration and win/win. While girls learn to play one on one, be fair to all, and keep power even, boys learn to focus on the goal, obey the coach, and win the game. Traditional managers are product and task oriented, while most women are process oriented. Carolyn Heim in *Hardball for Women* (1992), reminds us that in girls' games there are no time limits, play or process is what is important. "No one wins a game of dolls." Neither task nor process orientation is right or wrong, but a process orientation may better foster relationships over the long term. Due to our process orientation, the Japanese concept of Kaizen, literally "finished never is," or continuous improvement, is a natural fit for women.

Heim also points out that in our culture, power and masculinity have almost been synonymous. Following this logic then, power and femininity would be mutually exclusive. In fact, finding a balance between femininity and authority has been a tremendous challenge. Fortunately, this doesn't have to be an either/or proposition. While traditional male managers have viewed power as the ability to exert control over others, women tend to view power differently. For

many women, power is primarily a means to control our own lives and use our talents. We seek power to address issues. We are more likely to use our personal power to negotiate solutions where all involved can win, whereas traditional managers used their power, gained as a result of their position in the hierarchy, to direct outcomes. The traditional manager acquired power just to possess it. Expanded views of power held by many women, can result in a sharing of power, and empowerment.

Another area in which women differ from the traditional male system, is in how we view our work. Simply put, work isn't everything! Work, for women, is one aspect of a multifaceted life in which each activity must mesh with all others. Women in the workforce do not define themselves solely by their occupation as men have tended to do. Striving for balance has produced flextime, child care and other benefits men and women alike now enjoy.

Women who work in natural resources frequently view themselves as ecosystem managers. This means taking into consideration the interdependence and interconnection of natural processes and functions. I would argue that we are ecosystem managers in an organizational sense as well. Women leaders are likely to take a holistic approach. Traditional management called for separating work into a discrete series of tasks to be performed in a prescribed order. Women on the other hand tend to operate more in a multidimensional capacity, searching for interconnections, and alternate ways of achieving a goal.

Vinnicombe and Colwill, in *The Essence of Women in Management* (1995), cite research at the Cranfield School of Management in Canada. Using scores from the Meyers-Briggs Type Indicator, women leaders have shown a preference for intuitive means of acquiring information. Between 40 and 60% of women managers exhibited this preference, while only 30% of the men did so. While both types of orientations are essential, this intuitive asset many women offer will help in reading the big picture and developing solutions for complex, ambiguous problems.

When Cultures Collide

There is a strong analogy between the evolution of women in management and what happens when differing cultures intermingle. When two cultures with different ways of seeing the world and different values come into contact, one of several things (barring annihilation) may happen. The dominant culture, if there is one, can force the other to accept its beliefs. The dominant beliefs and practices eventually come to be adopted wholesale. This is called assimila-

tion. Women trying to "become men" is an example of attempted assimilation. As you can imagine, a great deal is lost when assimilation occurs. A second possible outcome when cultures meet, is that the ways of the dominant culture remain on the surface, but the beliefs of the "weaker culture" continue to guide how those individuals see the world and behave. This is called acculturation. Acculturation from the standpoint of women in the workplace occurred when women had to operate by the traditional management culture, but did so only of necessity, not because they shared the values. Finally, in adaptation, both cultures accept some practices from the other, and the result is a blending of the two. Over time, the work environments that women have entered, have run the gambit from assimilation to adaptation.

As a parallel, let's consider how Native Americans interact with the dominant culture in this country. Some Indians have moved away from their relatives and reservations, and have lost touch with traditional teachings. These individuals have assimilated into the dominant culture. Other individuals and Indian nations, although they may not embrace mainstream values, in general find it necessary to learn the ways of the dominant culture for economic survival. In these cases, acculturation has occurred. In acculturation, Native Americans have learned to operate in two cultures. Women in the workplace have also had to learn to operate in two cultures, the traditional white male system and women's own ways. Schaefer argues that the ability to operate in two cultures, to see things from more than one viewpoint, provides an advantage over those operational in only one culture. We can now hope that the eventual outcome of the meeting of these two ways of managing, or "management cultures," evolves into a situation where each approach is valued and the best of both are brought together. Adaptation is a two-way street.

From Liability to Asset

We have finally arrived at the time when women's natural ways of leading and managing are seen as an asset. In fact, given the breakdown in effectiveness of traditional management systems and beliefs, the search for new ways of leading are pointing directly to women's ways as the management style of the future. Tom Peters in *In Search of Excellence* encourages men "who wish to stay employed to study women's ways of leadership."

Women can make important contributions in helping prepare future leaders for the challenges ahead. At the Cranfield School of Management, women's input has been used to design a personal development program

for managers. The program, which uses experienced tutors in small groups, is highly interactive and emphasizes increasing personal effectiveness. Social and psychological issues, attitudes, and experiences are addressed in a supportive environment. Ways of assisting managers in understanding their personal strengths, and increasing effectiveness need to be incorporated into formal education curriculum for all future leaders.

As the global economy shifts from rigid, highly-structured enterprises to more flexible organizations which must be quickly responsive, women's talents will shine. As advocates of flatter organizations with greater flexibility, we will see our influences helping to reshape organizational structures for success. Women's desire to make work meaningful and individuals' contributions appreciated will mean attracting and retaining talent in a highly competitive work environment. In these times of increased employee mobility and decreased employee loyalty, women have the opportunity to excel in recruiting and retaining a diverse workforce. People are no longer willing to join an impersonal organization which requires them to check their identity at the door and prove their loyalty by emulating management. Women will put their efforts into providing a work environment where diversity is an asset, and in which the individual needs of employees of all backgrounds are considered and balanced with organizational goals. Loyal, dedicated employees will be the result.

Increasing numbers of women now have the experience and credentials to enter and succeed in management ranks or to start their own ventures. Traditional ways of managing have broken down and the search for new management paradigms is on. Global change is coming fast and furiously, and talent, regardless of gender or race, will rise to the top. There has never been a time of greater need for what women have to offer. According to Naisbitt and Aburdene in *Reinventing the Corporation* (1985), "Women can transform the workplace by expressing, not by giving up, their personal values." It's our time! Time to trust our abilities and intuition, and offer our best.

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RUN AWAY! RUN AWAY!

Elaine Zieroth

My husband and I were in that vacation frame of mind as we returned from visiting relatives in Wisconsin in July 1994. Not only had we forgotten what day it was, but we didn't have a clue as to what was going on in the world as we headed back across Canada on our way home to Washington State. I think it was in Moose Jaw, Saskatchewan (it was probably Alberta, but this sounds more exotic) that we couldn't ignore it any longer. There was a definite haze in the air that increased as we headed west. We sought out a newspaper, and there it was. Big fires across western Canada. Four major fires threatening Penticton, British Columbia with 18 homes burned on the edge of town. Over 19,000 hectares burned. (Don't feel bad, even many Canadians still have to multiply acres by 2.5 to figure out hectares.) And the newspaper account ended with the statement that several large fires raged out of control in northern Washington State where we live.

Great. Here we were two days from home—which happens to be 60 miles south of Penticton, B.C.—and not a U.S. newspaper to be had. We tried to stop worrying. By the time we crossed from Alberta into Washington, the smoke was so thick that the sky had taken on an end-of-the-world pallor. We passed two fire camps, those carnival setups with their big circus tents, fun rides, but no cotton candy, which house the firefighters. As we passed through the town where my husband works for the Colville National Forest, the fire camp was located at the fairgrounds. I bet him that there would be a camp on my district, on the Okanogan National Forest, at the junction of the Aeneas Valley Road. I really didn't enjoy winning that particular bet.

Monty Python and the Flying Circus made a movie in the 1970s about the crusades titled *Monty Python and the Holy Grail*. As the crusaders approach their first enemy castle, the distinctive trumpet sounds the charge "Attack! Attack!" But as the French soldiers catapult various farm animals over the castle walls at the crusaders, an equally noble trumpet call sounds "Run Away!, Run Away!" When I worked for the Forest Service in Colorado, we stenciled "Run Away!, Run



Thunder Mountain Fire still burning hot one week after starting from a lightning strike, Okanogan County Washington, 1994.

Away!" on the backs of our fire shirts, in case we ran into flying farm animals or real fire. As I passed the last fire camp before home, you can guess what the voice in the back of my head was saying.

We weren't home very long before my husband answered the phone, despite my warnings. "Welcome home. Hope you had a nice trip and are VERY RESTED. Bring all your fire and camp gear to work in the morning. Have a nice day." I decided to surrender myself voluntarily the next morning rather than wait for them to find me.

I was assigned as Resource Advisor on the Thunder Mountain Fire, which was already several thousand acres (or a few less thousand hectares) in lodgepole pine in a large roadless area. As Resource Advisor, I was the local contact on natural resources values, Forest Plan standards, road and water locations, hazards, and local services. Thunder Mountain was in a particularly sensitive location. Although it was several miles from any houses, it was in prime habitat for grizzly bear, gray wolf, Canada lynx, and dozens of rare plant species. The Chewuch River, with an anadromous fisheries population, flowed on the western edge, which also was the edge of spotted owl habitat. The Pasayten Wilderness bordered to the north, with steep, inaccessible terrain. Hundreds of acres of mountain beetle-killed pine lay on State land to the east and we were only a few miles (not to mention kilometers) from Canada, which had enough fires without getting our hand-me-downs.

It used to be a lot simpler to fight fires. You brought in a bunch of guys with tools and a few women with food and tried to put the thing out. Nobody worried back then about how to add toner to the copy machine back in camp and the firefighter's handbook had

nothing about hand-held infrared sensors for locating hot spots or using explosive to build fire line. Now command meetings with the overhead team are sometimes video-taped for use later in the inevitable lawsuit. To complicate things further, we had to initiate informal consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service over the impacts of fighting the fire on threatened, endangered, and candidate species—while we were still fighting the fire. Fortunately, we had anticipated this two years before by preparing a plan for protecting rare species and habitat during firefighting and reclamation efforts, complete with information about the species, maps, posters and pamphlets for folks on the fire.

One of my first jobs was to enforce the clean camping provision of our plan, to keep garbage and food from attracting large carnivores into camp and acclimating them to the taste of firefighters. Many of our crews were from as far away as Mississippi and Florida, folks from all walks of life, and they were not taking the clean camp order seriously. Despite our efforts to have garbage controlled and hauled out daily and to police kitchen wastes, firefighters were still taking food back to their tents. This is hazardous, not just because of the bears, but the food could kill you too. I finally had to gather the troops and have a chat. "Do you know what bears call firefighters with food in their tents?" I asked them. There was silence. "Sandwiches," I quipped. Their eyes studied me. "No s—?" they said. "Yes," I repeated, "we do have bears, lynx and wolves out here, not to mention the woodrats, mice, and other camp robbers who are just dumb enough to eat fire rations."

At this point I wasn't being totally accurate. We had radio-collared Canada lynx in

that very area. Black bears were fairly common, and wolves, including pups, have been found in parts of the North Cascades. But technically, we have only verified a population of grizzly bear TRACKS. You can distinguish grizzly from black bear tracks and we had confirmed grizzly tracks, but no real bears have been seen or photographed. However, it would not have been convincing to tell them to watch out for grizzly bear tracks. Apparently grizzly bears were convincing because the camp Security Officer caught me the next day to say that several of the crews from the south poked their heads out of their tents during the night and said that they had to go real bad but they weren't going out there in the dark and be eaten by some grizzly bear (tracks).

About two days later, I talked to one of the crews coming off the fire line. They had seen the wooden boxes in the trees that we put up for boreal owl nests and asked what they were. In a moment of weakness, I told them that when the bear chases you, you climb up a tree with a box in it, and there were cellular phones in them for emergency calls. They even asked what number they should call. I felt bad then and told them the truth.

The T-shirt booth was doing a great business, especially after the 90+ temperatures changed to snow overnight and they switched to selling sweatshirts. I am very suspicious of the fire T-shirt businesses. I picture the day when our lookout will call in a smoke report and direct the initial attack crew to the fire by, "Take Road 34 to the junction, pass the fire T-shirt booth and they can direct you to the fire." Of course, they will already have the T-shirts ready with the name and a

drawing of the yet undiscovered fire ready to sell. If we ever have a set of unexplained fires start, I'm looking for the T-shirt folks.

I was very proud to see my district back in action. Everyone is dedicated and knows their role, and they function together like a well-oiled machine. After months of downsizing, changes in direction, lawsuits, and appeals, it was good to see enthusiasm and high spirits. This was despite the long hours of hard work, tension, and sleep deprivation. We were stretched thin for resources. The big Tye, Rat Creek, and other fires south on the Wenatchee National Forest had first priority for resources, as they should, since those fires threatened towns and houses. Our international fire agreement with Canada was of no use since they had their resources tied up on their own fires. Thunder Mountain was close to 10,000 acres now and temperamental, when a storm went through with new lightning. The radio and phone were going non-stop and we soon had 29 new flags on our fire map as evening approached. I will never cease to marvel at how well the system works.

Our experienced fire folks assessed the risk of each fire report: risk to private property and lives, risk to firefighters and risk of expansion, based on terrain, vegetation, fuels, fire history and proximity of homes. People were quickly and efficiently dispatched to most of the "smokes," based on their experience and skills. Smokejumpers were dropped in small groups into more remote areas. Constant communication and support kept everyone safe and going until rising humidity and lower wind and temperature calmed things down for the night. Of the 29



Staging areas are widened for buses, equipment, storage, and as safety areas for firefighters to retreat to. These areas require rehabilitation immediately after the fire is put out.

STATISTICS FOR THE AREA

Near Wenatchee, Washington —————
Acres Burned: 186,994 acres (292 square miles). Tye Creek - 140,300 acres; Round Mountain - 3,231 acres; Hatchery/Rat Creek - 43,463 acres.

Percentage of Chelan County burned by fires: 9.76 percent.

Homes lost: 39 - 14 primary and 25 seasonal (20 in the Icicle Island Club and along Blewett Pass Highway; 13 in the Entiat Valley; and six in the Johnson Creek area).

Homes saved: 540. The fires had burned up to the edges of the home or were in high-level evacuation areas.

Fire causes: Tye Creek, Hatchery Creek and Round Mountain: Lightning strikes following a lengthy period of hot, dry weather. Rat Creek: Smoldering cigarette ashes on private property near Icicle Ridge and Rat Creek; ruled accidental, no charges filed.

Fire apparatus (estimates): 505 engines, 116 water tenders, 169 crews, 22 helicopters, 127 bulldozers, 8 air tankers.

Total firefighting personnel: 8,031, plus 400 National Guard Troops and 1,200 Marines.

Where firefighters came from: 25 states spanning the country, from Alaska to California to Florida to Maine.

Gallons of retardant dropped: 536,916.

Fire suppression cost: \$71.6 million.

Fire cost to local governments: \$3.2 million (\$3 million in direct cost, \$204,875 in estimated losses in such things as sales taxes, park and golf course operations).

Rehabilitation cost: \$19 million.

Rehabilitation acres: 134,289 acres seeded, 122,860 acres fertilized (8,100 more scheduled), log terracing on 16,068 acres.

Near Okanogan, Washington —————
 Many fires in July and August of 1994 included Thunder Mountain (8,900 acres), War Creek (6,194 acres), Palmer Complex (9,665 acres) and White Face (4,350 acres).

Sources: *Wenatchee World*, July 23, 1995. Chelan County Office of Emergency Management, and U.S.D.A. Forest Service information.

Fire camp is set up to sleep and feed 700 firefighters. Sensitive meadow and wet areas are flagged (in foreground) to prevent damage. Tents, equipment, portable toilets, and semi trucks with food, kitchens and showers are crammed into level areas.



new fires, all were kept under five acres and held. New, large fires popped up on State lands though, which were in the drier, more volatile vegetation types.

Firefighting is not without its politics and arm-chair quarterback. Many local citizens were concerned that we did not have enough firefighting resources to fight all fires aggressively. A 36,000 acres fire in the mid-1980's burned many homes and still haunts the local community. So, our fire crews were sometimes met by citizens making sure that we did not let the fires burn, or with folks trying to fight the fire themselves. An air tanker was prevented from dropping retardant on one fire until they could talk the nearby landowners into backing off. We also had folks show up to protest the use of bulldozers to build firelines in roadless areas, trying to get us to let more fires burn.



Smoke indicates areas still actively burning and areas that are starting to cool after burning 9,000 acres. Note old fire patterns in foreground.

Back at Thunder Mountain, a water tank was needed so that helicopters could fill their water buckets. Three of us went off to dismantle a tank that was set up too far from the fire. We slogged out to the tank, set up in a marshy area, up to our knees in mud and water. The tank resembles a huge metal playpen, lined with a rubberized bladder. The metal-barred sides were about as tall as I am, which isn't saying a lot. We unbolted the four sides and the other two guys carried the first side back to the truck. Laws of physics being what they are, the rubber liner put pressure on the side panel that I was supporting, which weighed more than I did soaking wet, which I was, proceeding to topple me over backwards into the muck. I could only wait until the others returned, trapped under the bars and looking rather stupid. To make matters worse, I had to answer dumb questions all day about how I got my back all muddy fighting a fire.

The amazing thing was that we deployed hundreds of firefighters, support people, airplanes, helicopters and other vehicles for several long, exhausting weeks, and there were no serious injuries or illnesses. We had folks working in rough, steep, sometimes inaccessible terrain, from all parts of the country. This attests to a good job by the Safety Officers, and to an awareness of the over 30 lives of firefighters and pilots lost in 1994 on fires. There was a renewed sense of personal responsibility for safety and a questioning of escape routes, hazards and strategy by everyone—which is a healthy thing. Run Away! Run Away! has its place.

The rehabilitation assessment started before the fire was even contained, so that erosion control and resource protection could start immediately. As soon as firefighters loaded the buses for home, the camp, which was a city of over 500 people at its peak, disappeared like a gold rush boom town. The camp was cleaned up and put to bed with surprising little damage. We made sure that the truck that pumped the portable toilets did not mistakenly dump the sewage into the city water system, as a truck had two years before. That was considered tacky.

The battle over whether to log the burned trees, whether to build roads into roadless areas and whether the areas are more susceptible to re-burn once the trees start to topple, rages on with no containment in sight, but that's another story...

Elaine Zieroth, at the time of writing, was on a 20-month assignment as a wildlife biologist for the Interior Columbia Basin Ecosystem Management Project. From 1988-94, she was District Ranger of the Tonasket Ranger District, Okanogan National Forest in northern Washington. Currently, she is District Ranger at Bonners Ferry District, Panhandle National Forest, in Idaho. Prior to these appointments she worked for the BLM and Forest Service in



Colorado and California in wildlife, recreation, and public involvement. Her Masters in biology is from California State University at Fresno. Zieroth is a WiNR editor.

AFTER A NATIONAL SCIENCE FOUNDATION CONFERENCE, THIS AUTHOR CONTINUES TO THINK ABOUT THE IMPEDIMENTS WHICH STILL EXIST IN HER FIELD OF PHYSICS.

WOMEN AND SCIENCE: WHERE DOES THE *GLASS WALL* COME FROM?

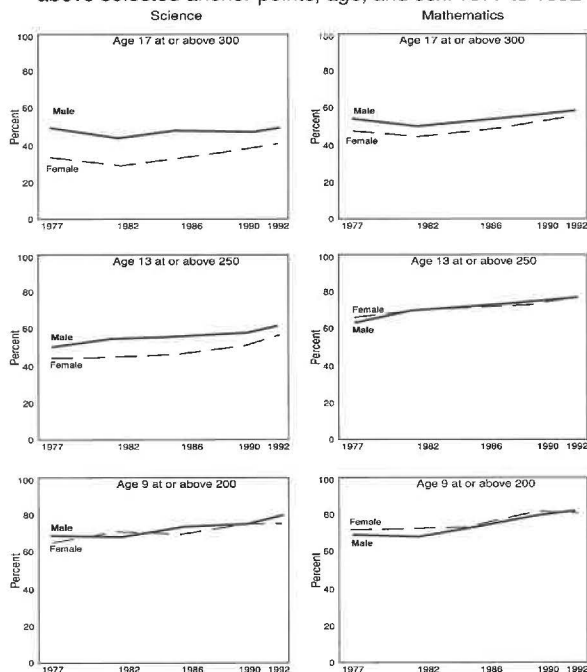
FRANCESCA
SAMMARRUCA

While participation of women in most professions has risen considerably, the percent of women in science and technology remains low. This is true in the academic setting as well as in other categories, with the degree of limited participation depending strongly on the specific area of science.

Recently, I attended a conference entitled *Women and Science*, sponsored by the National Science Foundation, (December 13-15, 1995, Washington D.C.), from which I learned a lot about the present status of women in science. Often, in this analysis, I will be referring to discussions, views, and ideas which emerged from this conference, attended by 700 female scientists nationwide, from educational institutions, national laboratories, and industry. The meeting's purpose was to celebrate achievements, (progress has in fact been made), as well as to discuss future challenges, (we are not yet where we should be).

I use the expression *glass wall*, rather than *glass ceiling*, because the way we have come to understand it, the expression

NAEP science and mathematics proficiency, by percent of students at or above selected anchor points, age, and sex: 1977 to 1992



Source: Mullie, I.V.S., et al. (1994). NAEP 1992 trends in academic progress (Report No. 23-TR01). Washington, DC: National Center for Education Statistics.
Indicators of Science and Mathematics Education 1994

glass ceiling applies to career advancement. In my view, the issue of women and science involves many more, and more subtle, aspects. In fact, very early in life a girl may be confronted with discouraging factors (invisible barriers, or *glass walls*), which may adversely influence her decision to pursue a future career in science.

Limited participation starts early. From Fig. 1 we see that proficiency in mathematics and science for girls and boys shows an interesting trend. While girls start out in mathematics and science as promising as their male peers, at some point they begin to fall behind. As a result, they lose self-confidence and participate less. Naturally, the less exposure they get, the less competitive they become. This happens during the crucial years when a young person is especially sensitive to peer pressure, media pressure, and in general, the power of socialization. It is also the age when gender becomes an issue.

The data show that girls begin to fall behind in science even earlier than they do in mathematics. In fact, by the age of 13 the difference is already noticeable. From personal experience with my 12-year old, I am convinced that, at this young age, proficiency and interest in science comes in large part from extra exposure, encouragement from families, support and assistance from adults to facilitate participating in science projects, science fairs, etc. Therefore, teenage girls who do not get this because they are not expected to want or need it, are already falling behind and have hit an early invisible barrier—the *glass wall*.

Moving further down the education pipeline, note in Fig. 2 the number of science and engineering degrees awarded to males and females per 100 in the U.S. population. Even more revealing, Fig. 3 shows how the percent of doctoral degrees awarded to women depends strongly on the area of science, with physics and engineering at the bottom. This is of particular concern to me as a physicist.

What are some of the factors producing more glass walls in physics for young adult women in their college years? The fraction of women faculty in Ph.D. granting physics departments is at only five percent in the U.S. (see Fig. 4). The number of Ph.D. granting physics departments nationwide with zero women faculty went down in the past 10 years from 55 percent to a still worrisome 36 percent (see Fig. 5).

What is the problem here? When we compare the figures with those from other nations at the forefront of physics research, the U.S. ranks among the lowest (see Table 1). Obviously, this strong correlation with nationality suggests that a crucial role is played by culture, social structures, and the social status of the female scientist in different countries. It also clearly eliminates the possibility that

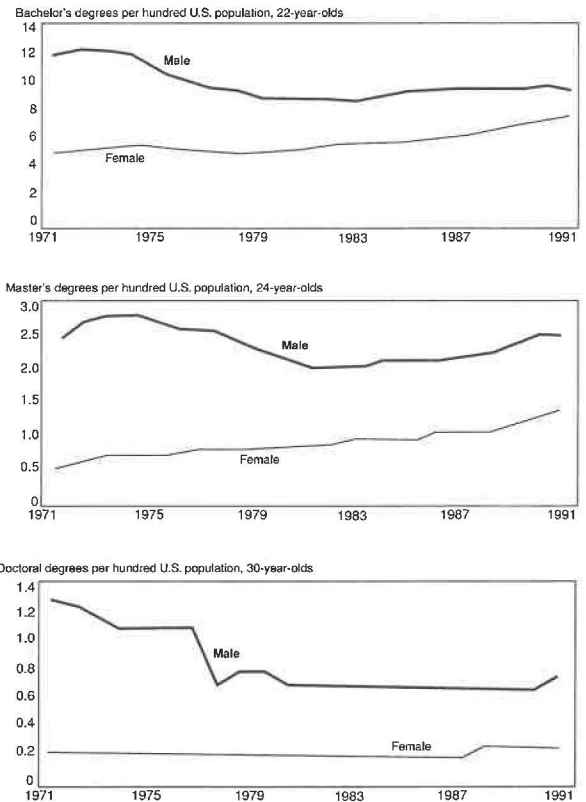
women could be inherently less gifted than men in science. After all, women are biologically women in the U.S. as well as in Hungary, with the latter showing 47 percent of the physics faculty being female!

My personal observation is that social status (that is, the way a female scientist is perceived within the culture), plays as big a role as social structures in creating those strong differences by nationality. There is, in this country, a cultural tendency to "glamorize" physical attractiveness in girls and women more than intellectual skills, or even to downplay scientific skills, as unattractive and unfeminine. This perception of science by girls and women themselves, continues to add strength to the glass wall, starting early with teenagers and continuing on into the workplace. Girls are also treated differently in classrooms: the American Association of University Women recently ran an ad which says in part, "in schools, girls are discouraged from taking science and math, courses they will need for America to compete in the future. Girls hear that math is too tough for them. They get called on less than boys in the classroom...."

As Table 1 shows, it is not so in Europe—especially eastern Europe—where, accordingly, we see the largest participation of women in science. Cultural differences, as well as a more rigid high school curriculum, may be among the sources of those differences by nationality. European female scientists also seem to enjoy greater appreciation and support from their male peers and many European countries have excellent family-support policies in the workplace.

Which naturally merges into my next point, namely the causes of such limited participation, especially in U.S. physics and engineering. In the past, women have been under-represented in many fields, except those roles traditionally defined by society as feminine. During the past 30 years, however, women have successfully entered many of those fields. But why does participation of women in science still remain so limited? Why has resistance to women entering science survived so long? This question has always intrigued me because it appears to be one with deep historical roots. Exclusion of feminine modes from the scientific and philosophical arenas is well documented in the history of science. A typical *masculinization* of scientific inquiry is seen in history and philosophy of science as associated with the need to keep the scientific thought pure and objective; that is, *away from feminine modes*. Unlike the Cartesian scientists of the 17th century, none of us, I am sure, would claim today that women are too subjective for pure scientific thought! And yet many stereotypes remain associated with the definition of feminine modes and masculine modes. Women, we often say, are sensitive and subjective.

Figure 2. Science and engineering degrees awarded per hundred U.S. population, by degree level and sex: 1971 to 1991



Source: National Science Foundation. (1994a). Science and engineering degrees: 1966-91 (NSF 94-305). Arlington, VA.

Indicators of Science and Mathematics Education 1994

They thrive and succeed in a collaborative environment. Men, on the other hand, are projected as more objective and analytical. They thrive in their separatism and detachment. When, in addition, a certain *masculinity* is attributed to the language, message, or methodology of science, the well-known misconception about women and science is born.

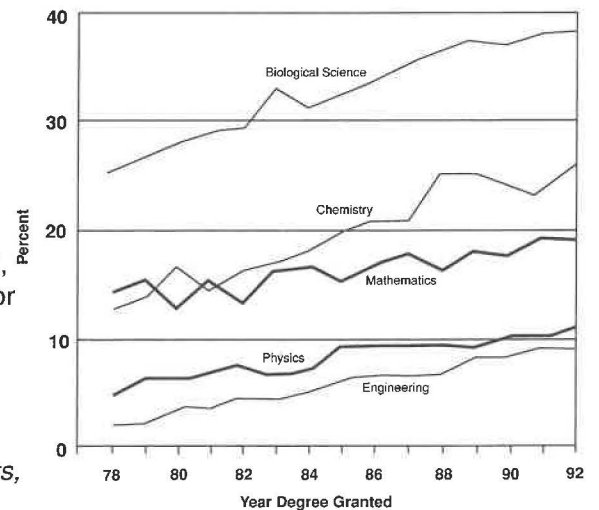
As a natural consequence of this misconception, we often use the male norm to define success in science. For instance, we often refer to a female scientist as *exceptional* because she *made it in the male-dominated field of science*. This is also an unnecessary projection which only perpetuates the wrong perception that a woman who

succeeds in science must be *exceptional* (because after all, science does not agree with feminine nature!). Such a projection can be very discouraging for a young girl who wants to fit in.

Consistent with the above, the scientific learning environment is often projected as aggressive, competitive, or confrontational, rather than collaborative, which is also quite discouraging (as well as very unnecessary). The point of the matter is, while it may be true that different individuals have different learning modes or discovery modes, that implies nothing about their inherent skills and abilities to give their own individual contribution to the field of science.

As a female physicist, I can tell you for a

Figure 3. Percent of PhD's Earned by Women in Selected Fields, 1978-1992



Source: NRC Summary Report, various years. The data cited for physics PhDs earned are from the AIP and Degrees Reports.

Improving the Climate for Women in Physics Departments, M.S. Dresselhaus, et.al.

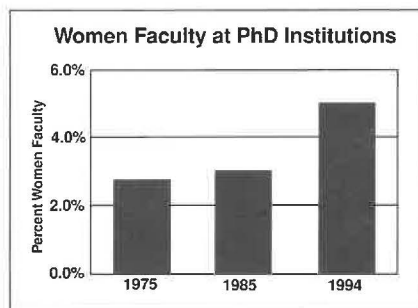


Figure 4. Women Faculty at PhD Institutions, 1975, 1985, and 1994.

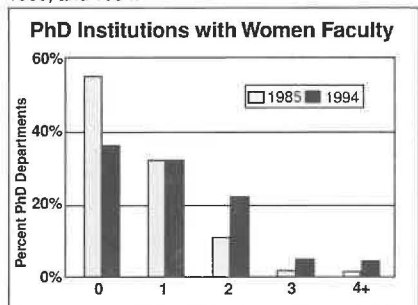


Figure 5. PhD Departments with Women Faculty. Based on resources provided by over 160 PhD-granting departments. Source: AIP Education, Employment, and Statistics Division.

fact that gender is unfortunately still an issue in the classroom. I am personally aware of situations where female science students felt isolated, ignored, or even demoralized. In the workplace as well, women may still experience poor climate, hostility, sexist behaviors. I remember an episode when one of my male coworkers was giving a talk to introduce a new, large, piece of equipment we had just received. He thought it would be very amusing to joke during this (public) talk about the fact that I might be the only one unable to move the equipment around. If this

is the attitude of some senior scientists, I wonder what message our students receive concerning something as simple as respect due to all professors, regardless of gender.

Data clearly shows that university women are also subject to some form of "rank" discrimination. For example, among the doctoral scientists, after eight or more years of experience, 60 percent of male scientists are tenured full professors, while only 33 percent of women are (see Fig. 6). At this stage the *glass wall* merges with the *glass ceiling*.

I recall an interesting presentation at the Conference entitled "Thresholds and glass ceilings: science careers and gender" derived from Project Access conducted at Harvard University. The researchers, focusing on gender and career outcomes, surveyed a group of men and women who had all received prestigious post-doctoral fellowships. It is therefore reasonable to assume that their careers were, at the stage of receiving the degrees, equally promising. And yet the study showed gender differences in their career outcomes. From their survey (of 699 questionnaires and 200 interviews) they conclude that many subtle, but clearly identifiable factors play a role in adversely affecting a woman's career in science. They found that while each individual impediment may be small, in their accumulation they have a measurable and significant effect.

The issue of poor climate in the workplace reminds me of another occurrence of ignorance and insensitivity I was involved in. Concerning a vacant position, a male colleague of mine was kind enough to remind me that I didn't really need that position, being a married woman. While this can equally well be interpreted as an insensitive

(to say the least) remark concerning the more general issue of all working women, I can't help wondering what his attitude would have been had the position in question been a typically *feminine* one. That is, to which extent in his mind I was trying to take a *man's place in science*.

Concerning what we can do or continue to do (as parents, educators, institutions, or government agencies) to increase participation of women in science, we all had very concrete and focused suggestions to present at the conference. Typically we would break out into small sessions and our suggestions were recorded and summarized for presentation to NSF directors. The participants' views were also collected prior to the Conference in a book of abstracts.

Among the suggestions are two levels of intervention. On the one hand, there is an issue of education and cultural change to ensure that girls have the opportunity to develop a full spectrum of skills. On the other hand, it is equally essential to sustain those women who are already committed to science so that they can remain in science and continue to attract other women.

Concerning these aspects, mentorship, positive role models, attitudes, and shattering misconceptions, are key points. We must create an environment where a girl will feel comfortable *thinking of herself as a scientist*, considering this option as attractive as any other option. We know now that girls are just as capable as boys, but they still do not participate as much. Naturally, they must be exposed to mathematics and science as often as boys in order to be as competitive. Let us keep in mind that for a gender obstacle to be there *de facto*, it is sufficient that a girl perceives one and we must listen to young girls tell us why they are opting out—and then act on it.

Sometimes girls (who may have already been conditioned) do not see the relevance of science for their careers. It is essential that we encourage them to take mathematics and science credits *regardless of their future career plans*. As we move into the 21st century, scientific literacy and technological skills become more and more important for any career, as well as independence in a technology era. In order to reach out to girls, it is necessary to influence teachers—perhaps through seminars—which help them make the necessary transition in their pedagogy. This applies to college and university science professors as well.

When it comes to the workplace, to increase participation requires improving the climate. For this purpose, leaders show the way. Therefore, a strong message about gender equity in institutions should be the responsibility of executives and administrators.

Degrees to Women in Physics and Women as Physics Faculty (in percent)

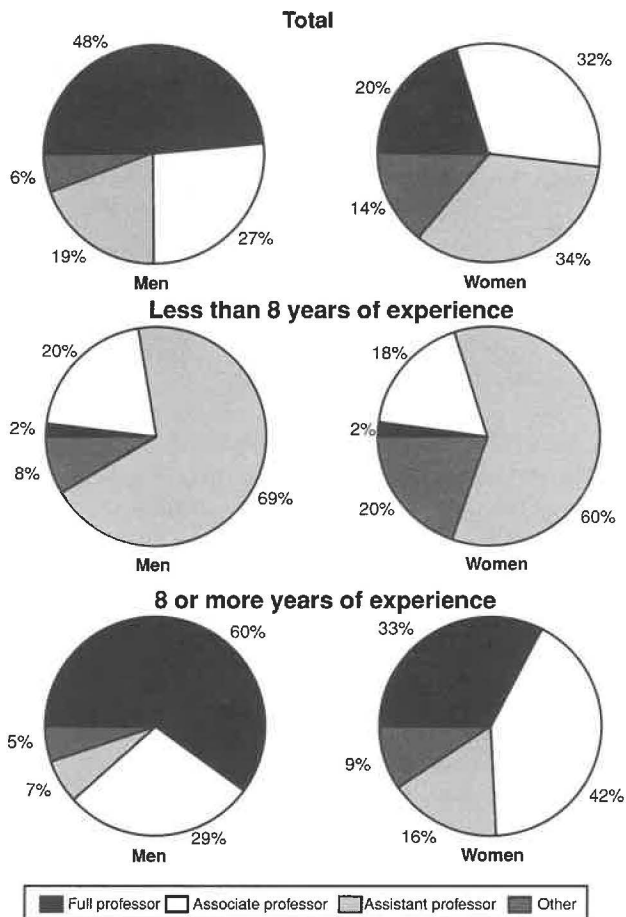
Degrees to Recent Graduates

Country	Bachelor's	Doctorate	Faculty
Belgium	33	29	11
Brazil	24	31	18
Democratic German Republic	12	18	8
France	24	21	23
Hungary	50	27	47
India	25	26	10
Ireland	22	20	7
Italy	29	21	23
Japan	7	4	6
Korea	20	5	3
Netherlands	20	4	6
New Zealand	10	11	6
Philippines	28	60	31
Poland	14	17	17
South Africa	24	21	9
Spain	17	21	16
Turkey	38	17	23
Union of Soviet Socialist Republics	34	25	30
United Kingdom	16	12	4
United States	15	9	3

Source: W. J. Megaw, *Gender Distribution in the World's Physics Departments*, paper prepared for the meeting, Gender and Science and Technology 6, Melbourne, Australia, July 14-18, 1991.

In: *Improving the Climate for Women in Physics Departments*, M.S. Dresselhaus, et al.

Figure 6.
Academic rank of
doctoral scientists
and engineers, by
years or
professional work
experience and
sex: 1991



*Women, Minorities, and
Persons with Disabilities*

Of course, family issues must also be addressed. Problems related to maternity leave, daycare issues, re-entry after childbirth, are often prohibitively difficult to deal with (for women in science, as well as all women!). If strategies are devised to sustain women with young families, these women can remain active and provide positive role models, thus helping to break the cycle of limited participation.

Among the suggestions we presented to the National Science Foundation, some specifically addressed creative solutions to help women with the unique challenge of synchronizing their biological clocks and their career clocks. Something as simple and relatively inexpensive as funding a woman's position so that she can work part-time after childbirth, is an investment in the future which can have a large return. As a financial incentive to institutions, it was also suggested, among other things, to create funding opportunities for those scientists whose scientific agenda includes integration, training, or support of women. Furthermore, it was proposed that priority be given to scientifically valid proposals which can demonstrate and be accountable for diversity goals.

Proper credit is due to the NSF for their past and present effort to promote women in science. As just one example, NSF supported programs like WISE (Women in Science Excel) which have the goal to motivate high school and college young women to develop their talents by putting them in touch with female scientists through a variety of academic and social activities. The *Women and Science Conference* certainly made it very clear that inclusiveness of science is a crucial item on the scientific agenda of the Foundation. While the conference alone will not solve the many and complex aspects of the problem, it can be used to stimulate changes in schools, campuses, agencies, and communities, providing ideas and models to follow. That is why I feel that my main contribution as a participant is to bring home the message.

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Views of the Conference Participants. 1995. Book of contributions from the National Science Foundation Conference on Women and Science, December 13-15, 1995, Washington, D.C.

Francesca Sammarruca, pictured below, is a theoretical nuclear physicist of Italian origin. She is a visiting assistant professor in the Physics Department at the University of Idaho. She holds a Master's in Physics from the University of Pavia, Italy, and a Ph.D. in Physics from Virginia Polytechnic Institute.



Dirt: The Ecstatic Skin of the Earth William Bryant Logan

Riverhead Books, a division of G.P. Putnam's
New York, 1995

Fresh out of college with a B.S. in Forestry (Range Management major), my very first job was as a Soil Conservationist for the (then) Soil Conservation Service (now Natural Resources Conservation Service). I can remember having involved conversations with some of my colleagues about developing a "worm's-eye view" of soil as an exhibit or environmental education lesson plan. Unfortunately, it was all talk. But the concept has stayed with me and when I recently ran across this book, I thought "This is it!" And the truth, of course, is that it is and it isn't.

The author, a professor of journalism and columnist for *The New York Times*, has written a book of short essays grouped into seven main categories. Each essay is so short, that I can easily imagine them being delivered individually as a sermon, guest lecture, after dinner speech, or short classroom presentation. These essays provide lots of little pieces of information but don't provide the landscape ecology picture

of soil as the basis for life on our planet. The 202 pages are a great introduction to soil if you are an urban reader who has never gardened or otherwise thought about soil. If, however, you labor in the garden of natural resource management, it may be too esoteric. Unless, of course, you delight in linking the basic stuff of life—the medium that supports plant growth—with cosmic questions of all sorts.

For instance, in the four and one-half page essay on gopher mounds, Logan challenges the reader by providing a graphic example: "Doing some quick calculations to approximate per-acre gopher density it would theoretically be possible to move all of Utah into Colorado within a century..." He goes on to explain that it isn't as far-fetched as it sounds and describes the "mima mound" topography found in the western United States, South and East Africa, and Argentina. He says these 6-foot high—and up to 75-150 feet in diameter—mounds, were created

by gophers. Although never providing a coping strategy for gardeners battling gophers, the author suggests you be grateful you don't have prairie dogs! For both, he recommends control by their natural predators: gopher snakes for gophers and coyotes for prairie dogs.

These essays work best when they are aimed at a specific topic such as the one entitled "The Compost Man." Here he describes Florida's Clark Gregory (who wears a bright green tee-shirt emblazoned with "Clark Gregory, compost man") and his work across Florida to make humus from what we put in our landfills. Following the author on a trek across—and up and down—several landfills, we learn about the value of crab shells and tree branches, and about the smells. An employee at one of the landfills claims that "it smells for a day and then stops." The resulting humus is "sweet and earthy, with an orangy tinge at the edges." Due to Clark Gregory's efforts, the demand from local garden-

ers for compost is outstripping the supply.

The book works least well because it is a collection of short essays. Perhaps the author recognized the futility of capturing the story of soil in such short bursts. In "Underground Horizons," Logan writes:

To try to understand the soil by taking a few trowelsful and submitting them to chemical tests is like trying to understand the human body by cutting off the finger, grinding it to paste, and performing the same tests. You may learn a lot about the chemistry of pastes ... [but] about the body's functions as a whole—you will learn nothing at all.

So, too, it seems to me for soil.

Jonne Hower works for the Bureau of Land Management in eastern Oregon. Her Bachelor's in Range Management is from the University of Idaho, her Masters is from the University of Portland. She is an editor for Women in Natural Resources.

BOOKS

Reviewed by
Jonne Hower

HEALTH MANAGEMENT: ATLANTIC SALMON RESTORATION EFFORT

LARISA A. FORD
PATRICIA BARBASH

HISTORY

The Connecticut, Merrimack and Penobscot rivers once supported large populations of naturally reproducing Atlantic salmon, *Salmo salar*. In 1797, the first dam was constructed on the Connecticut River at Turner's Falls, Massachusetts, impeding natural salmon migration and reproduction. The onset of the Industrial Revolution—and coincident pollution throughout New England rivers—also contributed to destruction of habitat. Salmon returns continued to decrease. By 1815, Atlantic salmon were no longer returning to the Connecticut River, and returns of salmon to the Merrimack and Penobscot were severely reduced (Atlantic Salmon Federation, 1986).

Attempts to restore Atlantic salmon in New England date to the mid-1800's. Individuals involved with early efforts were highly motivated and conservation minded. These individuals, however, lacked the essential knowledge of Atlantic salmon biology necessary to restore the resource. Their efforts were further complicated by a lack of cooperation among federal, state, and private agencies (Atlantic Salmon Federation, 1986).

The establishment of the Atlantic Sea Run Salmon Commission by the Maine State Legislature, in 1948, marked the first modern-day attempt to restore Atlantic salmon to New England (USFWS, 1989). In 1965, the passage of the Anadromous Fish Conservation Act (P.L. 89-304) by Congress resulted in a more concerted effort by State and Federal agencies to restore Atlantic salmon to New England rivers (USFWS, 1989). In the same year, the Model River Program was initiated by cooperation among the Maine Atlantic Sea-Run Salmon Commission, the USFWS, and the Penobscot dam owners. The objective of the Model River Program was to restore Atlantic salmon to the Penobscot River. Similar programs for the Connecticut and Merrimack river systems were established in the late 1960's (USFWS, 1989).

Since 1971, the number of Atlantic salmon adults returning to their respective rivers has fluctuated (3,000-7,000); but a general increase in the run has been documented. From the late 1980's and until 1994, over one million smolts and fry were produced annually by various federal and state agencies and released into New England rivers. Today, adults return to 16 New England river systems as far south as the Connecticut River (USFWS, 1989).

The coordinated efforts between state, federal and private agencies are key to the growth and success of today's Atlantic Salmon restoration programs. Private groups, such as the Restora-



tion of Atlantic Salmon in America, The Atlantic Salmon Federation, Trout Unlimited, Salmon Unlimited, and the National Wildlife Federation have contributed to the restoration effort by sponsoring workshops, providing volunteers, and educating the public.

Salmon Life Cycle

In early spring adult salmon begin their spawning migration and return to their native rivers, although natural migration and reproduction are obstructed in New England rivers. Historically, adults would travel upstream to spawn in stream beds. Today, most adults are captured at fishways and transported to broodstock stations to be spawned artificially. Eggs will hatch by late March. Alevins, which feed on their yolk sac, develop into feeding fry in about a month. The fish continue to grow and when they reach 2-3", they are called parr. They remain in this stage for one to two years.

Within two years parr undergo internal physiological changes and begin to turn bright silver, one characteristic of the transition to the smolt stage. These fish are capable of migrating downstream to the ocean. The fish remain at sea for one to three years, before returning to their native rivers to reproduce.

Hatchery Environment

The two years that the juvenile salmon remain close to their freshwater birthplace is spent in a constant struggle for survival. Predation and competition for food and space within the stream habitat play major roles in the survival of juvenile salmon to the migrating smolt stage (Netboy, 1968; Bley, 1987; Jarvi, 1989). Human intervention, through the establishment of hatchery programs, is necessary to enhance the survival of juvenile Atlantic salmon and to reach the goals of the restoration effort. Hence, a significant number of fish contributing to each salmon run in New England have spent part or all of their juvenile life in the "protective" environment of a fish hatchery. Whether they were born in the gravel of a stream in Maine, planted as fry in New England tributaries, or raised to smolts at hatcheries, the management of the Atlantic salmon at the time of parr-to-smolt transition is crucial to their successful downstream migration.

Despite the modernization of fish culture techniques and equipment which reduce stress and disease on hatchery fish (Piper, et al., 1983), Atlantic salmon hatcheries of the restoration program still

experience occasional disease outbreaks. Epizootics among previously healthy hatchery smolts held at imprinting and self-release facilities have provided insight to the probable effects of stress and smoltification on the well-being of migrating salmon after they are stocked into the river environments. Imprint ponds serve as river orientation structures for smolts where constriction of water flow, heavy debris, or rising temperatures enhance chances of epizootics. Smolts which remain in the river systems encounter higher levels of disease and mortality than those that migrate quickly to ocean waters. Radio telemetry studies, however, have determined that the rate of migration of smolts from a given stocking point to the estuary varies greatly from several weeks to only a few days (Knight, 1987; Shepard, 1991; Hanson and Royer, 1991).

DISEASE AND MIGRATION OF THE ATLANTIC SALMON IN NEW ENGLAND

Just like any other animal, disease in fish is not always the result of mere contact between host and pathogen. A complicated yet delicate relationship exists between fish, pathogens, and environmental conditions. An animal can live a healthy existence despite the presence of a pathogen, unless environmental conditions are altered to favor infection and disease. The role of stressors which predispose fish to infection or disease is well documented (Wedemeyer, 1970; Wedemeyer and Wood, 1974; Snieszko, 1974). Wedemeyer (1970) defines stress as, "... a state produced by any environmental or other factor which extends the adaptive responses of an animal beyond the normal range or which disturbs the normal functioning to such an extent that, in either case, the chances of survival are significantly reduced."

In response to a stressful environmental change, cortisol is released by the interrenal (adrenal) tissue in fish. This steroid is associated with a sequence of physiological and biochemical events that lead to deficiencies of the immune system. When in the presence of either obligate or opportunistic pathogens, a lethal disease can occur.

Wiik, et al. (1989) reported that serum cortisol levels increased 20 times above the norm when Atlantic salmon juveniles experi-

enced physical stress. When exposed to the bacterium, *Vibrio salmonicida*, mortality was higher among groups of fish which were deliberately stressed than among control groups maintained under normal conditions.

Prior to release from a hatchery, the Atlantic salmon undergo stressors involved with normal fish cultural operations: marking, handling, crowding, diet deficiencies, etc. Diet can also have a significant effect upon the health and survival of hatchery and wild Atlantic salmon during migration. Hatchery fish are commonly fed commercial fish feed which is formulated to meet the nutritional requirements of Atlantic salmon. The breakdown of vitamin C (ascorbic acid) in fish feed is common and a diet deficient in vitamin C has been linked to lowered resistance to disease (Hardie et al., 1991).

While at the hatchery, Atlantic salmon also begin to undergo parr-to-smolt transition. Smoltification involves a well documented, elaborate network of physiological, biochemical, morphological and behavioral changes which enable the salmon to complete its downstream migration and adaptation to the saline ocean environment (McCormick and Saunders, 1987). Smoltification is itself a physiological stress that increases serum cortisol levels, depresses immune competence and enhances susceptibility to infection (Maule et al., 1987). As the salmon begins its transformation into a smolt, it must also face the physical and environmental stressors which await in the river downstream.

The River Environment

Obligate fish pathogens (e.g. *Aeromonas salmonicida*, *Yersinia ruckeri*, *Vibriosispecies*, and *Renibacterium salmoninarum*) are present within the rivers and estuaries of New England (Bullock, et al., 1976; Sawyer, 1978). One can speculate on the deleterious effects which can offset the delicate host-pathogen relationship in favor of the pathogen. The handling which hatchery Atlantic salmon must endure while being stocked into the river systems has been known to cause significant physical damage to the protective skin-scale complex of the smolts. Descalation caused by nets and transport can be extensive. The removal of large patches of mucus and scales can effect the osmotic integrity (electrolyte balance) of the smolt (Bouck & Smith, 1979; Sillas et al., 1990) and invite infection (Van Oosten, 1957).

The structural obstacles imposed by hydroelectric dams have necessitated construction of appropriate fish passage facilities. Depending upon the highly variable rate of river flow, smolts will descend each dam either through the propellers of an operating turbine, over the spillway and sluice gates, or through a fish passage facility if one is available. Among the expansive network of dams throughout New England, 50% of Atlantic salmon smolts swim through hydro-turbines. Studies have also determined that hydroelectric turbines cause 2-26% immediate mortality to salmon smolts which undergo turbine passage (Stier, 1983; Saunders, 1991; Shepard, 1991; Hanson and Royer, 1991). In some river systems, the injuries and mortality are cumulative as smolts migrate past several dams before reaching the ocean.

In addition to immediate turbine-related mortality, delayed mortality can occur due to secondary infection from mechanical injury. Experiments conducted by Gloss and Wahl (1983) and Kosteci et al., (1987) indicated that 43% of smolts lose 20-28% of their scales passing through the turbines. Increased scale loss was associated with an increase in mortality 48 hours after turbine passage. Bouck and Smith (1979) also showed that experimentally descaled salmonid smolts will die when immediately exposed to seawater. Survival, however, increased when fish were held in freshwater for 1 to 5 days before saltwater exposure. These investigations were designed to determine the effects of descalation on the osmoregulation capabilities of seaward migrating smolts. Assays for the detection of fish pathogens were not performed. Strong implications exist, however,



that a mechanical disturbance such as turbine passage would most certainly lead to delayed mortality associated with secondary disease infection.

Water Quality

Lastly, but not of lesser importance, are the environmental factors involving river water quality. Inland and coastal aquatic environments are greatly affected by human activities which create varying degrees of water pollution. Pollution is frequently cited as a stress that may evoke disease (Snieszko, 1974). Pippy and Hare (1969) linked the environmentally ubiquitous bacteria *Aeromonas hydrophila* to fish kills of Atlantic salmon and suckers on New Brunswick's Miramichi River following an episode of copper and zinc mine pollution. Varying degrees of pollution from industry, waste water treatment, agriculture and acid rain introduce other stressful burdens upon salmon migrating through New England waters.

Water temperatures, which fluctuate on the lower New England rivers during spring migration, can pose an additional stress. Elliot (1991) reported an upper lethal temperature limit of 27.8°C for juvenile *Salmo salar*. Temperatures recorded in the southern New England rivers have come dangerously close to this limit. For example, the Merrimack River temperature has been 24°C in late May, when some smolts were still believed to be in the river systems (Rottiers, 1990).

Stress

Little information is available concerning the effects of environmental stress on smoltification in the wild. It is reasonable to assume, however, that these stressors coupled with the presence of obligate and opportunistic bacterial pathogens existing in the New England river systems pose a significant threat to the survival of downstream migrating Atlantic salmon smolts. It has been suggested that survivors of bacterial epizootics may become carriers, and succumb to disease during the stresses of migration and smoltification (Bullock, et al., 1976). However, the only proven incidence of infection has been derived from smolts which were held in river water under unnatural and stressful conditions, as previously discussed. Use of vaccines on pre-released juveniles to protect them from river and estuarine pathogens have been unsuccessful (Sawyer, 1978).

It is difficult to know the exact impact of these factors on the health status of downstream migrating Atlantic salmon smolts introduced to New England rivers by the Atlantic Salmon Restoration Program. Attempts to determine the physical status of migrating smolts are hampered by the inability to locate and sample fish in the lower river.

Ocean Survival

After smolts enter the ocean they proceed north to feeding grounds off the Greenland coast. Little information is available concerning the life history and disease problems of Atlantic salmon during this stage. *Renibacterium salmoninarum*, the causative agent of bacterial kidney disease, is ubiquitous in freshwater streams and salt water habitats encountered by Atlantic salmon (Evenden, et al., 1993). Although clinical disease has not been documented for sea run Atlantic salmon in the United States, asymptomatic infections are known to occur (Hiney, et al., 1994).

Increasing popularity of net-pen culture for commercial production of marketable coho and Atlantic salmon has created reservoirs for vibriosis pathogens along the coast and estuaries of the Northeast (Sawyer, 1978; Sawyer et al., 1979). The impact of the disease on migrating salmon is not known, however, they are most certainly exposed to the pathogen both when exiting the river as smolts, and upon re-entrance as adults. Vibriosis is a disease which occurs mainly in saltwater surroundings, and its pathogenicity within the host tissues after freshwater entrance is speculative (Bullock, 1987).

To date, bacterial isolations of *Vibrio* sp. have remained infrequent in mortalities of captive sea-run salmon held in freshwater environments.

PROBLEMS FACING UPSTREAM MIGRATING ADULTS

After two to three years in the ocean, the adult salmon return to their natal rivers to reproduce. During their return to freshwater, salmon suspend their feeding activity and draw upon energy from stored fat to accomplish the long river ascent and to develop sexual organs. The rivers of present day New England inflict many more stressors upon migrating fish than what may have existed during former pristine periods. Some of the same stressors which apply to the downstream migrating smolts also occur when the adult fish enters the river estuaries, only now in reverse order. The physiological transition from salt to fresh water in conjunction with adverse conditions of flow and water quality of the coastal and river environments create ideal conditions for the onslaught of disease pathogens to which the salmon are exposed. Injury can also occur due to fishing—nets, hooks, boat propellers—and high rainfall creates torrential river floods, sending debris through the water column in which the salmon struggle. The effects can include laceration, descalation, and exhaustion. If the strength of the sea-run Atlantic salmon permits, it will find its way upstream and meet with the first physical barrier which, depending upon the river, may be one of many to come before the salmon spawns.

Prior to the era of human industrialization in New England, these obstructions existed as steep rapids or falls where this species acquired its name and reputation as *Salmo salar*, "the leaper." With the construction of hydropower dams at nearly every set of falls within the tributaries and mainstem rivers of southern New England, these pristine conditions sadly vanished, taking the abundant populations of anadromous fish with them (Netboy, 1968; Dunfield, 1985). The provision of fishways around the various dams has introduced an entirely new assortment of stressors, (e.g., crowding, low dissolved oxygen concentrations, high water temperatures and mechanical injury) to the migrating fish that use them.

Since early efforts at restoration, engineers strived to design fish passage facilities which were economical to build as well as passable for anadromous fish species (Moffit, et al., 1982). Only the more recently built fish ladders have proven successful and then only when proper water flows are maintained to reduce swimming stress. Fishlifts, or elevators, were also erected at several dams such as those in Holyoke, Massachusetts on the Connecticut River, and in Lawrence and Lowell along the Merrimack River. The mechanical operation of such structures contribute to some of the stress to the fish that use them, but they also provide for fish passage and for counting stations for collection of valuable data on rates of returning salmon to each river.

Almost every fishway possesses a counting and trapping station located near its exit at the top of the dam. It is at this point that the success, or failure, of extensive efforts in anadromous restoration are realized, and where human intervention has become necessary in assuring that each salmon returning from the sea survives until it is able to spawn in the fall. A great percentage of migrating salmon which pass through these stations are trapped there, and transported to a nearby holding facility (Figures 1-3). Fish which are allowed to remain in the river are tagged and released in hopes that they will progress over successive fishways to arrive at suitable spawning habitat in the tributaries. The handling involved in trapping, tagging or transportation can be extremely stressful to the fish, and the survival or demise of those fish which are released into the wild remains obscure.

The sea-run salmon which are transported to holding facilities provide us with a great deal of insight to the factors which may influence their survival to spawning. Unlike the out-migration of



smolts, it is possible for us to observe the results of the varying host-pathogen-environment interactions in populations of adult Atlantic salmon after they have been captured and removed from the rivers and placed in the "protective" environment of a hatchery. The holding facility environment also creates stress factors of its own which the salmon must contend with before spawning. In addition, stressful physiological changes occur in the fish just prior to spawning which can severely impair the immune system, rendering these valuable broodstock susceptible to a multitude of endemic pathogens. The pathogens which have consistently caused pre-spawn mortality in adult Atlantic salmon held at fish culture facilities are continuously studied.

PATHOGENS

Bacterial infections are known to impact the survival and health of both juvenile and adult Atlantic salmon. The primary bacterial pathogen of concern to the Atlantic salmon restoration effort is *Aeromonas salmonicida*, the causative agent of furunculosis. Clinical signs of disease include cessation of feeding, fin hemorrhages and in chronic disease, furuncles. Internally, the organs are extensively hemorrhaged (Bullock et al., 1983; Bullock, 1990).

A. salmonicida is an obligate fish pathogen, and its virulence factors have been the subject of extensive study. Leucocidin, proteases, other extracellular products produced by the bacterium, and the A-layer (a crystalline array protein on the outer membrane of the bacterial cell) have all been implicated as virulence factors and play a role in the development of pathology in the fish host (Bullock, et al., 1983; Cipriano, 1980; Ellis et al., 1981; Fuller et al., 1977; Shieh and Maclean, 1975; and Udey, 1978).

Isolates of *A. salmonicida* are serologically similar, making the development of vaccines realistic (Popoff, 1969). Currently, adult salmon that return to the river are given a combined vaccine for prevention of furunculosis and enteric redmouth disease, another pathogen of concern to the restoration effort (Barbash, 1991a).

Enteric redmouth disease (ERM) is caused by *Yersinia ruckeri*, a gram-negative bacterium. The disease organism causes extensive hemorrhages throughout the body, particularly in and around the mouth. Two of the serotypes (I and II) are known to cause epizootics in fish populations (Bullock and Cipriano, 1990). To date, *Y. ruckeri* has been only a secondary concern of the restoration effort because few epizootics in adults or juveniles have been documented.

Another gram-negative bacterium, *Vibrio salmonicida*, causes extensive losses in Atlantic salmon grown in net-pen operations in the salt water environment (Egudius et al., 1984; Bullock, 1987). Vibriosis, which can be caused by several species of *Vibrio*, *V. anguillarum* and *V. ordalii* is also characterized by extensive hemorrhage throughout the body (Bullock, 1987). *Vibrio* species are common in sea water and estuarine environments and some species require high salt concentrations for growth, therefore, vibriosis is generally considered a disease confined to the marine environment. During the adult return to the river, spawning, and development of the juveniles, areas in which the restoration effort is concentrated, little concern is directed towards vibriosis.

Another bacterium of concern to the restoration effort, is *Renibacterium salmoninarum*. Although *R. salmoninarum*, is a primary pathogen of Pacific salmon, the Atlantic salmon stocks have not been as heavily affected, though asymptomatic infections do occur (Evenden, et al., 1993). This bacterium is a gram-positive rod that is very difficult to isolate from the host and is typically detected by fluorescent antibody techniques. The bacterium causes the kidneys of the host fish to become swollen and often discrete white lesions develop in the kidney tissue (Bullock and McCraren, 1990).

Lethal fungal infections are of grave concern at sea-run Atlantic salmon holding facilities. A substance known as malachite green was historically considered the best compound for the treatment and prevention of fungus at many hatcheries (Hoffman, 1970). This compound is a teratogen and is no longer legal to use. The U.S. Food and Drug Administration (FDA) has permitted limited experimentation with formalin and hydrogen peroxide as possible replacement prophylactics for fungal infection.

The primary parasite that impacts the Atlantic salmon restoration effort is *Ichthyophthirius multifiliis*. These organisms are spherical, ciliated protozoans that cause "Ich". The protozoan is distinguished by its horseshoe-shaped nucleus, and the development of white cysts in the skin, over the entire body surface and gills of affected fish (Meyer and Bullock, 1990). "Ich" epizootics have been reported in juvenile Atlantic salmon and have contributed to significant losses in hatchery populations (Barbash, 1991b). Treatment with formalin, a registered parasiticide for salmonids, has limited effects because it kills only the free-swimming life stage of the organism.

Viral epizootics have not affected the restoration program, but monitoring for Infectious Pancreatic Necrosis (IPN) virus is routinely done because IPN virus is known to infect Atlantic salmon.

IMMUNE RESPONSES IN ATLANTIC SALMON

Attempts to increase survival of hatchery-released salmon and the number of adult returns have led to vaccination studies of parr, smolts and adults. Only a few studies concerning the vaccination of Atlantic salmon against furunculosis and enteric redmouth disease have been reported. Fingerlings immunized with extracellular protease from a non-virulent *A. salmonicida* were protected against challenge with a virulent isolate (Shieh, 1985). Data compiled since 1986 by the Northeast Atlantic Salmon Restoration Project and the US Fish and Wildlife Service, Fish Health Unit (Lamar, PA) show that mortalities are reduced in adult salmon given a combined bacterin (to *A. salmonicida* and *Y. ruckeri*) and antibiotic treatment (oxolinic acid) (Clifford, 1990). Reduction in mortality can not be attributed to the effects of the vaccine alone because the antibiotic treatment may have contributed to the increase in survival. In fact, data from Ford and Cipriano (1991) indicated that the adult salmon are able to mount a humoral response (increase in antibodies) to the bacteria, but the increase in antibodies did not correlate with protection. The antibiotic may contribute more beneficial effects than the vaccine. Although the adult fish are immune competent, the antibody response to the vaccine does not appear to contribute to the protection of the fish to disease. The cellular immune responses, such as phagocytosis,

may be evoked by the bacterin and may contribute to the increase in survival, although no definitive studies have reported stimulation of the cellular components of Atlantic salmon immunity by the combined bacterin.

HEALTH MANAGEMENT

The ultimate concern of each of the adult salmon holding facilities is to maintain the health and survival of every sea-run from time of capture until spawning time. Even after they have first contributed their valuable progeny to the restoration, many of the Atlantic salmon adults can continue to live to spawn again in subsequent years (Bullock, et al., 1976). After the first spawn, some female fish are "reconditioned," or coerced back into their feeding activity, and held at a fresh water facility throughout their productive life span as a future source of eggs while others are released to the wild for angling purposes. The continuing survival and productivity of both the sea-run captives and their progeny depends upon good fish health management.

National and regional policies concerning the management of difficult fish pathogens have existed since before restoration efforts began. Atlantic salmon facilities must comply with directives set forth by both the "Fish Health Policy and Implementation Guidelines" aimed at federal facilities throughout the nation, as well as the "New England Salmonid Health Guidelines" of the northeast region. With these guidelines, fisheries managers can reduce the effects of disease on fish at culture facilities.

Initially, vaccination was implemented as a measure to control the bacterial pathogens *A. salmonicida* and *Y. ruckeri*, which were also causing disease and mortality among sea-run returns. Records indicate that injection of incoming sea-runs with bacterin in 1983 reduced prespawn mortalities to below 20% at most facilities. However, pathogens were isolated from over 50% of the mortalities, and many of the fish succumbed to disease after the first spawning.

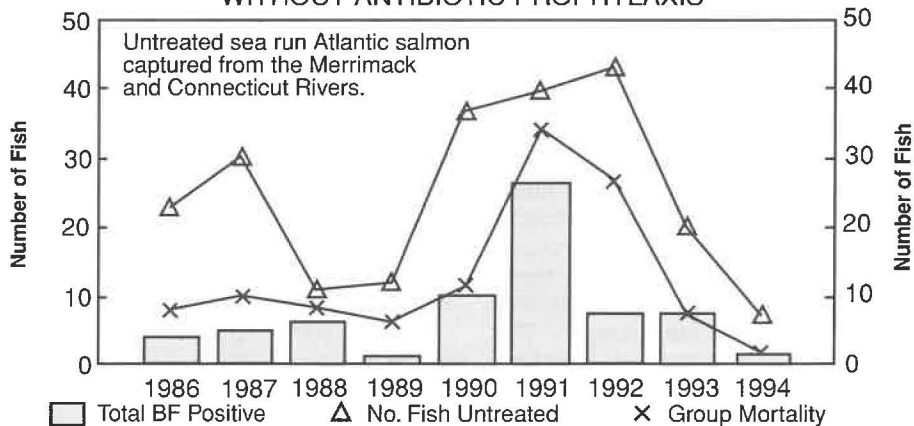
Treatment of persistent fungal and bacterial infections have undergone various changes throughout the years, because of stringent regulation of drug use by the FDA. Very few therapeutic compounds are legal for use on fish, and fish culturists are held legally accountable for any misuse (Schnick, 1989). Sea-run Atlantic salmon at broodstock facilities, however, are not considered food grade fish. As an endangered species in New England waters, the FDA has granted certain permits for the use of unlisted compounds to treat disease. Rigid conditions are enacted to prevent the possibilities of human consumption and environmental contamination. These involve procedures such as incineration of fish carcasses and carbon filtration of effluents, which have proven costly.

In 1985, the federal facilities involved in restoration of the Merrimack and Connecticut Rivers implemented the use of

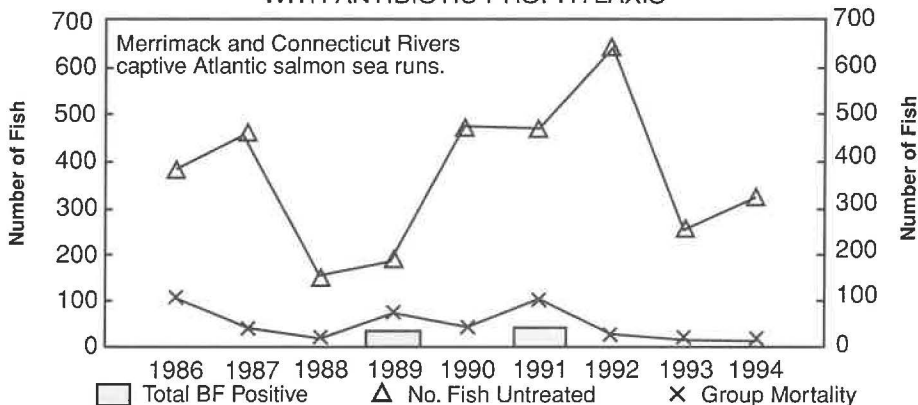
oxytetracycline, an FDA approved antibiotic, but this treatment was unsuccessful because form of the drug chosen was not intended for use as an injection. Unfortunately, disease mortalities persisted. The bacteriocidal agent, oxolinic acid, was then authorized by the FDA to be used in an urgent attempt to minimize spawning mortalities at Cronin National Salmon Station (NSS). Oxolinic acid has been used extensively in European fish culture for the control of bacterial diseases in fish (Grave et al., 1990). It was necessary, therefore, to acquire an emergency authorization from FDA for the use of this drug on the valuable Atlantic salmon. Its administration at the peak of mortality at Cronin NSS was followed by a decline in mortality within one week's time indicating oxolinic acid as a promising possibility for the future of the sea-run broodstock programs for the lower New England Rivers. Another treatment protocol for the

1986 season was devised and proposed (Bullock and Fletcher, 1986). Under an Investigational New Animal Drug Permit (INAD) issued by the FDA, returning salmon received an injection of oxolinic acid in combination with a bacterin against both *A. salmonicida* and *Y. ruckeri*. The INAD permit required the maintenance of some uninjected control fish and prohibited the release of treated fish into the wild as well. In subsequent years, the efficacy of this protocol for controlling furunculosis and ERM became apparent, and it is still the current protocol of choice (Figure 4). However, in 1995, the FDA banned all veterinary use of the class of antibiotics known as quinolones which includes oxolinic acid. Oxytetracycline is currently being used as a replacement for oxolinic acid and the efficacy of this drug in management of bacterial pathogens effecting Atlantic salmon broodstock is yet to be determined.

GRAPH A: ANNUAL TRENDS IN BACTERIAL INFECTIONS WITHOUT ANTIBIOTIC PROPHYLAXIS



GRAPH B: ANNUAL TRENDS IN MORTALITY WITH ANTIBIOTIC PROPHYLAXIS



Annual mortality of Atlantic salmon sea runs in Southern New England rivers caused by furunculosis (BF) a bacterial infection which can kill over 50% of a spawning population, as indicated in Graph A, unless treated prophylactically with antibiotics to control infection and mortality as shown in Graph B.

Transmission of these bacterial pathogens from females to their eggs (vertical transmission) is a minor concern, as long as proper egg disinfection procedures are followed. The FDA approved use of iodine compounds on fish eggs have been proven effective in preventing vertical transmission of some bacterial diseases.

There exist only two antibacterial drugs which are registered for legal use at salmonid hatcheries for the treatment of furunculosis (Schnick, 1989). Unfortunately, resistant bacteria have been detected for both oxytetracycline and Romet (sulfadimethoxine, ormetoprim), and their efficacy is limited. Other antibiotics are being considered, but registering drugs for use in fish culture is both costly and time consuming.

Parasiticides which are legal for use on salmonids are limited to formalin only. Extensive use of formalin at Atlantic salmon production facilities has aided in combatting protozoan parasites such as *Ichthyophthirius* and *Chilodonella* species. Formalin is also used regularly as a fungicide on incubating eggs. A great deal of salt is employed in the prevention of stress-related disease at fish culture facilities. Salt acts as an osmoregulatory enhancer, stabilizing body electrolytes that are lost during stressful situations such as handling or crowding.

FUTURE RESEARCH

In regards to health issues, broodstock and production facilities have limited therapeutic options for disease treatment. While some efforts are being made to provide data necessary for FDA drug approval for these fish, fisheries scientists are concentrating on prevention of disease. The first step in sound fish health management involves the maintenance of an environment that is balanced in favor of the fish over the pathogen. The reduction of stressors such as crowding, handling and poor diet is a must in the prevention of fish disease. In migrating salmon, physiological stressors which reduce immunocompetence of fish should be further investigated, as well as the pathogens which take advantage of this phenomenon. More data on seawater survival of smolts is essential including disease implications as well as smoltification effects and predation. Only then can we be fully successful in the prevention and control of diseases which plague the Atlantic Salmon Restoration Program. Additionally, enhancing the disease resistance of these fish by immune modulation and selective breeding should not be overlooked.

SUMMARY

Through cooperative efforts of state, federal and private agencies, the knowledge

base of Atlantic salmon biology has greatly increased and enabled the restoration effort to continue towards its goal. Detailed information concerning such areas as physiology of smoltification, behavior, fish passage requirements and health problems of Atlantic salmon have been instrumental to the restoration of New England Atlantic salmon populations.

The future of the restoration effort not only depends on good health management, but innovative hatchery and stocking programs, as well as continued cooperation among all the agencies involved.

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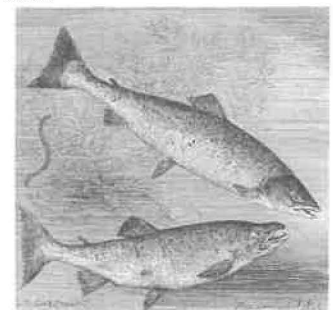
Patricia Barbash is a Fish Health Biologist (since 1989) with the U.S. Fish and Wildlife Service, stationed at the Lamar Fish Health Unit in Central Pennsylvania. The Fish Health Unit serves the Northeast region with a variety of fish health assistance, including disease inspections and diagnostic services. Her Bachelor's is from Hampshire College, Amherst, Massachusetts in Marine Ecology. She began her career with the USFWS as a field technician for the Massachusetts Cooperative Fisheries Research Unit at the University of Massachusetts in Amherst, working on various projects related to hydroelectric power dams and anadromous fish. Earlier she worked at the Richard Cronin National Salmon Station in Sunderland, Massachusetts and then the Nashua National Fish Hatchery in New Hampshire.

Photos these pages by Dan Flint, USFWS, of the Richard Cronin National Salmon Station.

Figure 1. Atlantic salmon sea-run male being held by Dr. Christine Densmore of the NFHRL, NBS, Leetown West Virginia.

Figure 2. Milt being collected from an Atlantic salmon sea-run male by Dr. Christine Densmore of the NFHRL, NBS, Leetown, and co-author Patricia Barbash of the Fish Health Unit, USFWS, Lamar, Pennsylvania.

Figure 3. Eggs being collected from an Atlantic salmon sea-run female by Bernard M. Novak, Hatchery Manager, Richard Cronin National Salmon Station, Sunderland, Massachusetts.



THIS GARDENER IS IN THE BUSINESS OF GROWING AND SELLING PLANTS. AT HOME, HOWEVER, COMFORT AND BEAUTY COME FIRST.

GROWING, SELLING, AND STUDYING PLANTS

DIANE M. CALABRESE

Ask Chris Chmielewski to name her favorite plant. She demurs, "I feel like a parent. I love each one."

Does that mean Chris has no problem plants among more than 50 varieties she grows? "Well," she says reluctantly, "Comfrey (*Symphytum officinale*) takes over when it's encouraged with any hospitality. I have to train it. And I pamper Delphinium, which is temperamental. But I don't mind going out of my way for such a beautiful flower. On the other hand, I do not love bee balm (*Monarda didyma*) or tea roses (*Rosa* spp.) enough to indulge them, so I live without."

Chris Chmielewski gardens in a big way in a small space. Her varied offspring—uh, plants—mingle in 600 square feet of a city yard. Her urban habitat is just four blocks from the bayfront of Erie, which is Pennsylvania's city on the Great Lakes. Erie is just 711

feet above sea level. The frost free date is 15 April on the lake plain. But Chris says, "I am so close to the water, and its ameliorating effects, I can push that a little."

With resourcefulness, a gardener can plant contentment anywhere. Chris demonstrates that. Visit her green space and feel its soothing effects.

For human and canine sitters, there's a spongy cushion of Scotch moss, aka bedstraw (*Galium* spp.). For birds, there are baths.

In only three years, Chris replaced "unkempt shrubbery and bits of grass" with diverse layers of perennials. How did she do it?

Like a proud parent, she emphasizes simplicity. "The first year, I found a lot of bricks when I was turning over sod, so I decided to make a path," says Chris. "At about the same time, I fell in love with witch hazel and I planted lots



for privacy. Then, I started to fill in with plants that were not too expensive. In many ways, the garden designed itself."

The garden might have taken shape on its own. But Chris's hands and imagination instigated the magic. For example, Chris is a great salvager. She collects plants like yarrow (*Achillea millefolium*) and butter-and-eggs (*Linaria vulgaris*) from urban construction sites and gives them a new home. Chris likens her 'saves' to finding a pet at the Humane Society.

Then too, Chris draws on years of experience. "I've been gardening ever since I was a kid," she says. "I lived with my grandparents for years. I helped them grow vegetables. Early on I had my own patch—ten feet by twelve feet—of cucumbers and squash, coriander and lavender. I started reading gardening magazines when I was nine. During college, I missed gardening. Post-college I lived in England and Germany and all I could do was visit and study gardens."



Chris Chmielewski and her dog, Pumpkin, at work in Erie Pennsylvania.

When Chris began to unleash her pent-up enthusiasm and expertise, she worked methodically. She reclaimed a section of her yard at a time. To eliminate tenacious weeds, she light starved them with covers of black plastic. When planting, she introduced as many disease- and pest-resistant plants as possible. In many ways, though, Chris says, "I let things work out naturally. For example, I don't fight slugs. That means I also don't grow English daisies (*Bellis perennis*), even though I am fond of them."

In fact, Chris plans a great deal, often while sitting in her compact sanctuary. She painted her two story house to make it a complementary backdrop for her gardens and window boxes. Pale pink shingles, green fascia and green sills grew from instinct and from Chris's professional knowledge about colors. She worked in advertising until May 1995. But after ten years in the setting, she decided she was ready for a venture better suited to the gardener in her. A Pennsylvania certified Master Gardener, Chris now manages a wholesale business.

Most plants are grown outdoors, making the operation more nursery than greenhouse. What is a round-the-clock commitment to plants like? "The great thing about being manager is that I have some say about the different plants we grow," says Chris. "If there's a plant I think has commercial value, I order starters or seeds. That's how we began selling Ravenna Grass (*Erianthus ravennae*) this year."

A genuine give and take exists between Chris's garden and her employer's operation. She has added to her employer's stock and varieties from the perennials she splits in her garden. Is there any downside? "My boss once reminded me my job is to sell plants to other people, not raise them all to maturity."

Chris enjoys the "stories" her plants write. "Soapwort (*Saponaria officinalis*)," she says,

A profusion of late June blossoms.



"was a clothes and body soap in colonial times. Now it's used to wash museum textiles." The Sweet Woodruff (*Galium odoratum*) ground cover under her shrub roses adds flavor to traditional May wine.

By the way, her shrub roses are purple 'Reine des Violettes,' pink 'The Fairy,' and trademarked Pink Meidiland. And they are heirloom plants. "It's important to preserve history," says Chris. "I work in many heirloom plants with native wildflowers. Some people think of evening primrose (*Oenothera biennis*), yarrow, and flax (*Linum perenne*) as weeds. I like to show how beautiful they are."

Where some see limited space, Chris sees a challenge. She says, "I learned even though green space is at a premium in Europe, peaceful and relaxing places are found everywhere. I'm trying to create the same. As for surprises, I love growing raspberries and strawberries because people are amazed how well the fruits do in a small area."

Indeed, space limitations did not preclude Chris from adding a small "peanut" pond to her environs in March 1995. Pumpkin, Chris's dog — a feisty eight pounds of white fluff, is not so keen on the structure. But Chris believes Pumpkin

will come around. In time, Chris expects the pond to be colonized by semi aquatic and aquatic insects. She can probably count on velvet water bugs (*Veliids*), small water boatmen (*Corixids*) and several kinds of small semi-aquatic beetles. Being so close to the bay and lake, she can also anticipate damselflies (*Odonates*) to lay eggs, which will hatch to slender aquatic nymphs. Before insects will land and take up residence, algae must get a start. And layers of detritus must settle on the bottom. Patience is on Chris's side.

Haste does not suit Chris at all. She says, "When I find a curious creature, I learn about it before I decide whether to try to remove it. I once found a caterpillar feeding on fennel. Someone told me it was a tomato hornworm. If I had reacted, I'd have missed seeing a beautiful swallowtail emerge. I have a comfort garden," says Chris. "It's a place where I can relax, feel secure in a world that's constantly in flux."

Sentimental? Yes. But there is a hearty sense of humor too. An ardent fan of Martha Stewart, Chris laughs over the television image of no-nonsense Stewart tiling her pool with cast-off credit cards. The size of Chris's green space cannot match Stewart's. But Chris's 'there-are-only-opportunities' attitude can. Grow your own garden... anywhere.

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Photographer Melody Sherosky is Calabrese's niece. Melody is 16, an avid Girl Scout, a photographer who has shown her work, and the editor of a small magazine, *The Blindman's Rainbow*.

Watershed Analysis and Cultural Resources: Tribal Contributions to Collaborative Ecosystem Management on the Olympic Peninsula

J. Anne Shaffer
Jacilee Wray
Bonita Warner



The Olympic Peninsula, located in the northwest corner across the Strait of Juan De Fuca from Canada in the State of Washington, is a unique mosaic of natural and cultural resources. It is a region of steep forested mountains, unique climate, and remote pristine beaches. Salmon and timber resources of the Olympic Peninsula are among the richest in the world, and have supported large international forestry and fishery markets.

The cultural resources of the Olympic Peninsula are also unrivaled. The western Peninsula is home to five Native American tribes. The Quinault, Hoh, Quileute, Makah, and Elwha Klallam tribes have lived on the Peninsula for thousands of years. Each tribe is a thriving, unique entity with cultural and economic identities based on, and intertwined with, the natural and physical features of the Olympic Peninsula.

Management of Olympic Peninsula resources has been equally complex. Mono-specific and project scale focus on timber and fishery resources led to peak resource extraction over the past 20 years, and devastating reductions in resources in the last 10. Timber production was brought to a virtual halt with the listing of the Northern Spotted Owl as a threatened and endangered species. Severe losses in salmon runs, due largely to habitat loss and over-fishing, led to the restriction or closure of commercial and sport fishing for rivers and ocean areas of the Olympic Peninsula. For example, Queets River spring Chinook, once an important run for both sport and commercial fishing, has not supported a targeted fishery for a number of years due to decline in fish numbers. Lake Ozette sockeye, no longer a viable population, was once a healthy commercial and sport stock. Ocean fisheries for coho and Chinook salmon have been extremely restricted for the last two years from Elwaco north to Cape Flattery.

Understandably, these changes have had an immediate and catastrophic effect on

the coastal tribes of the Olympic Peninsula. Timber and fishery extraction effects on cultural resources were not considered consistently or thoroughly, leaving the tribes with little opportunity to assess how these uses of the resources were affecting their cultural lifeways. Salmon fishing closures and associated impacts to the support industries have added significant stress to tribal economies and community.

Historic management strategies did not fully address protection of, or cumulative effects on, the area's resources. It therefore was necessary to develop a new approach to land management (Naiman, 1992).

Two major efforts, one state and one federal, were therefore undertaken to define new resource management strategies. Each share the goal of focusing on cumulative effects of resource utilization at the watershed scale, which they achieve through different management objectives. Each are of major significance to the Olympic Peninsula. The first was the Timber, Fish, and Wildlife (TFW) agreement, ratified in the State of Washington in 1987. This landmark agreement brought together state, private, and tribal land managers to cooperatively develop management activities that would simultaneously allow for both sustained resource utilization and preservation of key resource habitats, as well as "to develop a process to inventory archeological cultural spaces in management forests; and to inventory, evaluate, preserve and protect traditional cultural and archeological spaces and assure access" (TFW Agreement). The management strategy that resulted, Watershed Analysis, was formally incorporated into the state forest practices regulatory framework in 1991 (Washington Department of Natural Resource, 1995). The objectives of TFW Watershed Analysis are to develop watershed management plans for state and private lands (Washington Department of Natural Resources, 1993). TFW, and associated Watershed Analysis, is currently the

dominant decision making process used on the Olympic Peninsula for managing state and private lands.

The second was the Northwest Forest Plan, formally adopted by federal agencies in 1994 (U.S. Departments of Agriculture and U.S. Department of Interior, 1994 a & b). Although much broader in scope, it, like the state TFW management strategy, is an interdisciplinary cooperative tool for conducting ecosystem management. A key component to this plan is the Aquatic Conservation Strategy, and affiliated Watershed Analysis (U.S. Departments of Agriculture and Interior 1994 b & c). The federal Watershed Analysis shares the same goals (watershed management for economic and resource sustainability) as the state, but the objective of the federal Watershed Analysis is to develop a document that clearly summarizes the major processes acting within a watershed without a decision making (and regulatory) component. Implementation of watershed analysis calls for protection of tribal treaty rights and trust resources (U.S. Departments of Agriculture and Interior 1994b; 1994d).

Watershed analysis looks at the processes affecting a watershed and how management activities affect and are affected by the ecosystem. By looking at the manner in which people have utilized watersheds over the centuries, each analysis team has a better understanding of the cultural and natural processes. Without an understanding of the human elements, a major causative factor in the analysis of watersheds is missing.

Treaties signed between the United States and each of the peninsula tribes in 1855 guarantee each tribe's right to its resources within defined treaty areas. These treaty areas cover state, federal, and private lands. The Treaty of Olympia, which includes Quinault, Quileute, Makah, and Hoh tribes, and Point No Point Treaty, which includes the Elwha Klallam, have similar language with regard to fishing, gathering, and hunting.

The right of taking fish at all usual and accustomed grounds and stations is secured to said Indians in common with all citizens of the territory, and of erecting temporary houses for the purpose of curing and same; together with the privilege of hunting, gathering roots and berries, and pasturing horses on all open and unclaimed lands.

Together—the treaties, federal legislation, and court decisions—define the United States' trust obligations to tribes as sovereign nations and formal resource co-managers within their treaty areas (Cohen, 1986). This unique relationship, combined with the fact that the tribes of the Olympic Peninsula are the original inhabitants of their water-

sheds, makes the tribes integral players in watershed management. As a result, tribes have developed active natural resource management programs over the past 20 years. Collectively—and importantly for management purposes—the tribes hold the most comprehensive resources management data for the Olympic Peninsula and, as a result, are one of the dominant management entities on the Olympic Peninsula.

With this increasing profile in resource management comes a concomitant awareness and concern for management of tribal cultural resources within the watershed. Cultural resources for the tribes of the Olympic Peninsula are extensive, and have both a historic and contemporary dimension. Each tribe has its own definition of cultural resources. For general discussion purposes, they may be classified as traditional places, archeological, and historic sites.

- Traditional places are landscapes, sites, places, and objects that are important for the maintenance and perpetuation of traditional values and practices. They may be locations where traditional religious, ceremonial, and social uses and activities of tribes and the broader community occur. They can provide subsistence needs as well as provide a foundation for the community's ceremonies, customs, and beliefs. Mythic sites, hunting, fishing, and berry picking sites, are examples of traditional places. Animals that are cultural resources, such as salmon, owls, elk, deer, and raven are included in this category.

- An archeological site is the geographic location in which archeological resources are present. Such resources are those material remains of cultures that are found in place, and may include artifacts such as stone tools or flakes, basketry, fire-broken rock, shell middens, and features such as cairns, graves, rock art, and culturally modified trees.

- Historic sites are locations where pivotal historic events have taken place. They reflect patterns of settlement, and use and development over time. Agricultural areas, fishing villages, mining districts, logging camps, and homesteads are examples.

These cultural site types can overlap. For example, the Sol Duc Hot Springs is a traditionally used location for the Quileute and the site of a former historic resort. Current trail and road networks follow historic trail routes first created and used by the Quileute and other tribes, local settlers, and explorers.

Put into a watershed context, it can easily be said that *the entire watershed is a cultural resource*. The tribes of the Olympic Peninsula have therefore been very active in integrating cultural resource management in the watershed analysis process. Federal

participation in integrating cultural resources into watershed management is well defined, and federal responsibility quite broad. The National Historic Preservation Act requires federal agencies "with jurisdiction over a federal, federally assisted or federally licensed undertaking to take into account the effects of the agency's undertakings on properties included in or eligible for the National Register of Historic Places, and prior to approval of an undertaking, to afford the Historic Preservation office a reasonable opportunity to comment on the undertaking" (NHPA, amended 1992).

The 1992 Amendments to the National Historic Preservation Act define undertaking as a project, activity, or process funded in a whole or in part under the direct or indirect jurisdiction of a federal agency, including (a) Those carried out by or on behalf of the agency; (b) Those carried out with federal financial assistance; (c) Those requiring a federal permit, license, or approval, and (d) Those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency. Furthermore, the National Environmental Policy Act (NEPA) requires that a federal project's effects on cultural resources be identified in an EIS.

In a watershed analysis, the first step towards "taking into account the effects" on cultural resources is to inventory, evaluate, and assess the status of cultural resources. Watershed analysis will then provide guidance for future projects in the watershed. For example, watershed analysis may provide the base for a cultural resource management implementation plan. In such a plan, contemporary cultural resource needs (say, cedar bark) may be efficiently incorporated into management activities (cedar log harvest). The plan may also include the identification

of cultural resource preservation needs. Cultural information collected in the analysis process also provides important data for determining where certain fish and mammal species were historically located, what plants the indigenous people and Euro-American homesteaders utilized, what areas were cleared or burned by Native Americans to propagate bulbs and other edible plants and to provide forage for wildlife, what belief systems are associated with identified geological features, and what effects long term use has had on an area. By looking at how people have interacted with the watershed over the centuries, each user of the watershed analysis has a better understanding of the historic, current, and potential future watershed and cultural processes. This information will then allow the tribes, and other land managers, to define how to restore and protect the cultural resources of their watershed.

Two federal projects occurring within the watersheds of the Olympic Peninsula, the Sol Duc watershed analysis and Elwha River Ecosystem and Fisheries Restoration Act, have included cultural resources as a major component of their analysis.

The Sol Duc pilot watershed analysis, completed this year, was a co-sponsored effort to define the status of resources and processes within the Sol Duc watershed. The Sol Duc watershed is located on the western side of the Olympic Peninsula. It's 145,000 acres support a diverse assemblage of fish and wildlife resources, including chinook, coho, pink, chum, and sockeye salmon, and elk. These, and other resources are the essence of the Quileute Tribe. Timber and fishery resources in this watershed have also formed the basis for non-tribal establishment on the western Olympic Pen-



Figure 1 - Olympic Peninsula

insula, with parts of the lower watershed experiencing intense timber management. In contrast, the upper watershed currently stands within the boundaries of the Olympic National Park, and is considered pristine.

The Quileute Tribe, United States Forest Service, National Park Service, state Department of Natural Resources, and private land owners conducted a year long analysis of the Sol Duc watershed. Major goals of the pilot watershed process were to:

- 1) test existing watershed analysis modules;
- 2) develop innovative analysis methods where none existed, and;
- 3) illustrate how interagency efforts can succeed in implementing ecosystem management.

This broad mandate allowed the participants to develop a full cultural module that assessed cultural resources within the formal watershed analysis process. The result was the inclusion of cultural resources into the overall analysis of the watershed, as well as a dedicated cultural resources module (written by Jay Powell, Quileute Tribe/UBC, and Molly Ericksen, USFS). The Sol Duc watershed analysis identifies cultural resources for the watershed, defines major processes that may affect these resources, and suggests management priorities for cultural resource preservation and restoration.

The Elwha River Ecosystem and Fisheries Restoration Act (Public Law 102495) is a negotiated settlement that resolves a contentious federal licensing process of two privately held hydroelectric projects on the northern Olympic Peninsula. The majority of the river system is located within the boundaries of Olympic National Park, where the waters are class AA, considered "extraordinary" quality. Two dams, the Elwha and Glines Canyon, were built along the Elwha River in the early 1900s. The Elwha dam, completed in 1914, was built just 4.9 miles from the river mouth and creates a fish barrier to 93 percent of the historic salmon and steelhead spawning habitat, which has resulted in the extinction of some runs and severe depletion of the remaining runs to the river. The Glines Canyon dam, 13.4 miles from the river mouth, was completed in 1927 and is now within Olympic National Park boundaries. Historically the river supported large coho, chinook, chum, pink and sockeye salmon and steelhead trout runs that are integral to the culture of the Elwha Klallam Tribe.

The dams have inundated important cultural sites and affected traditional use of this watershed. Federal relicensing of these dams by the Federal Energy Regulatory Commission was challenged by several parties; Congress responded with the Elwha River Ecosystem and Fisheries Restoration Act of

1992. In this Act, Congress directed the Secretary of Interior to study ways to fully restore the dam-altered ecosystem and native anadromous fisheries, while protecting the water quality and water rights of existing users. The environmental impacts of the proposed action are being addressed in two Environmental Impact Statements (EIS) prepared by the National Park Service, the U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, U.S. Bureau of Indian Affairs, U.S. Army Corps of Engineers, and the Elwha Klallam Tribe. The first EIS, released in June 1995, recommended removal of both dams as the only alternative that would fully restore the ecosystem and native anadromous fisheries, the standard set by the Elwha Act. The second EIS draft will be out in the spring of 1996 and will analyze implementation of dam removal and provide a preferred alternative with minimized adverse environmental impacts, such as low turbidity levels. These Environmental Impact Statements also address identification and protection of important cultural resources and treaty rights to fish at all usual and accustomed grounds and stations.

Over 70 percent of the public comments to the first EIS were in support of dam removal. The federal agencies and the Elwha Klallam Tribe are currently attempting to secure appropriations for full implementation of the Elwha Act which includes dam removal and full restoration.

Watersheds and cultural resources are completely intertwined: assessment of cultural resources will define the human dimension of the watershed in the past, present, and future context. Analysis of watersheds and their cultural identity is a complex, yet critical component of ecosystem management. Cooperating tribes and land managers on the Olympic Peninsula look forward to the challenge and successes of implementing ecosystem management together.

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The map is courtesy of the Olympic National Park, National Park Service.

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TIMBER INCOME FOR WASHINGTON STATE

During fiscal 1995 (July 1994 to June 1995) total income for Washington State's five million acres of income-producing lands increased to \$197.8 million, up from \$138.3 million in 1994. In spite of the federal statute banning state-owned timber from export and despite the challenges presented by federally protected species which are believed to be indicators of the health of Northwest forest lands, revenue for 1995 kept pace with the five-year average of \$196.5 million. Counties received the highest trust income (for schools, universities, prisons, public building improvements, etc.) in history. The Department of Natural Resources sold 607.3 million board feet of timber.

Resources Update, February 1996

PITY THE POOR CITIES

One of the most dramatic demographic issues which will confront the delegates of the United Nations Habitat II Summit which will take place in June 1996 in Istanbul, is the world-wide phenomenon of rapid urbanization. Urban areas owe much of their growth to immigration and migration caused by population increases throughout the world. Modern towns and cities pose a challenge to environmental sustainability. They produce little or none of their own food, fuel or water, and use immense quantities of energy and raw materials for transport, communication, construction and production. They generate vast amounts of solid wastes and dangerous concentrations of air and water pollution. The growth rate has been very high and fast. In 1950, only 29 people in every 100 lived in cities. By 1992, the world's urban population had more than tripled to 2.4 billion and 43 out of every 100 lived in towns or cities. There are 20 mega-cities with more than eight million and 14 are in the developing world, where in 1950 there were none. Only 39 percent of the world's population lived in the third world in 1950, now 61 percent do. In these countries, national policies

regarding job creation, education, housing and tax incentives have unduly increased the attractiveness of urban areas to potential rural migrants and fostered cities' growth.

More common than countries with no urban plans are countries which are unable to enforce the blueprints they have. Even if a plan has not been rendered obsolete by the sheer numbers of the unforeseen urban inhabitants, problems associated with explosive growth have diverted funding from regulatory functions. As a result, unplanned or uncontrolled, if not actually illegal developments have far outstripped those that are formally planned.

World Ecology Report, Winter 1995

HOW TO RUIN THE NAVY

The U.S. Navy has not fought a real sea battle in over 50 years, and it has not lost an admiral in combat since 1944. But this past year, it lost five admirals to sex—to disgrace for sexual harassment or inappropriate sexual behavior.... The Navy that gave us John Paul Jones and helped defeat Imperial Japan seems incapable of cleaning up its act when it comes to women. Since 1992, the Department of the Navy has logged more than 1,000 new harassment complaints and more than 3,500 charges of indecent assault, from groping to rape—nearly three times the national rate for the same period. The Navy acknowledges that sexual abuse is actually underreported. Sexual abuse is difficult to root out because it is now so embedded in the Navy's day-to-day culture. Over the last 30 years, an attitude of contempt toward women has become routine not only below decks but also in the officers' quarters. Sailors have always been known for their bawdiness, but officers, at least, were supposed to be gentlemen. Then came Vietnam. Billeted in southeast Asia and increasingly frustrated by a losing war, a whole generation of naval officers began carousing in the sleazy bars of Bangkok and the Philippines. The Vietnam vets—and the exploitative

sexual attitudes they developed in Asia—arrived home in the '70s just as women were beginning to move into the ranks. The result was a colossally unlucky convergence of declining manners and morals with the arrival of female sailors and officers. For the men, this has meant careers wrecked by lewd indiscretions. And the Navy's women have been forced to learn how both to go along and to fight back—with very mixed success.

The story begins during the Vietnam War at the Cubi Point Officers Club, near the Navy's vast station at Subic Bay in the Philippines (where the officers) routinely destroyed the Cubi Point club during boozy brawls. Finally, the Navy built a cinderblock annex to the bar, with steel mesh over the light bulbs. Fliers dubbed it "the Tailhook Bar"... The behavior at the Tailhook Bar was carried on at the annual conventions where in 1991, the abuse of 83 women forcefully underscored the spread of the post-Vietnam naval culture. Founded in a Mexican hotel in the '50s, this debauch moved to Las Vegas and had become a three-day drinking and sex binge. For years, the top brass looked the other way—or joined the fun.

Cleaning up after Tailhook '91 has been virtually impossible. Two "standowns" were ordered, bringing the Navy to a halt while every unit discussed sexual harassment for a day. But the action has moved down the Pacific Basin, to the Pattaya Beach in Thailand, a strip joint-honky-tonk scene where almost every night, drunken American carrier pilots can be found "relieving" their fears. The Tailhook spirit lives on.

Gregory L. Vistica, *Newsweek*, February 5, 1996

IS LIDDY DOLE IN FOR IT? ANOTHER STRONG WOMAN, AFTER ALL

Without a doubt, Bob Dole admires Elizabeth Dole's strength. After Ronald Reagan crushed him in the primaries, he said that he "decided to drop out when Elizabeth got ahead of me in the polls." When asked about a Dole-Dole ticket, he would say,

"That's a great idea. But can I be president for at least the first term?" Over the years an edgier tone has entered Bob Dole's stumping. "If I am elected, Elizabeth will not be in charge of healthcare policy." Whatever Liddy Dole (a Harvard Law graduate) feels about that remark, by promising to return to her current job heading up the Red Cross, she has made clear that the job of First Lady is just too limited for her. The mistakes that Hillary Clinton has made are not simply ones of presentation. And some of her would-be successors, with their own careers hovering on the ethically murky border between politics and business, are already facing similar scrutiny. But the most certain legacy of Clinton is a new political commandment to wives: Thou shalt not appear threatening.

Harper's Bazaar, March 1996

URBAN RIVERS AND PROPERTY RIGHTS: USDA'S DEPUTY SECRETARY LOOKS AHEAD

Water touches everyone, everywhere. Every great city has a river running through it, and community commitment and individual foresight are transforming many urban river environments and capitalizing on the broad set of values these waters provide to those in the community.... We are moving aggres-

sively in the USDA to expand our presence in urban and suburban areas and our service to urban residents. Urban natural resources have long been neglected, and it is time they get our attention. As we deal with the health of rivers that run through public and private lands, the USDA is in the middle of intense public debate about private property rights and whether or not laws and programs designed to protect natural resources infringe on those rights and require public compensation. This debate raises several questions regarding river conservation. The first involves equity and environmental justice. Will the rights of millions of Americans in cities and suburbs be recognized if individual property owners upstream must be compensated for actions to minimize the effect they may have on water quality? Who will compensate America's cities?

The question of economics also is raised. Who is to pay private landowners to compensate them for actions taken to protect clean water? What is the source of such funds? What market forces permit these values to be captured? How can downstream users come up with the resources to compensate individual landowners upstream?

Landowners act differently if they know how to minimize the water quality impacts of their activities at minimal cost. Isn't the investment in education and technical assistance better than compensation for regulatory takings? How much authority and capability should a community have to act against those who flaunt their own rights in the face of the legitimate rights of the community? As a society we must address these questions...

James R. Lyons, *Fisheries*, December 1995

THE SOIL & WATER CONSERVATIONIST'S FUTURE

The natural resource issues impacting agricultural land management have evolved from the more traditional, single problem oriented issues such as soil erosion to more complex, interrelated environmental issues involving layers of multiple natural resources. These include agricultural non-point source pollution control, fertilizer and pesticide management, and biodiversity.

Resource management will need an ecosystem and/or watershed management perspective. While still working with the land manager or landowner on specific field and farm level plans, the resource professional working on agricultural land will also be working within new partnerships to achieve a more comprehensive integration of solutions. The emphasis on working in watersheds and on an ecosystem basis will expand the players to include other resource professionals from fish and wildlife agencies, the Environmental Protection Agency, state environmental agencies, local environmental groups, and even local municipalities or water supply utilities.

The disappearing middle in terms of farms will continue to follow the current trends as farm operations become even larger while at the same time, there are more and more, small part-time farmers. This disappearing middle is the traditional clientele that the soil and water conservation profession served. The profession will change to address resource issues from the perspectives of the very large farm operators, usually with significant internal capabilities, and the small part-time farmers. Land managers now receive significant resource-related information from private sources; this privatization of information to the large farm operator will only increase. Another major societal change will occur as more farmers retire. The current average age of farmers is in the mid 50s. Finally, the expanding role of technology including computers, GIS, prescription farming, and biotechnology will continue to challenge the resource profession.

Sarah Fast, *Journal of Soil and Water Conservation*, July/August 1995

SEX & THE SINGLE REPTILE

Alligators with undersized testicles may seem like a problem only for other alligators, but scientists at the University of Florida

argue that what happens to 'gators today may happen to humans tomorrow. In fact, the alarming reproductive problems of Florida's alligators may be surfacing in largemouth bass, a sign of widespread lake pollution. Lake Apopka (third largest in Florida) has suffered from what may be called "battered lake syndrome" for decades because of relentless development. A chemical spill in 1980 and ongoing agricultural pesticide contamination are the primary reasons. Fewer male alligators are being born, and those that are "don't appear normal," explains Tim Gross, a reproduction endocrinologist at UF. "When their gonads are sectioned, they're abnormal. Their hormone production is abnormal as well." Both females and males are showing abnormally high levels of estrogen and low levels of testosterone in male alligators and fish.

The now defunct Tower Chemical Company spilled large amounts of the pesticide Dicolof into a stream that drains into the lake. The ingredients include DDT and its derivative DDE—endocrine disrupters. Tower's buildings have since been designated a Superfund cleanup site by the EPA. Gross says: "We're eating the fish and we're exposed to these same environments. It may not be too far in the future...for people to be less and less able to have offspring."

E Magazine, February 1996

NAGANO 1998: THE XVIII WINTER OLYMPIC GAMES IN JAPAN. LOTS OF LUCK TO NATURE

Rising 3,000 meters above sea level from the center of Japan there stretches a range of precipitous mountains known as the Japanese Alps, or the "Roof of Japan." The area's abundant forests, streams, and deep ravines are a treasure trove of plant and animal life. The range was designated a national park in 1934 and over 20 percent of the entire prefecture is now protected by law. The Nature Conservation Study Council, a group of 28 representatives of environmental organizations and experts on environmental issues established by the prefecture, has been formed to ensure that all of the Olympic facilities remain nature friendly.

Look Japan, March 1996

IDAHO RANCHERS RELY ON BORDER COLLIES

Ray and Marianne Holes divide their four-legged cowhands into "his" and "her" dogs. "Her dogs will absolutely not work for me," said Ray. The couple own and operate Lazy H Livestock (1,500 head on 38,000 acres) with one hired hand and a kennel full of border collies. In the past year, cattle prices have fallen to the point where the Holeses say they're getting about half the price they used to receive. That makes the dogs all the more attractive. For some reason, Ray said, the dogs can't stand disorder. They want the cattle to stay and move together. So does the cowhand. And the teamwork that come of all that, is the goal of every rancher who uses stock dogs. The dogs will scamper around a herd of cattle and often try to make eye contact with the lead animal. Sometimes the intense stare is enough to turn the leader and the herd follows. Other times, the dog might have to get aggressive and bite. "Coley," said Ray, "he's good at getting things stopped. He has a big bite." Once cattle have worked with dogs, they tend to cooperate even in the ranch's rough river breaks.

The Holes communicate with their dogs by first understanding what they tend to do naturally and then incorporating a set of voice, hand and other signals. "Away to me," said Marianne, means for the dog to circle around the right flank of a herd and get to the front. "Bye" means do the same thing, only to the left flank. "There" means to stop and "walk up" means what it suggests, slowly work toward the herd and get it moving. "Easy" means slow down and "back" is the command to move away. "That'll do" means the work is over, take a break. The Holes' train dogs too, and a finished stock dog with experience costs between \$5,000 to \$7,000.

David Johnson, *Lewiston Morning Tribune*, February 25, 1996

Beginning June 1996, the Institute of Public Service International at the University of Connecticut will be offering a month long training workshop for top and mid-level managers from developing countries who are responsible for design, implementation, and management of development projects in which women are active as participants and planners. Contact IPSI, Attn Andrea Luery, UCONN-IPSI, 1800 Asylum Ave, West Hartford, CT, 06117 (860-241-4924). Ask about the Gender in Development Planning and Management course.

The 5th International Conference on Desert Development will be held August 12-17, 1996 in Lubbock Texas. For information contact Idris Traylor, Office of International Affairs, Texas Tech University, Box 41036 Lubbock TX 79409 (806-742-2218).

The Summer Institute for Women in Higher Education Administration is holding its 21st intensive training for women administrators at Bryn Mawr College. For information contacts HERS, Mid-America, University of Denver, Park Hill Campus, 7150 Montview Blvd., Denver CO 80220 (303-871-6866).

The Society for Ecological Restoration will hold Paved to Protected: Restoration in the Urban/Rural Context Conference June 20-22, 1996 at Rutgers, The State University of New Jersey. For information, contact Jean Marie Hartman at 908-932-2917 or e-mail them at ser96@aesop.rutgers.edu.

For the June 1996 issue, *Women in Natural Resources* journal will focus on the 10th anniversary of the Dallas Symposium: Women in Natural Resources. We invite papers from attendees. To discuss topics, call or write Andrea Warner, 1515 4th St., Bellingham WA 98225 (206-734-9881) or the editor at 208-885-6754, e-mail dixie@uidaho.edu. Deadlines for manuscripts will be in April.

The Boeing Environmental Symposium will be held April 26-27, 1996 at Washington State University, Pullman. Critical issues related to managing the environment is the topic. Barry Commoner presents the keynote address. Contact: Kit McClelland 509-332-1293.

EPA has a new service for educators to assist in finding training, technical assistance, programs, grants, field sites, speakers, or teaching kits. Call 800-424-4372 from 8-4 pm Pacific Time.

The Western Forestry and Conservation Association is sponsoring a number of forestry continuing education and seminars. Call 503-226-4562 for listings.

Prairie Women: Adventures and Retreat, in Matfield Green, Kansas, is looking for a resident couple to lease the bunkhouse and ranch house to

run the popular accommodations business of the ranch. The owner-operator is going to focus her energies on the tallgrass prairie cattle operation. Call Jane at 316-273-8567 for details.

Greening of the Campus Conference is at Ball State University April 4-6, 1996. (All seven of the *keynoters* listed in the program, however, are men.) For registration information phone 317-285-2385.

The American Fisheries Society Conference meets in Dearborn Michigan on August 25-29, 1996. The theme is Sustainable Fisheries: Economics, Ecology, and Ethics. Contact Betsy Fritz at 301-897-8616 or Mary Fabrizio 313-994-3331 for registration information.

Camp Entrepreneur is a day camp which aims to provide education and training for daughters who want to succeed in the family business. In June and July there are three sessions for different ages. For information call 800-NECWB-4-U or fax 412-834-7131. Sponsored by The National Education Center for Women in Business.

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