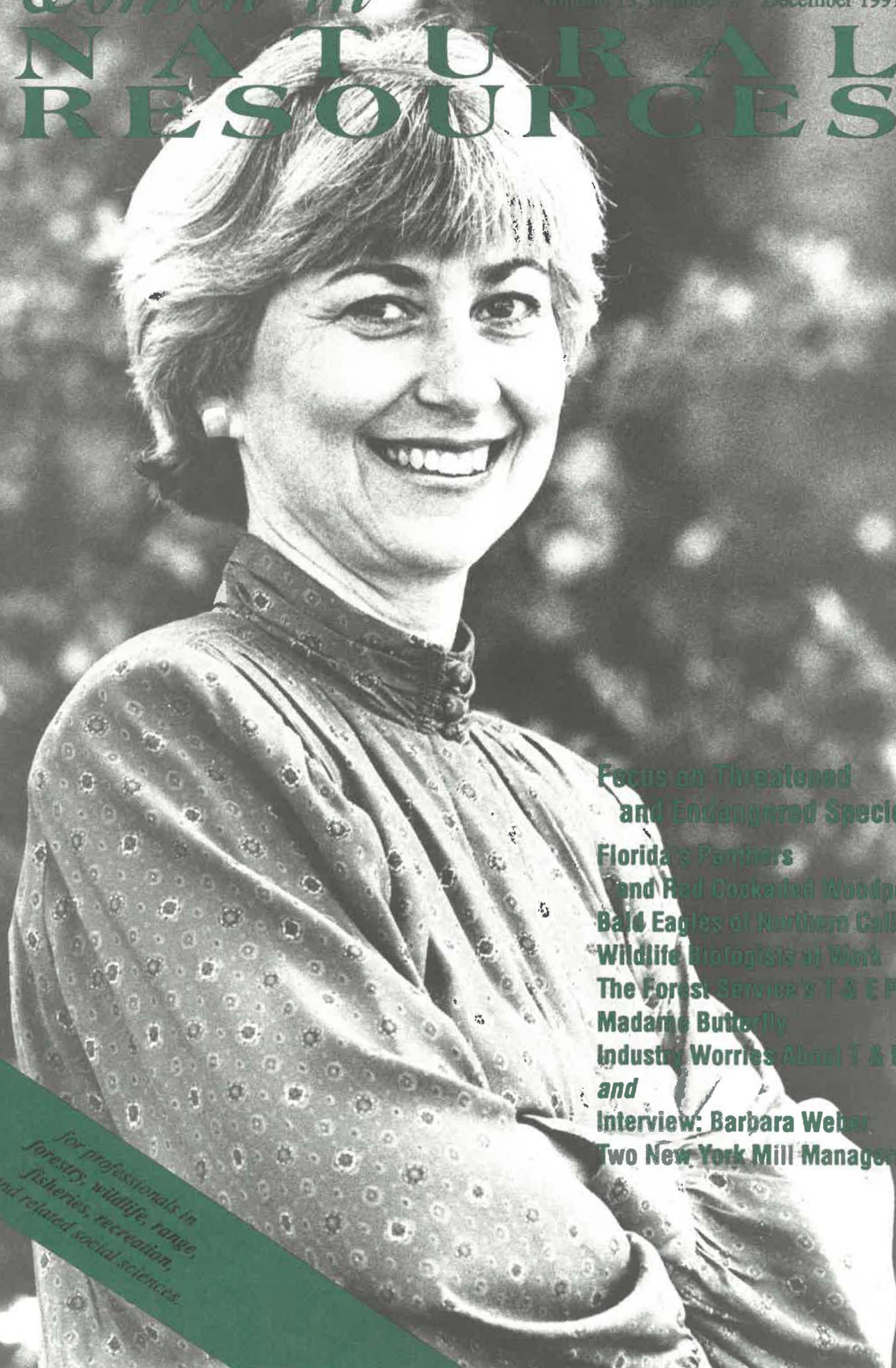


women in

NATURAL RESOURCES

Volume 13, Number 3, December 1991



**Focus on Threatened
and Endangered Species**

**Florida's Panthers
and Red Cockaded Woodpeckers**

Bald Eagles of Northern California

Wildlife Biologists at Work

The Forest Service's T & E Program

Madame Butterfly

**Industry Worries About T & E Costs
and**

Interview: Barbara Weber

Two New York Mill Managers

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

Editorial

Elaine Zieroth

In 1992, the controversial Endangered Species Act of 1976 comes up for reauthorization by Congress. The battle to save rare plants and animals has never before seen such painful national conflict.

The genesis for the conflict is a straightforward piece of legislation authorizing the U.S. Fish and Wildlife Service to determine whether or not a candidate species is rare enough to deserve special protection (threatened) or so rare that it is in danger of extinction (endangered).

In addition to federal species lists, most states have their own lists of species that are considered threatened or endangered in that state. There are additional species which are locally rare or need to be watched or studied, which are often called sensitive species.

At what point does a plant or animal cross the threshold to warrant special attention? The biological formulas used to determine the number of individuals and populations needed to sustain a viable, interbreeding species are complex and theoretical. They appear simple, however, when compared to the political, social and economic formulas that also apply. As more people compete for space and resources from the land, conflicts between humans and other species become inevitable.

The biological consequences of our reliance on chemicals, fossil fuels, wood products, water, synthetic compounds and pesticides are now catching up with us. Species like the spotted owls and the red-cockaded woodpeckers are the modern equivalents to the canaries used by miners to test the safety of their underground environment. These species have also become political footballs for politicians, environmentalists, resource users, and scientists wishing to support their positions.

Take the poor beleaguered spotted owl as an example. When initially petitioned for listing of the owl, the U.S. Fish and Wildlife Service determined that there was not sufficient evidence or research to support listing. When this was challenged in court, the political and social pressures left the agency with no choice but to list the species as threatened. Regardless of whether or not enough is really known about the habitat needs or viable population size of the species, once that threshold was crossed, the entire Pacific northwest became hitched to a runaway train. Timber harvests plummeted, jobs were lost, property values dropped, the tax base dried up, and death threats were hurled at scientists, loggers, environmentalists, and, sadly, at the owl itself.

As a wildlife biologist, I know the importance of retaining populations of all species. A cure for some forms of cancer has been found in the bark of the lowly Pacific Yew tree and in a rare plant from Madagascar. Should we protect the yew at the cost of human lives? Should we intervene when a bald eagle, which is endangered, is attacking a whooping crane, which is also endangered? How many jobs should be lost and how many families impacted by an owl? I am not equipped to make the tough choices. These choices border on playing God.

One thing I do know is that when the number of species is reduced, the resiliency and health of an ecosystem is weakened. So much of the history of this nation was spent taming and dominating the forces of nature. Trees were cleared for fields, animals killed to protect livestock and humans—resources seemed in endless supply. Now we are faced with hard choices in a nation whose people have never learned to curb their appetites or face the consequences of their exploitation.

In this issue, we wanted to present the reader with some of the interesting threatened and endangered

species issues from across the United State and Canada and from different agencies and perspectives. You won't find addressed here some of the historical or currently newsworthy species—such as the snail darter, grizzly bear, wolves, sockeye salmon—because the biologists who work with those species are burned out, concerned about the fast-moving reconfiguration of the information curve, or are hunkered down, waiting for the political weather to clear a bit.

I am proud to say that there are probably more talented female professionals involved with T & E species biology than any other natural resource profession. With the debates coming soon on the fate of the Endangered Species Act, this seemed to be a propitious time to feature some of them to help the rest of us stay informed.

Elaine Zieroth

EDITOR
Dixie Ehrenreich
CONTRIBUTING EDITORS
Lei Bammel
Karen Lyman
SECTION EDITORS
Elaine Zieroth
Diane Calabrese
Daina Dravniaks Apple
Jessie Micales
Reinee Hildebrandt
Linda Hardesty
Ruth Parnall
Lori Payne
Charlotte Young
Barbara Ogden
ART/CARTOONS
Deann Zwright
GRAPHICS/DESIGN/PRODUCTION
Barbara Ham
Marjory Knott
Business Manager
John H. Ehrenreich, Jr.

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WOMEN IN NATURAL RESOURCES



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The cover photo

is of

Barbara Weber

Director, Pacific Southwest

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I enjoyed talking to WINR editor Dixie Ehrenreich at the Society of American Forester's meeting in San Francisco last summer. It made me realize what an important service WINR provides. I especially enjoyed her comments about which employers provide friendly environments for women. I find such input very useful especially while I am finishing my dissertation and deciding what direction my career will take.

Amy Horne, Athens, Georgia

The articles in the Park Service focus issue were excellent. Those articles that contained a resource history of the parks--the ones on Redwood National Park and Indiana Dunes National Lakeshore for example--were great because they gave some histories of problems the parks were trying to overcome. The oil spill one which impacted Kenai, and Superintendent McGill's descriptions of what maintenance has to anticipate were others. The complexity of the work going on at these places was staggering.

Dana Brigham, Annapolis, Maryland

Editor's Note: There will be another focus issue on the Park Service in 1992 and we are soliciting manuscripts for that one, too.

I liked Richard Cripe's graphs and charts about where women in the Park Service are and who they are. Women have a very long way to go still.

Michelle Natal, Hartford, Connecticut

I wanted to share this poem by Douglas Malloch that I found in a book called *The Forest Poetic* (American Tree Association 1924). I've changed a few of the words so that it would speak to women.

*The sisterhood of the forest
I love those who love the wood
Whate'er their creed,
Whate'er their blood.*

*I may not know their native land;
Their creed I may not understand;
But, when we meet within the wood,
There each is silent-understood.*

*We worship at the selfsame shrine;
We see the same celestial shine
On lustrous leaf, on petaled flower;
We feel the selfsame grace and power;
Yea, walking on the selfsame sod,
We worship both the selfsame God.*

*I give who loves the wood my hands,
For here is one who understands;
Who loves the wood I give my heart,
For there responsive echoes start;
We meet in this sweet sisterhood--
We meet as sisters of the wood.*

I thought others who enjoy WINR might be moved by it.

Lynn Levine, Putney, Vermont

Gerda Lerner, who is an historian at the University of Wisconsin-Madison, is writing a history of the woman's movement from the point of view of exploding the myth that it was a movement of media stars and the white middle class on the west coast and eastern college campuses. Her subjects for interviewing include labor organizers, women of color, and married women with children who live especially in the mid-west. Many of them were survivors of being pushed out of their war-time jobs in the late 1940s. Lerner's point in all of this is to say that the women's movement has a continuum that has been violated by paying too much attention to the activities of the 60s and stars like Friedan, Steinem, and Harrigan. I agree with Lerner, but I think the women's movement has roots even further back: in the anti-slavery, temperance, and peace movements of the 1800s.

Lee Williams, Denver

Does anyone have a good feel for how the employment situation will be in natural resources for the near future? I'd like to read someone's speculations about that. Keep up the good work. WINR is circulated to so many people in our office that it is almost limp by the time I get it.

Sally Knowles, Washington DC

There was a good letter to the editor in one of the environmental journals that said—and here I paraphrase—that given the massive overpopulation we are headed for and the resulting destruction of natural resources that one should consider religious leaders who forbid birth control/abortion as the villains of history. The Pope, then, is seen as the worst eco-terrorist around. Since you had some letters about this, here's another.

Judy Worley, Grand Rapids, Michigan

Correction

In the last issue (Vol 13 No. 1) Karen Taylor-Goodrich's hyphenated last name was inadvertently reversed on her article about the Natural Resources Management Trainee Program. It was an editor's error and we apologize.

TWO MARINE ADVISOR POSITIONS AVAILABLE

CLOSES FEBRUARY 21, 1992

The University of California is seeking applicants for two Cooperative Extension Marine Advisors. One position is headquartered in Eureka and would be responsible for marine extension programs in Humboldt and Mendocino Counties. The other position is headquartered at Moss Landing Marine Laboratories and is responsible for marine extension programs in Santa Cruz and Monterey Counties. Both positions are 18-month academic appointments in the UC Division of Agricultural and Natural Resources with renewal based on funding availability and continued need.

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Candidates may apply for either the Eureka (#AN091-12) or Moss Landing (#ASC91-06) position or both positions. For further information, complete job descriptions, and application materials, contact: Sydni Gillette, Academic Personnel Recruitment, DANR-North Region, University of California, Davis, CA 95616 (Phone 916-757-8621; FAX 916-757-8817). Please refer to the position number(s) of interest to you.

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Preferred Qualifications: 1. Knowledge of forestry and forest resources relationships, including the application of new technologies for vegetative classification and forest resource inventory work in the global setting. 2. Ability to assist branch chief in providing guidance and leadership to multifaceted research program as demonstrated by experience as a program leader or significant technical staff role. 3. Ability to deal with high-level officials of public and private organizations, such as the Food and Agriculture Organization, Economic Commission for Europe, IUFRO, Federal and State Natural Resource Agencies, and Congressional contacts. 4. Knowledge of RPA Assessment requirements and other federal resource management policies, goals, and objectives. 5. Knowledge of equal employment opportunity and affirmative action programs and policies.

To Apply: Complete SF-171, Application Form, current Performance Appraisal (US Government employees only), AD-779 Biographical Sketch. Send them to USDA Forest Service, P. O. Box 96090, Washington DC 20250.

For additional information contact Branch Chief, Forest Inventory and Analysis Research at 202-205-1343. *USDAFS is an EOAA Employer. Minorities and women are encouraged to apply.*

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After their service, Volunteers get a \$5400 readjustment allowance *and* easier access to U.S. government jobs through "non-competitive eligibility." With such a concentration of natural resources jobs in the federal government, this is a significant consideration: It has opened the doors to EPA, the U.S. Forest Service, the National Park Service, the U.S. Fish and Wildlife Service, and other agencies for many returned Volunteers. Also, special scholarships and fellowships are available at over 50 colleges and universities for former Volunteers.

You must be a U.S. citizen. Most of the above positions require at least a bachelor's degree in an environmental subject. Sorry, children of Volunteers cannot be accommodated, although assignments for spouses may be available. Act ASAP as the selection process is competitive, and assignments are made on a first-available basis.



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EVERY SPECIES COUNTS

KATHY JOHNSON
BETH PENDLETON

The conservation of threatened, endangered, and rare plants and animals is central to the Forest Service's mission and is reflected in the phrase "Caring for the land and serving the people." The National Forest System provides homes to 198 plant and animal species listed by the U.S. Fish and Wildlife Service as either threatened or endangered. This is equivalent to 33 percent of all federally listed species in the United States.

The Forest Service also designates as "sensitive" almost 2,500 additional species of plants and animals for which special management is required to ensure they need not be listed as threatened or endangered in the future. The Southern Region alone has more than 850 sensitive species.

Following the recommendations of a national task force, an action plan was developed in 1990 to strengthen and increase threatened, endangered, and sensitive species program emphasis within the Forest Service. This plan identifies action items, completion dates, and parties responsible for conserving rare species. An offshoot of this plan is the Every Species Counts program, which brings together the resource and commitment of other federal and state agencies, private organizations, and individuals to enhance species recovery and

conservation. This program has adopted an aggressive approach to protect rare species and to prevent the need for federal listing.

Federal funding for threatened, endangered, and sensitive species habitat improvements increased from \$7.1 million in 1989 to \$9.9 million in 1990. Nearly 400 partners contributed an additional \$2 million. Accomplishments of this fledgling program and its growing number of partners included:

- Improvement to 5,661 acres, completion of 528 structures, and coordination with the U.S. Fish and Wildlife Service on several recovery plans (an additional 71,332 acres were improved and 2,318 structures were built with appropriated funds, K-V funds, and timber receipt funds).

- Completion of dozens of projects, in cooperation with State Natural Heritage Inventory programs, to inventory, monitor, and restore rare plants on national forests and grasslands.

- In the Beartree Challenge project, the Rocky Mountain Ranger District teamed up with many private sector partners to enhance foraging habitat for the threatened grizzly bear. Habitat improvements included selective harvesting to create buffaloberry shrubfields and plantings of white bark pine trees. Prescribed burning eliminated conifer encroachment in berry shrubfields.

- In partnership with the Utah Natural Heritage Program, the Moab Ranger District completed survey work for the Beck biscuitroot and Kachina daisy, two sensitive plant species primarily restricted to the Dixie National Forest in Utah. Project personnel

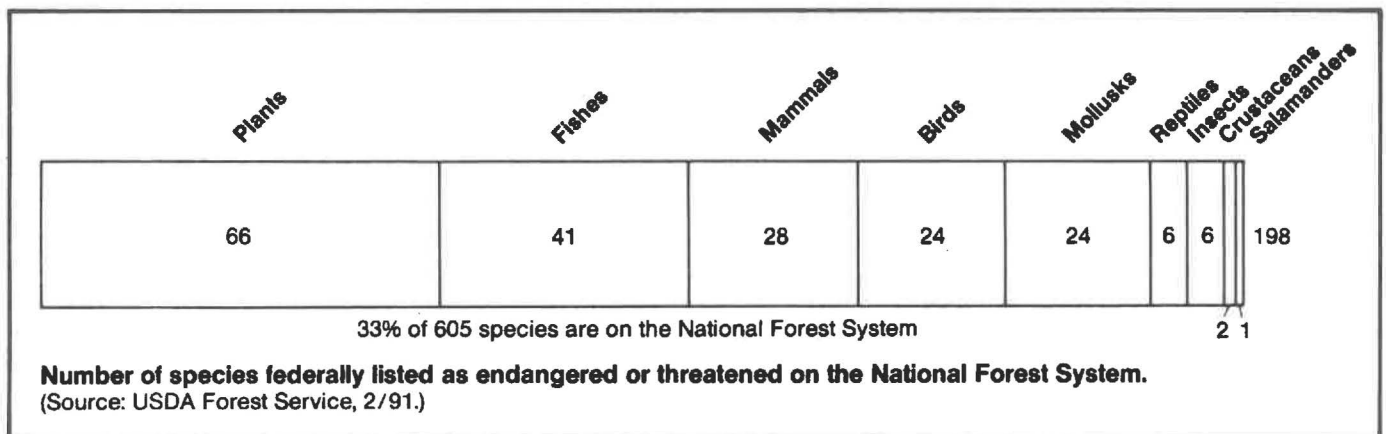
identified species distribution and management needs. Total cost: \$8,000 shared equally by partners.

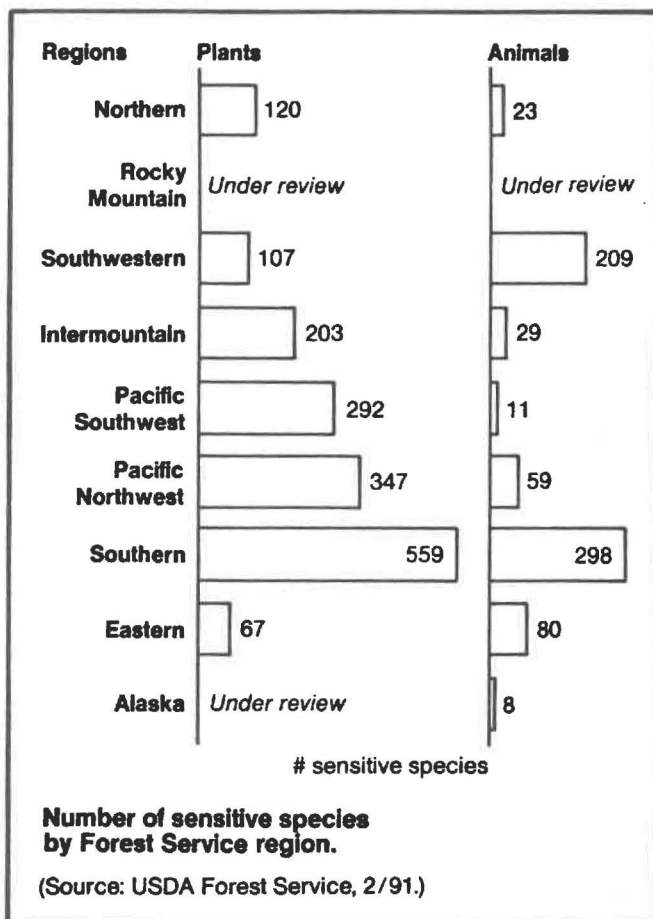
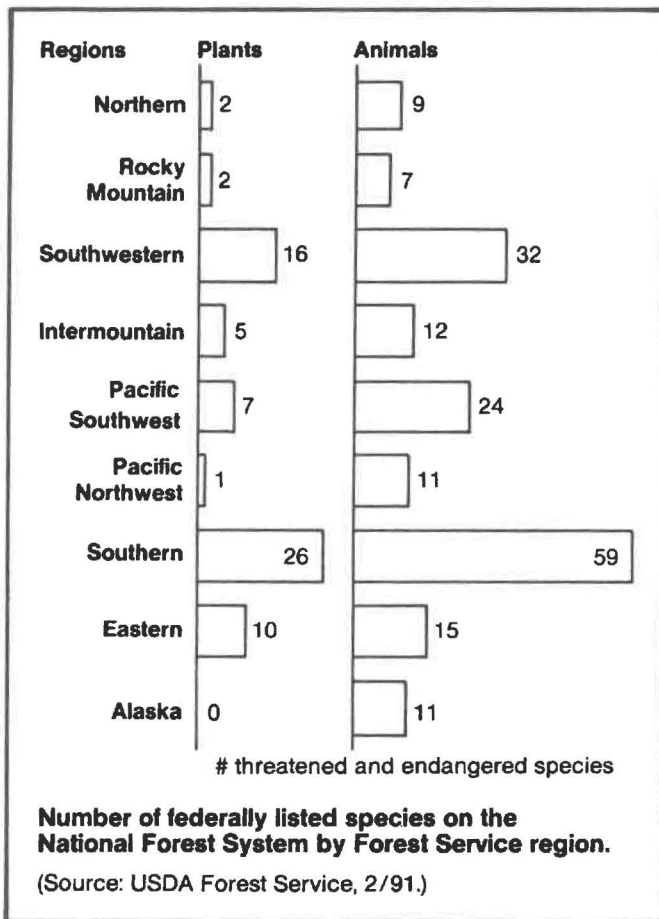
- In 1990, the Daniel Boone National Forest, in partnership with two Kentucky universities, state agencies, and U.S. Fish and Wildlife Service began a radiotelemetry study of the endangered Virginia big-eared bat. Cooperators captured and outfitted 30 male big-eared bats with tiny transmitters glued to their fur. They tracked the bats' nightly movements for 10 nights (the lifespan of the transmitters). Data gathered included range from their caves and rock shelters to forage, feeding habitat, preferred insects, travel corridors. Total cost: \$76,145 of which the Forest Service contributed \$15,000. The study concludes in 1991 with similar data on females.

- In 1990, the Nature Conservancy and the Forest Service cooperatively funded the first National Endangered Plants Program Manager to coordinate rare plant conservation efforts on National Forest System lands. Through this partnership, a data base is being developed to track the status, management, and recovery of federally listed, as well as sensitive, plant species. This data system ties in to the national network of Natural Heritage Inventory programs.

Kathy Johnson is currently the Endangered Species Program Manager in the Washington Office of the Forest Service. Since 1973, she has worked in various temporary and permanent positions for them, but began her worklife with the Youth Conservation Corps. Johnson's Bachelor's is in Biology, Vertebrate Ecology option, from Central Washington University.

Beth Pendleton is the Program Information Manager with the Wildlife, Fish, and Rare Plants Program in the Forest Service's Washington Office. Before that, she worked as a wildlife biologist and communication specialist in research and education with the National Wildlife Federation. Her Bachelor's is in Wildlife Biology and her Master's is in Wildlife Science and Journalism.





I look out my office window on the fourth floor of the Auditor's Building onto the Mall where the Washington Monument juts skyward into the late autumn haze. Through another window is the tidal basin which was transformed last spring by millions of cherry blossoms. Washington DC is full of history, and at the same time, full of the important events of the day. It is a long way from the Pacific Ocean and the Rogue River, where I was a District Ranger for the Siskiyou National Forest at Gold Beach, Oregon. The funny thing is that here in the *District* of Columbia I am working on issues that touch that *District*—so in a sense I never left it behind. The difference is that rather than responding to direction from above, or providing direction as District Ranger, I now help formulate the direction as a member of the Wildlife, Fisheries, and Rare Plant Staff and as the National Endangered Species Program Manager.

In the few years I've been here, we've worked on the spotted owl, anadromous fish, marbled murrelet, Mt. Graham red squirrel, red-cockaded woodpecker, and gray wolf. We've had congressional hearings on old growth forests. Every day brings a new challenge and a new opportunity for growth in the program. The job goes beyond dealing with contentious issues and requires developing trust, partnerships, and commitment to the program both in-Service and out of it.

The organization to implement the "Every Species Counts" program has grown, and with it opportunities for women in the biological and botanical fields. Several Regions in the Forest Service have Regional Program Managers, Botanists, and Program Assistants. Some National Forests and Ranger Districts are staffed with personnel who work fulltime on threatened, endangered, and sensitive species programs. Their skills are important. Why? We must know what the resources are and have the technical skills available to determine the significance of that resource. As Will Rogers said: *It doesn't matter if you're on the right track, you'll still get run over if you just sit there.* Here's to getting the train going.

Kathy Johnson

WILDLIFE BIOLOGISTS OFTEN HAVE TO MASTER A COMPLEX SET OF RELATIONSHIPS BEFORE THEY START OUT TO WORK ON ONE SPECIES. THEN AS THEY BEGIN WORK ON ANOTHER, IT STARTS OVER AGAIN.

A FOREST SERVICE BIOLOGIST

SANDRA J. NAGILLER



The majority of my career has been as a wildlife biologist with the U.S. Forest Service. Wildlife biologists in the Forest Service primarily function in a *support* capacity, that is, they coordinate wildlife habitat needs with land management activities such as timber harvesting, live-stock grazing, recreation uses, or other work on National Forests. The wildlife program itself involves managing habitat for Threatened, Endangered, or Sensitive species and improving habitat through on-the-ground projects. This variety of work has provided some memorable field experiences.

Bald Eagles

One of the most exciting projects was the one working with bald eagles on the Coconino National Forest located in north-central Arizona. Bald eagles winter on the Coconino National Forest primarily during the months of November through March. Depending on weather conditions, a few eagles may arrive as early as October with the latest departures in mid-April. The lakes near Flagstaff are considered the only significant winter eagle concentration area in Arizona, supporting anywhere from 60 to 200 eagles. Surveys conducted by Terry Grubb and Chuck Kennedy during the winter of 1977-78 had determined the general distribution and habitat associations of the eagles. Their study noted that bald eagle night-time roosts were the most critical habitat factor for management but the location and characteristics of our bald eagle roosts were unknown at that time.

In 1984, the Coconino National Forest entered a cooperative research

agreement with the Rocky Mountain Station for the purpose of locating these roosts to facilitate coordination of Endangered Species habitat with timber management activities. My involvement with this study was on the ground data collection under the direction of Research Scientist Terry Grubb. In the early portion of the study, I would locate bald eagles in the late evening and attempt to follow them to their roosts. This proved very difficult as the birds often did not fly away from the lake areas—where they fed on coots, waterfowl, and fish—until nearly dark. I would then take a compass bearing on the flight pattern until the birds were out of sight. The next evening I would reposition myself and wait for eagles to fly over and then repeat the process. This rarely resulted in locating a roost, however, as the eagles would change their patterns.

We then initiated baiting, trapping, and radio-tagging of bald eagles in the winter of 1985-86. I collected road killed deer and elk for use as bait at trapping stations. We utilized a portable rocket-net capture system based on designs from the Pennsylvania Game Commission and New York Department of Environmental Conservation. The rocket-net was fired by remote-control at distances of up to 1.5 km away. This allowed us to observe at distances that would not disturb the eagles. Great caution was taken in net firing due to the

potential danger of decapitation of an eagle by the rapidly moving net edge. We would wait until the eagle(s) were correctly positioned on the bait within the safety zone of the net target area before firing. The propellant in the rocket is basically the same fuel used in a howitzer cannon, so this trap is considered an explosive and is always handled as if it were a loaded, cocked firearm. We trapped eagles, outfitted them with radio-backpacks, and banded them.

Then the long nights of radio-tracking these birds over snow conditions began. Snow and ice with night temperatures at or below zero were common. Although I worked independently, I never felt lonely as I searched for the beeps on my receiver which would identify where an eagle was roosted for the night. Access was extremely difficult, requiring four-wheel drive Jeep, snowmobile, snowshoes, and sometimes cross-country skis.

I was able to locate 28 nighttime roosts. Most of these roosts occurred on lands available for timber harvest: in fact four roosts were located *within* the boundaries of an active timber sale and were designated for harvest. Bald eagles roost in large mature ponderosa pine in sheltered areas. These trees represented a significant value to the timber industry. I was able to work with the timber company, however, to remove from harvest these four roosts and an adequate buffer around them. As planning on future timber sales occurred, I incorporated roost protection into the sale design.

In addition to locating the roosts, we discovered that the wintering population was much more mobile than expected. When the lakes completely froze over, the waterfowl moved south to lower desert regions of Arizona. The eagles then moved to key winter ranges for deer and elk and focused on the terrestrial food resources from winter kill.

The satisfying part of the job was being able to locate key winter roosts and coordinate the protection and management of roosting habitat with timber management activities. The opportunity

to work on a research project was unique for a Forest Service biologist.

Peregrine Falcon

Another federally endangered species that I am involved with is the peregrine falcon. I monitored several eyries on the Sedona district when I was stationed there in 1980 and 1981. I watched the cliff nest sites through a spotting scope to record the reproductive success of the sites. At this time, it hadn't been too long since the fear that DDT may have doomed the peregrine to extinction. The sight of three young peregrines learning to fly made me feel hopeful. Today, the peregrine population is showing signs of recovery in the state of Arizona.

I now work on an adjacent district where two new eyries were established in 1990. The potential for human disturbance due to roads into one of these sites concerned me. As part of my duties for managing T&E species, I consulted with the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department. We visited the site and discussed the concerns. A proposed road closure will be implemented by the Forest Service prior to the 1992 breeding season.

Mexican Spotted Owls

Working at night in the woods has always been fun to me. In 1984, several other biologists and I went on a sunset trip to Walnut Canyon to call for Mexican spotted owls. That fateful night was the first documented location of these owls on the Coconino National Forest since 1930. Since then, conducting inventories and monitoring nest sites of Mexican spotted owls has become a major part of my work from May through August.

Not everyone feels comfortable in the woods at night--as I soon discovered when taking interested individuals out who got the "hee-b-g-bees." Since I enjoy the woods at night, the most difficult thing for me was coordinating a schedule and trying to squeeze in some sleep. Originally, I worked both days and nights. A typical schedule would be: work from 7:30 a.m. to 4:00 p.m. in the office or on other field projects, eat dinner, head to the field at about 7:00 p.m. and call for owls to about 11:00 p.m. or midnight, sleep under a tree, get up at

about 4:30 a.m. listening for owls and then trying to follow them to a roost site, and then return to the district office. Fortunately, the budget has increased so I now employ assistants to conduct these surveys.

I do miss those nights out hooting and experiencing the night sounds of the woods, however. Wonderful things happened: often coyotes would howl in response to my hoots and sometimes head straight to me at a dead run until a distance of about 10 feet before veering off. Many other owls were also heard, and I was particularly interested in recording locations of the flammulated owl. Turkey sometimes gobbled back in the spring and elk will bugle in the fall in response to my hooting.

During the day I attempted to locate the owl nests by using mousing techniques. Mice are placed on the ground or a stump beneath the perched owl. An owl with a nest will usually capture the mouse and fly it into the nest to feed the female or young.

These days, my field work with spotted owls is limited. I primarily utilize the results of surveys to implement regional guidelines for management of their habitat. This usually means delineating a 2000 acre territory and evaluating proposed activities within owl territories. Many other biologists have also "donated" time in order to complete these critically needed surveys. This typifies the attitude and dedication of many wildlife professionals.

Beardtongue *Penstemon Clutei*

My duties also involve management of rare plants. Although not a botanist by training, I have had some botany classes and enjoy surveying potential habitat for rare plants. I am currently exploring the possibility of using prescribed fire to manage *Penstemon clutei*, listed as Sensitive by Region Three of the Forest Service. This species grows on soils covered by volcanic cinders in the ponderosa pine and pinyon-juniper area. It is found only on the Peaks Ranger District of the Coconino National Forest and the Sunset Crater National Monument.

To begin the work, I designed an administrative study which utilizes one of the newest technological advances, the Global Positioning System (GPS) for recording the locations of plants. GPS uses satellites and computers to trian-

gulate positions anywhere on earth. We recorded all locations of the plant within a control and study plot in 1990. We then conducted a prescribed fire in the study plot to simulate conditions of a previous wildfire where the plant appears to be most vigorous. I am now in the process of recording the post-fire plant locations and evaluating the results.

Although data analysis is not complete, it appears at this time that the prescribed fire consumed some mature plants but new seedlings have already appeared and were probably stimulated by the fire. Results will be documented in a report along with habitat management recommendations.

Gambel Oak

Gambel oak is an important tree which has a limited distribution within the Ponderosa pine forest. It provides valuable food and cover for many wildlife species and also provides important nesting sites for secondary cavity nesters and bats. The Mexican spotted owl, for example, will nest in the hollow interior of dead Gambel oak. Some of these large hollow oaks are 400 years or older.

Unfortunately, this tree is also highly desired as fuelwood. I have recently become alarmed at the rate of habitat destruction which is occurring due to illegal cutting of oak. Typically, the penalty for poaching oak is a fine based on the cord value of the wood and does not consider the loss of habitat to wildlife. It appeared that something new should be tried, so when I was involved with Forest Service law enforcement agents on a green oak theft case, I researched information on Gambel oak and submitted wildlife habitat damage assessments.

This was a unique assignment to determine the monetary value of a tree to wildlife. I testified as an expert witness in Federal District court and the information I presented resulted in significantly higher fines. This case is considered precedent setting. It is my hope that the judge's willingness to assign higher fines that include aesthetic values such as wildlife will result in a deterrence to future oak poachers resulting in more protection for this valuable resource.

Wildlife Habitat and Timber Sales

One of my major duties is to coordinate wildlife habitat on timber sales.

Although not as glamorous as working with the animal itself, it is probably the most important part of the job because it deals with vast acreages of important wildlife habitat, affects the entire ecosystem, and provides the opportunity to apply management to the results of inventory data.

I recently escorted Arizona State Governor Symington on a field trip to examine timber harvesting and associated wildlife habitat concerns on the Coconino National Forest. The Governor's interest had been accelerated by controversy over the northern goshawk. The U.S. Fish and Wildlife Service has been petitioned to list the southwestern population of the northern goshawk under the Endangered Species Act.

Goshawks

Most of my time during 1991 has been spent on the goshawks issue. In 1990, I was aware of seven nests on my district. As publicity fed controversy, we received additional funding to conduct surveys. At the end of the 1991 field season we had increased the number of known nests to a total of 17 so a significant amount of my time was spent implementing current interim guidelines for goshawks on timber sales.

These guidelines call for the establishment of a 600 acre post-fledging family area (PFA). A scientific committee is currently preparing recommendations on the habitat management within the foraging area of goshawks. Goshawks have been documented to forage over large areas, approaching or even exceeding 6,000 acres. I'm sure that guidelines will be modified as we gain additional information. The field season in 1992 will once again include a significant emphasis on the northern goshawk because many acres of suitable habitat are yet to be surveyed.

Volunteers In Habitat Improvement

Another aspect of my job involves working with organizations and individuals: National Wild Turkey Federation, Ducks Unlimited, Northern Arizona Audubon Society, Rocky Mountain Elk Foundation, and the Coconino Sportsmen (local chapter of the Arizona Wildlife Federation). The people in these groups and organizations cooperatively enhance wildlife habitat by the donation of time, labor, equipment, or money to projects on the National Forest. I have met many interesting and dedicated individuals and by enlisting them as "partners" under the Challenge Cost Share Program, we have built osprey nesting platforms, enhanced duck nesting habitat, improved deer and elk range through burning and road closure, and constructed water developments.

The meaningful part of my job is not just in finding rare things, but working with other resource professionals in managing habitat so both plants and animals can survive—perhaps even flourish. The work is always interesting. Many of these species are in a precarious position because humans don't know habitat requirements and impacts—we keep modifying their environment to the species' peril. Trying to save them, trying to assist more of them to be born, trying to provide them with what it takes to keep them from being lost from the planet is indeed a challenge which suits the creative skills of many women.

Sandra J. Nagiller graduated from Arizona State University with a B.S. in Wildlife Biology in 1977. While a student, she worked for the University conducting diet analysis on bighorn sheep. She has worked as a wildlife technician for the Rocky Mountain Station and the U.S. Fish and Wildlife Service. She held positions as Range Conservationist with both the Bureau of Land Management and the U.S. Forest Service. She is currently working as a Wildlife Biologist on the Coconino National Forest. Nagiller co-authored a paper, published in the Southwestern Naturalist, which describes the roosting pattern and high mobility of her area's bald eagle population. This study also resulted in refinements in the rocket net system.

PANTHERS AND RED COCKADED WOODPECKERS

BIG CATS AND

DEBORAH JANSEN



GENETIC DIVERSITY FOR DIMINISHING POPULATIONS IS AT THE CRITICAL POINT FOR AT LEAST TWO SPECIES AT BIG CYPRESS NATIONAL PRESERVE.

LITTLE BIRDS

Prior to ever seeing Big Cypress National Preserve, many people envision a swamp of majestic old cypress trees draped in Spanish moss, curved-billed ibis perched atop and gators floating silently below. Some parts of the deepest strands that escaped the logging of the 1940s are indeed like that. Most of Big Cypress, however, is an intermingling of small portions of many vegetative types due to a difference of literally inches in elevation.

If one would walk a straight compass bearing through many parts of Big Cypress, she would traverse an old growth pine stand with saw palmetto and grass underneath for perhaps 20 minutes, then slog through an almost perfectly circular cypress dome for two minutes, before coming out into a grassy prairie around which several more cypress domes and pine stands were in view. As the sea dropped, limestone eroded and small outcrops of bedrock appeared. The higher spots supported pine and hardwood seedlings, whereas the poolings of water and nutrients in the lower spots formed cypress domes or strands. The intermediate elevations became prairie.

The birds in Big Cypress also tell the story of this habitat diversity. It is not uncommon to hear the rattle of the kingfisher in unison with the clear, whistled song of the meadowlark and the trill of the pine warbler. It is in this ever-changing landscape that I've been studying little birds and big cats for the better part of the last 11 years.

This National Park Service land was established by Congress in 1974 to protect one of the least developed watersheds in south Florida. It originally consisted of 574,440 acres, but 146,000 acres were added in 1988. If the Big Cypress had been the swamp envisioned by most people, neither the Florida panther nor the red-cockaded woodpecker, two Federally listed endangered species, could have existed there.

The Florida panther, which once ranged through 10 southern states, has its last strongholds in Florida's large chunks of public and private land where infrequent homes and roads and disturbance are still within tolerable limits. Critical to that existence are deer and hogs for food, vegetative cover for resting and raising young, and enough space for this large cat to fulfill its characteristic itch to roam without encountering busy roads or recurring disturbance. Males in south Florida have been documented with home ranges of over 200 square miles; females average half that.

The red-cockaded woodpecker, which once ranged in pinelands through 15 states, exists today where its critical habitat, living old-growth pines, have not been cut. The red-cockaded is the only woodpecker that excavates its own cavities in living pine trees. There it roosts at night and raises young each spring. Chipping away at



JANSEN AND THE RED-COCKADED WOODPECKER

living wood is no easy task, so it chooses trees that are weakened inside by a fungus that causes heart rot. This occurs most often in pines that are more than 60 years old.

After the logging era in the southeast, including Big Cypress, the red-cockaded woodpecker was left with only those pinelands that were not cut. Today, only 25 percent of their potential nesting habitat on commercial forest land is in public ownership. That on private lands may well be lost by future logging and the subsequent short-rotation cycle of current timber practices.

The present population counts of the panther and the woodpecker are not sufficient for their longterm survival. It has been estimated that 500 breeding age panthers are necessary to prevent their certain extinction. There are approximately 30 left. In the past 11 years of intensive research in Florida by multiple agencies, including the National Park Service, Florida Game and Fresh Water Fish Commission, U.S. Fish and Wildlife Service, and Florida Department of Natural Resources, 45 panthers have been captured and radio-collared. Monitoring them has given researchers information on home range size, habitat preferences, food habits, and social structure and interaction.

It has been found that panthers feed primarily on deer and hogs, although their diet also includes alligators, raccoons, opossums, turkeys, otters, bobcats, and armadillos. They prefer hardwood hammocks and pinelands as day resting sites and natal dens, especially during the 6-month-long wet season when the other habitats are immersed in a foot of water. Panthers have been killed by automobiles, fights among themselves, diseases such as rabies, and accumulations of mercury through the food chain. Their future genetic fitness to withstand diseases and reproduce is in question because signs of inbreeding "depression," such as heart defects and low sperm levels, are present in the population.

Just as we secure some of our money in a savings account, the agencies are "securing" some of the panthers and their genetic diversity in captivity. In 1991, six panther kittens were placed in a large holding facility in north Florida; plans to do the same in 1992 are being made. Just as our savings account generates more money, it is hoped that the panthers in captivity will produce offspring that eventually can be released into unoccupied areas of suitable panther habitat in the southeastern U.S.

In three dry-season sessions of searching for panther sign in the 540,000 acres of Big Cypress south of Interstate-75, my crew and I have found and radio-collared only two panthers. One, a young male, died of rabies after probably eating a diseased raccoon. The other, a 5-year-old female, has been monitored for two years with no signs of reproducing. She was joined a year ago by another 5-year-old female who, born and raised in Everglades National Park, traversed the expansive Shark Slough which separates the larger areas of uplands of the two adjacent Park Service lands. But two females do not kittens make.

Two males that potentially could provide that reproductive necessity were also born and raised in Everglades and traversed Shark Slough into Big Cypress. Thus far, however, the ranges of the two females and two males have not overlapped in space and time. Other potentially available male panthers are being monitored north of Interstate-75, but none are crossing that road and entering the ranges of the two Big Cypress females. These four Big Cypress panthers have been determined to be critical to the overall genetic diversity of the entire south Florida population. Their loss without first passing on their genetic makeup through offspring could have longterm implications.

Although the situation with the red-cockaded woodpecker in Big Cypress does not appear as urgent as that with the panther, it warrants our attention. There are an estimated 2700 clans or breeding units of red-cockaded woodpeckers on Federal lands in the southeastern U.S. Since they are nonmigratory and because mature pine habitat is now highly fragmented, isolated populations exist. For longterm survival, each of these populations needs 100 clans. We have documented 31 active clans in Big Cypress. No additional clans have been found in adjacent areas. As the second-growth pines mature in Big Cypress, they will become suitable for new colony formation by dispersing young, but that may not happen in time to sustain adequate genetic diversity.

Initial signs of trouble have been observed in an isolated group of clans which are the southernmost red-cockaded woodpeckers in the U.S. The area, called Lostman's Pines, had eight documented clans in the early 1980s. Today, only three still exist, and only one of these raised an offspring in 1991. During our radio-telemetry study of the Lostman's Pines subpopulation in the summer of 1991, only six individuals including two adult females were found. Inbreeding and subsequent depressed reproductive capabilities are suspect. Although offspring, especially females, will disperse



and form new colonies nearby, it is the individual that occasionally comes from afar that adds a new complement of genes to the population. If the suitable habitat within that traditional travel route has been severed by logging, fire, or development, that necessary genetic enhancement may not occur.

Thus, a similar problem, isolation, exists for the big cats and little birds of Big Cypress. Given time, the situation may remedy itself. One of the male panthers in the southern Big Cypress may travel farther north and find the females. One of the northern males may cross the busy interstate or use one of the yet-to-be-completed wildlife underpasses and find the females. Given time, a nomadic bird with a red-cockade may fly the 15 miles from the nearest known colony to Lostman's Pines and breathe some fresh genetic life into those few remaining birds.

That time, however, cannot be assured before the two female panthers or two female red-cockaded woodpeckers die. Therefore, as the wildlife biologist responsible for the well-being of these two species in Big Cypress, I have proposed active management to remedy these two detrimental situations.

Land managers have realized that as public lands have been purchased over the years, little consideration had been given to the need for populations to have "corridors"



through which to exchange their genetic material. They essentially live on fragments of habitat with no natural means to intermingle with other isolated populations. This isolation seriously threatens their genetic variability and viability. In the near future, the "state of the art" of wildlife management will undoubtedly be the translocation, or planned physical movement of individuals from one "island" to another for genetic enhancement.

Reintroduction of species such as bald eagles, peregrine falcons, black-footed ferrets, and gray wolves in order to reestablish populations in areas where they have been extirpated, is ongoing. Given suitable habitat and enough individuals, these experiments have been successful. The luxury of numbers, however, does not exist in the Big Cypress panther situation.

After a year of discussion, the Florida Panther Interagency Committee endorsed the translocation of at least one male panther into the area used by the two female panthers to take place in the spring of 1992. Highly experimental and controversial, it still was the preferred option over doing nothing or placing in captivity these four genetically important animals.

The red-cockaded woodpeckers in Lostman's Pines may too possess genetic components that are important to the future of the Big Cypress population as a whole. Therefore, a translocation of one or more females into Lostman's Pines has been proposed to take place also in the spring of 1992. Individuals of this species have already been successfully translocated in several other parts of the southeast.

As wildlife habitat is lost to agricultural and urban development, Big Cypress National Preserve, as one of the largest land masses owned by the public in Florida, will only become more and more important to the survival of endangered species, such as the Florida panther and red-cockaded woodpecker. Agency and public support of active management techniques, such as translocation, will assure the future well-being of the wildlife on these "islands of habitat".

Deborah Jansen has spent eleven years of her life in wildlife biology, working for seven years for the Florida Game and Fresh Water Fish Commission, and the last four years with the National Park Service at Big Cypress. The species she has worked on in Florida include the panther, Southern Bald Eagle, American Crocodile, Eastern Greater Sandhill Crane, Red-cockaded woodpecker. Her Bachelor's in Biology is from the University of Wisconsin Eau Claire and her Master's in Wildlife is from the University of Wisconsin Stevens Point.

GOOD PLANNING, COORDINATION, AND RESPONSIBLE FIRE MANAGEMENT BEHIND THE SCENES SAVED LIVES.

FIRES AND IMPERILED SPECIES

HEATHER MURPHY



During the middle of July 1990, the Lake Wenatchee Ranger District received 35 lightning fires from one storm. An Integrated Resource Team was immediately formed on the district to analyze resource concerns over these burning areas, one of which was an 800 acre wilderness fire. District specialists identified and mapped potential problem areas for wilderness, historical sites, timber, soils, fish, plants, and wildlife: threatened and endangered species were among those noted. The Integrated Resource Team—made up of local experts—supplied early information about these species to the Area Incident Command Team which was lead by Phil Jones of the Wenatchee National Forest (north central Washington state). Informal consultation with the US Fish and Wildlife Service and Washington Department of Wildlife lead to more information about the effects of fire fighting on these fragile species.

Fires eventually were pinpointed near spotted owl nests, a gray wolf rendezvous site, and mountain goat kidding areas. The logical flight path for helicopter and fixed wing planes delivering drops would be directly over an active bald eagle nest and osprey nests. Of particular concern to the biologists was the fact that this summer season is the time of year when most young animals like the goat kids are still sensitive to disturbance. This is also the fledging period for raptors when they are too inexperienced to be on their own. Plants are also of concern because they are in early growth periods, prior to seed set.

The fire managers decided to make the biologists' concerns, their concerns also. For two weeks of heavy aerial activity, managers rerouted helicopter and water tankers flying over bald eagle and spotted owl nests using maps supplied by biologists. Disturbance buffers were maintained at 1000 feet above the eagle nest sites for half a mile distance from the nest. When aerial attack was necessary within half a mile of a spotted owl nest, helicopter water drops rather than fixed wing drops were used to reduce tree breakage near the nests. Snags were left in more abundance than normally left to benefit spotted owls, especially in the spotted owl Habitat Conservation Areas. (Habitat Conservation Areas are blocks of habitat which are deemed likely to ensure a viable population and are thought to be capable of supporting one or multiple pairs of owls.)

The effort to reduce disturbance to the threatened and endangered species was assisted by most personnel fighting the fire. During fire weather monitoring in the remote high country, a fire fighter observed a gray wolf adult and pups, the first confirmed site in many years. This brought a new concern about planned helicopter landings there and was solved by moving the heli-spot to a new location one mile away. Fire spike-out crews agreed not to camp near this site. Fire crews were asked to dig around—not through—a ridge where a sensitive plant, pygmy saxifrage *Saxifraga debilis* grew in its moist-rocky soils.

When attention was brought to the bull trout streams and anadromous fisheries, the concern was to limit entry of fire fighting

foam and liquid retardant. Although no research demonstrates an effect on fish, the Incident Command Team decided to protect these sites by not using the foam near streams. They prescribed using catch-cloths under any water pumps sitting near active waterways to stop petroleum products from leaking into the water table. Personnel monitored the water levels of high mountain lakes to avoid depletion due to helicopter bucket loading.

Other species of concern included the mountain goats, just nearing the end of the kidding season, and ospreys, which were into their fledging season. Air support personnel avoided them in their routine duties. This prevented inadvertant tumbles from safety for the young, and protected low flying aircraft from attacks by raptors. Pilots flew more than 500 feet away from the kidding sites and did not use retardant drops on those sites until after July 31. Near the osprey nests, pilots flew 500 feet above and a quarter of a mile away.

Many of the lightning strike fires occurred within the wilderness so the wilderness itself as a resource was evaluated. Managers decided to use no chemical retardants within its boundaries.

After the fires, rehabilitation personnel also were mindful of habitat. For the burned areas, native grass and forb species were preferred for use in revegetation.

As a result of this new sensitivity in fire fighting, the first young bald eagle in 20 years fledged in the midst of the action. There were, in addition, no impacts noted to the wildlife being monitored by personnel during actual fire fighting. In 1991, the eagles nested again. After monitoring in 1991, biologists noted that the wolves and spotted owls were back in the same location.

There were side benefits to the collaboration and information diffusion about the threatened and endangered species during the fires. One was a heightened awareness gained by firefighters. The firefighters reported many new wildlife sightings to district biologists. Consultation with the Fish and Wildlife Service and Washington Department of Wildlife—while the fires burned—set new standards for coordination. The integrated resource effort helped early trouble shooting and increased cooperation between the district and the Incident Command Team.

Firefighting has taken a new turn in recent years and some Forest Service National Forests, like the Okanogon, have instituted new fire management standards designed to mitigate resource damage. Some of the standard equipment and methodologies are being questioned by many federal and state agencies because of their effects on the land and wildlife after the initial battle has long been over. This can only be good for those species already in perilous condition.

Heather A. Wallis Murphy is the District Wildlife Biologist (since 1988) at the Lake Wenatchee Ranger District, Wenatchee National Forest in Washington state. She has worked there in wildlife since 1979. Her projects include TES animal and plant coordination, spotted ow management, gray wolf conservation, fisher/marten studies, mountain goat habitat improvement and others. Murphy's Bachelor's is in Wildlife Habitat Management from the University of Washington.

THE NORTHERN SPOTTED OWL ISSUE HAS MANY TIMBER PRODUCTS PEOPLE IN THE PACIFIC NORTHWEST WORRIED. HOW TO PROVIDE FOR CUSTOMERS UNDER THE NEW RULES CONCERNS THIS MANAGER.

COSTS RELATED TO THE ENDANGERED SPECIES ACT

MALCOLM EPLEY, JR.

When the Endangered Species Act became US law in 1973, few in this country foresaw it as a possible threat to community and regional economies and stability. Impacts on people, while a consideration, surely were to be minimal in scale. Even the extreme case of the now famous snail darter—which threatened a dam project and possibly a regional economy—seemed an aberration to all except maybe the most environmentally expert and politically sophisticated person.

But when intentions to preserve a species turn to action, the impacts surface quickly. They can be far-reaching in their range and devastating in their intensity. Specifically, with the emergence of concerns about the northern spotted owl, the northwest timber industry's lumber production capability has been placed in jeopardy. That means users of forest products may be forced to find alternatives to wood, the world's most environmentally acceptable building product. And an unhappy by-product of it all is human misery on a huge scale.

In the beginning, the Endangered Species Act indeed was legislation of great moral purpose, a high mark for human civilization. It demonstrated a sense of urgency to halt environmental erosion in one component of the planet's biodiversity. Few of the 250,000 people who made their livings from the western forest at the time probably were aware of this historic legislation, but without question, most would have approved of its intent. In the US west, workers in the sawmills and loggers in the woods, especially, not only labor but live close to the forest. Among them are some of the world's truly practical environmentalists. Though we know of no survey that would have proved it, surely most of the western lumber industry's employees of the mid-70s would have been quick to speak up for wildlife and habitat.

So it should be no surprise that men and women who make their respective livings

manufacturing lumber products are outspoken in their dismay over the imposition upon their lives of regulations intended to protect an owl few people have ever seen—much less even heard of until the late 1980s. One estimate is that the present plan to protect the spotted owl, when adding direct wildlife management expenditures to the wages lost in prospective job reductions, will cost about \$10 million per owl.

But the northern spotted owl is just the beginning. While its impact on the personal economics of forest workers attracts the attention of the nation's media, as the saying goes—"You ain't seen nothin' yet." There are powerful social, economic, product, and environmental implications yet to be tested, just for this species alone. But the next species protection need—murrelet, salmon, goshawk or some other wildlife creature with a real or "strategic" threat to its future as a viable species—will add to those existing burdens.

As people lose jobs, assistance programs begin, eating into stressed public budgets. Funding for roads and schools, historically supported by federal timber sales receipts, are diminished in step with declining volumes of federal forest harvests, thrusting the burden on county citizens. State and federal sales tax and income tax coffers must be replenished by drawing more from the non-forest taxpayer base, or by reducing services. Important western US cities like Portland, Spokane, Boise, Missoula, and Seattle can be expected to suffer as owl and other species habitat protection requirements remove major segments of the region's federal forests from the timber-for-products supply. High on the impact list of endangered species protection activities are the mills which exist for one reason: wood products are needed by civilization for housing, commerce, and institutions.

Over the years, modernization has streamlined the industry's manufacturing capabilities, reducing the hours required to manufacture a thousand board feet of lum-

ber. In 1978, 243,000 people held lumber and wood products manufacturing jobs compared to 225,000 in 1988. But most of these lower job numbers occurred through attrition in the "lumber depression" of the early 1980s, a time that virtually shut down the industry. Most mills shortened shifts, suspended operation for a period, or simply closed up forever. But 92 percent of the jobs were retained when markets came back because the industry, knowing better times were ahead, aggressively plowed-back heavy investment into high technology. By reinvesting, the industry could compete with steel, aluminum, concrete, plastic, and other products. That modernization, said to cost jobs, actually saved jobs.

But endangered species protection so far carries no relief for the future. Not only is the spotted owl job-loss shock expected to be fast, severe and sweeping, it is expected to be permanent—unless something changes in the fundamentals.

Worldwide, ballooning population growth is demanding ever more structures: developing nations hunger for housing, eastern block nations need rebuilding, and sophisticated nations want finished lumber. Wood products can provide for those needs more economically and with less environmental impact than with any other product. In the US, domestic demand for wood continues, zig-zagging from year to year on the charts, but upward in the long-range trends. In 1990, only a so-so year for lumber demand, the US consumed 45,003 billion board feet of sawn lumber. The US Forest Service (Haynes) projects a demand (softwood lumber only) in the year 2000 at 45.5 billion, 49.7 billion for the year 2010 and 54.3 for 2020.

Only two Pacific Rim countries outside north America—Chile and New Zealand—are able to boast they are net exporters of processed wood products, so the world must look to traditional suppliers to extend their product capabilities despite declining supplies for products. If western timber production declines, neither Canada nor the deep

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south see themselves picking up the slack—and some forecasters predict reduced production for those areas, too.

The ultimate impact of northern spotted owl habitat protection falls squarely upon sawmills drawing timber from old-growth stands primarily west of the Cascades in Oregon and Washington and in northern California's mixed-species and redwood. In 12 western states in 1988, 49 percent of all lumber manufactured came from logs originating on federal forests—where endangered species protection impacts initially have been highest. By 1990, this had dropped already to 44 percent. Forest economists expect that to plunge rapidly once harvests commencing prior to spotted owl regulations complete their pass through the pipeline, starting in 1992. So unless the science of endangered species protection provides timber-for-products objectives in the future, second-growth forests must bear the burden.

Half of the lumber produced in the west already has been coming from second-growth timber. Though extremist environmental arguments imply the forest industry has been wholly dependent upon old-growth, the fact is the second-growth manufacturing technology has long been in place. So much so that as we entered the 1990s, virtually every sawmill with a "big-log side" also had a "small-log side" to match. However, this does not diminish the importance of old-growth in generating products for market, nor the severity of the impact on both mill and market due to the sudden and premature loss of the old-growth timber supply.

Especially in the coastal areas of the Pacific northwest and some sections of northern California, the classic mill objective for the past century typically has been high volume. This mass-production philosophy has helped minimize costs of the nation's housing. Faced now with its "new" timber supply, a shift is expected from volume to a value orientation. Look for more attention given to each log, to maximize that log's return as never before.

With all of this impact on production volume and product mix, it should not be surprising that few expect historic supply and demand relationships to remain in the same balances as in the past. Western sawmill production volumes may never see their old highs again. And though at this time there is no way to know at what lower levels production will stabilize, one must assume nevertheless the western forest products industry will remain a major player in the world's economy.

The next wave of environmental creativity must incorporate the next level of environmental reality, however. That is the fact that human beings are here, and species protection plans will be successful only when serving both threatened species and human civi-

lization simultaneously. Recognition of that reality must come sooner than later, since the world needs the productive infrastructure intact and in business.

Malcolm Epley, Jr. is Vice President of Communications of the Western Wood Products Association, headquartered in Portland, Oregon. His first job as a young man was in a firefighting camp and his lifelong marketing/communications career have kept him close to forests and forest products. His Bachelor's is in journalism from the University of Oregon.



Jessie A. Micales

Research

In

Progress

Focus on: Endangered Species



Rochelle B. Renken

New Hope for a Dying Giant: Saving the American Chestnut Sandra L. Anagnostakis Plant Pathologist

American chestnut trees were once so common in the eastern United States that everyone who could get to the woods in the fall could count on nuts for roasting and for stuffing their Thanksgiving turkey. The wood was highly resistant to decay and was used extensively for poles, fencing, and building materials. But a fungus, probably arriving on Asian trees, began to kill off American trees, changing the way eastern forests looked. Although Japanese and Chinese trees usually resist or tolerate the fungus, American trees prove to be highly susceptible.

The fungus enters wounds, grows in and under the bark, and eventually kills the cambium all the way around the twig, branch, or trunk. Everything distal to the canker then dies, sprouts are formed, and the process starts all over again. From the earliest discovery of the cankers in the U.S. (in New York City in 1904) attempts were made to control the disease, but nothing worked.

My first work with this problem started with a general study of the genetics and growth of the fungus. When a biological control was described from Europe, I wrote for cultures and started to experiment with this system. In our first trials, we were successful in controlling the lethal blight on an American chestnut tree, and this led to many years of work with several colleagues.

The basis of the biological control is a virus that infects the fungus and keeps it from being vigorous enough to overcome the trees' natural defense—callousing and “walling off” the invader. Strains of the fungus with virus (there are several different strains of the virus) are called “hypovirulent,” because their virulence is below normal. Molecular biologists are now working to better understand the virus and to understand the basis of its action.

We have tried many ways of introducing hypovirulent (H) strains for biological control. We have been very successful in a small 70 tree orchard of American chestnut trees at the Connecticut Agricultural Experiment Station farm. We inoculated new cankers with a mixture of H strains for four years. They have now gone ten years without any further treatment, and the new cankers that continue to form are usually converted to H cankers before they become serious. We believe that every bug, bird, and beast that walks from one canker to another carries killing or curing spores

on their feet, feathers, or fur. This stable system of biological control has allowed the trees to grow to maturity (they are now 18 years old), and they produce large numbers of nuts each year.

We have been less successful in the forest. Trees survive better with the biological control, and H strains are certainly spreading throughout the woods, but the heavy competition of other woody plants affects the chestnut trees. On the best sites, with good soil and adequate water, chestnut trees are competing better than in places with poor soil and drought conditions. We are currently trying limited and complete clearing around some of these trees to see how much we have to do to help them grow as well as our orchard trees.

In addition to these tests of the biological control, we have resumed breeding to combine the resistance of Asian trees with the form and nut quality of American chestnuts. The Connecticut Agricultural Experiment Station has a collection of chestnut species and hybrids that is probably the finest in the world. Since many of these trees have survived sixty or more years of blight and New England winters, we can select the best trees as parents to cross with the Americans in our orchard at the farm. After a few generations of crossing and selecting for trees that look like Americans and have full resistance, the offspring will be planted in the woods. This, in combination with hypovirulence, should give the chestnuts the competitive edge that they need to return to their rightful place in the Eastern hardwood forests of the United States.

Sandra Anagnostakis is an Associate Scientist at the Connecticut Agricultural Experiment Station. She received her B.A. from the University of California at Riverside, her M.A. from the University of Texas at Austin, and (after working for several years) her Ph.D. from Justus Liebig University in Giessen, Germany.

Interior Least Tern Research in Missouri

Rochelle B. Renken Wildlife Biologist

Sand, sun, and surf are components of a great vacation for me. I guess that is why I love conducting field research on interior least terns for the Missouri Department of Conservation (MDC). The summer home for least terns in Missouri (the Mississippi River from the mouth of the Ohio River to the Missouri-Arkansas border) is not everyone's idea of a vacation playground. But from May through August there's sand, in the form of sand islands and sandbars, and plenty of sunshine to boost the thermometer to a level

that rivals temperatures in Florida. Surf is supplied by the grain, coal, and oil cargo barges that make their way up and down the river.

The least tern is our smallest North American tern. It is a fish-eating bird that nests on sand islands and sandbars within the major river systems of the central United States, on sandy coastal beaches in California, and along the Gulf and Atlantic coastal beaches.

The interior least tern population, which breeds within the Missouri and Mississippi River valleys and a few selected tributaries, is listed as a U.S. Federal Endangered Species. This population was placed on the list in 1985 because of the drastic decline in the amount of sand island and sandbar habitat within those rivers since 1930. Habitat was lost because of the U.S. Army Corps of Engineers' river channelization and bank stabilization projects within the waterways. In the Mississippi River system, an estimated 40 percent of the available sand habitat that was present before 1930 has been lost due to the construction of dikes within the river channel. The Missouri River system has experienced a more dramatic decline in the amount of sand habitat: an estimated 90% of sand habitat has been lost since 1930. Dikes are constructed to narrow the river to a nine-foot deep and 300-foot-wide navigation channel. This causes the water to slow down and drop its silt and sand load. Eventually, the deposited sand and silt accrete to the river shore and woody vegetation grows on the sites, thus making them unsuitable for the unvegetated-sand-loving least tern.

The Missouri Department of Conservation has been conducting research on interior least terns since 1985. My involvement in least tern research began the moment I stepped into MDC's research center in 1989. I have been hooked on least tern research ever since. My first work objective was to summarize and analyze five years of general habitat and productivity data. More recent research objectives have concentrated on documenting the current distribution of nesting least terns, more fully describing the river habitat used by the nesting terns, and estimating tern productivity and survival. Future research directions will include examining the foraging ecology of riverline terns and modelling prospective tern population trends.

With sand in my shoes and the last vestiges of a suntan, I will continue to pursue answers to questions concerning factors that limit least tern populations. The recovery of this population appears to be attainable if continued attention is

focused on the tern and if the appropriate federal agencies incorporate tern needs in their management decisions.

Rochelle B. Renken is a Nongame and Endangered Wildlife Species Research Biologist. She received her B.S. in Fisheries and Wildlife Biology and an M.S. in Animal Ecology from Iowa State University. Her Ph.D. in Wildlife Biology was earned at the University of Missouri-Columbia. She has also worked for the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service.

Seed Biology of Ashy Dogweed

**Elinor Crank
Horticulturalist**

The National Wildflower Research Center in Austin, Texas is dedicated to the preservation and restoration of native flora. Our research focuses on the growth and establishment of native plant species, ranging from greenhouse propagation to large-scale restoration projects.

The Wildflower Center's interest in native flora extends to endangered plant species. The Texas Parks and Wildlife Department, for example, contracted with the Wildflower Center to study the federally listed endangered species *Thymophylla tephroleuca*, the ashy dogweed. Ashy dogweed is native to Zapata and Starr counties in far south Texas along the Texas-Mexico border. Three distinct populations are located on a private ranch. The plant, a member of the Asteraceae family, is a small semi-woody perennial with bright yellow flowers and aromatic foliage. Growing in a desert environment along with cacti and other scrub vegetation, ashy dogweed blooms off-and-on throughout the year depending on rainfall.

Our research focused on the study of seed biology. Seed collections were made several times a year over a two-year period, keeping the three sites separate. Germination and tetrazolium (TZ) tests were used to examine the viability of seed over time and to determine whether any pretreatment is required to

break dormancy prior to germination. TZ tests use a stain to determine whether seeds are viable; embryos that are alive and undergoing respiration will absorb the red stain. A TZ test often shows a higher percent of viable seed than a germination test, because it includes seeds that are dormant as well as those ready to germinate. TZ tests on ashy dogweed seed revealed a viability rate of approximately 60 percent.

Germination tests were then designed to examine the effects of pretreatment on germination rate. Each treatment used 450 seeds placed on moist blotter paper in Petri dishes. Seeds were either pretreated with heat-stratification at 100 F in a growth chamber for a week or not pretreated. Heat-stratification was chosen as the pretreatment based on the natural environment where the species grows. The average summer temperature in this area is well above 100 F, and the average low winter temperature is only 60 F. Heat is much more of a threat than cold.

The germination rate was significantly higher after heat pretreatment. Seeds that received no pretreatment had an average germination rate of 23 percent, while 49 percent of heat-stratified seeds germinated successfully. These data, along with the 60 percent viability rate indicated by the TZ test, indicate a high percentage of dormant seeds.

Understanding seed biology and the requirements for germination are important information for any species, especially for one that is endangered. A solid knowledge of seed biology can lead to the development of a successful recovery plan, thus preventing the total loss of a species and perhaps even increasing its numbers until it is no longer threatened or endangered.

Elinor Crank has been with the National Wildflower Research Center for four years. She received her B.A. in Botany from the University of Texas at Austin, and her M.A. in Horticulture from Texas A & M University.



Elinor Crank in the lab

THIS MANAGER COORDINATES ACTIVITIES RELATING TO 450 SPECIES OF BIRDS AND MAMMALS FOR THE STATE OF COLORADO

WILDLIFE WORK AT THE STATE LEVEL

JUDY SHEPPARD

I had a mission when I left graduate school: go out into the world and save endangered species. I had the education, I had some experience, I certainly had the motivation—it *seemed* like everything I needed.

In my six and a half years as a wildlife biologist with the U.S. Forest Service, things went well. I always knew I had the backing of the Endangered Species Act, which appeared to be just about the only piece of environmental legislation that had any teeth in it.

Then I went to work for a state wildlife agency...

Protection of endangered species under the umbrella of a state wildlife agency can be a horse of a different color—so to speak. Some states have *some* laws of varying strengths to protect state-listed endangered species. Some states have *no* laws dealing with endangered species; others, notably California, have laws that parallel federal laws, both in breadth and strength.

Colorado, where I now work, has strong laws designed to discourage the taking, possession or harassment of endangered and threatened species. Substantial fines ranging from \$100 - \$100,000 and jail or prison sentences (up to eight years) protect species from direct taking, and protect nests, eggs, and dens from destruction.

When it comes to proactive protection (i.e., protection of habitat), Colorado has a strong tradition of local control of land use. The control resides at the county level not the state level. While we have no provisions or requirements for consultation or conferencing when a



project could affect a state-listed threatened or endangered species, we are able to advise project proponents and county land use boards of possible negative impacts and mitigation actions.

In Colorado, species are added to the state threatened or endangered species list if they fit the following criteria:

1. The species or subspecies is native to Colorado.
2. The species or subspecies is known to occur or has probably occurred in the state within the last 10 years.
3. Plus one or more of the following:
 - a. The species or subspecies is federally listed as threatened or endangered, or
 - b. Data indicate that the population has declined significantly, or
 - c. The abundance and distribution is limited and insufficient to maintain a self-sustaining population.

The process of adding species to the list takes a minimum of six months. At this point, probably the only species that will be added are those that are federally listed. I will be responsible for bringing this in front of the Colorado Wildlife Commission when they are working on

that chapter of the regulations. Issues are considered at three public meetings of the Commission (whose members are appointed by the Governor), and through consultation with other state wildlife agencies, various Colorado water conservation boards, water development authorities, water conservancy districts, appropriate federal agencies, and other interested persons and organizations.

There are currently 23 species or subspecies listed as threatened or endangered in Colorado. Thirteen of these are also federally listed. The program responsible for the recovery and management of these and other species that aren't hunted, trapped or fished for in the state is called the Nongame and Endangered Wildlife Program. This program, begun in 1972, is responsible for 80 percent of Colorado's wildlife species. The program is primarily funded through donations to the Nongame Income Tax Check-off on the state tax form. These funds are supplemented with federal matching funds—*Pittman-Robertson, Dingell-Johnson, Endangered Species Act Section 6 Funds*, by some of the receipts from the sale of hunting and fishing licenses in the state, and by grant and cost-sharing agreements with various federal land-managing agencies. The Program's annual budget is approximately \$1.5 million (nearly four percent of the total agency annual budget).

While Colorado was the first state to initiate a state income tax check-off for nongame wildlife, the check-off has proven to be an unstable and inadequate source of funding. The agency has tried several times to initiate a new source of funding, but we have not yet been successful. There are other funding sources being discussed, however:

•In April, 1990, Governor Roy Romer established Great Outdoors Colorado! This program was intended to focus attention on the future of Colorado's outdoor resources. A citizen's committee was appointed to investigate the statewide needs for parks, trails, open space, nongame wildlife, and watchable wildlife. In December 1990, after monthly committee meetings, and a lengthy public input process, the citizen's committee presented a report on its findings to the people of Colorado. In the 1991 legislative session, a concurrent resolution intended to present a ballot issue to the people of Colorado creating a funding base for a Great Outdoors Colorado Trust Fund was introduced. The Trust would provide \$30 million in interest to fund the outdoor resource needs mentioned above. Although the legislature killed the proposal, the concept is not dead.

•A non-profit corporation, Citizens for Great Outdoors Colorado, has been formed. This group is in the process of determining what the next steps will be to develop a stable, sufficient, and protected funding source to adequately address the future of Colorado's outdoor resources, including nongame and endangered wildlife.

In the meantime, while we do not have many full-time nongame biologists in the Colorado Division of Wildlife, everyone has responsibility for nongame as well as game species of wildlife. For example, the Division has been actively involved in peregrine falcon recovery since 1974. Wild recovery, especially on the western slope of the Rocky Mountains is progressing well, but had been slow on the eastern slope. In 1988-89 we reintroduced peregrines to the "canyons of Denver." The Peregrine Partnership, a coalition of state and private organizations, had three primary objectives for its urban release. First, of course, was the enhancement of overall recovery efforts. The second objective was public awareness; and the last objective was public education. Volunteers, for example, reported peregrines landing on their windowsills. Others committed significant blocks of time to chase down peregrines as they wandered around the city. All were an integral part of the project.

Some view the project as a failure because peregrines have not yet nested

in downtown Denver. The Division, however, views the project as a major success. We received a tremendous amount of positive press, including numerous front page headlines and photos. Over 100 volunteers participated; 4,300 Teacher Resource Packets were distributed to school districts; and museum tours, lectures and a museum exhibit were offered to thousands of people. The public now routinely reports downtown raptor sightings. While peregrines have not yet returned to nest in Denver, we have seen a 66 percent increase this year in peregrines nesting along the eastern slope which was the area lagging behind in our recovery efforts. It is likely that some of this recent occupancy can be attributed to the downtown Denver peregrine releases.

Because our funding is so limited, volunteers like those in the Peregrine Partnership are becoming increasingly important in accomplishing our goals. They assist with recovery projects for bald eagles, least terns, and piping plovers. Volunteers are also being used in projects on burrowing owls, a bald eagle watch, osprey introduction, amphibian and reptile surveys, and bats using abandoned mines.

The bats and abandoned mines project is our newest volunteer opportunity and is a very interesting effort. Prior to a mine shaft being closed for public safety, volunteers conduct surveys outside the mine opening to determine if it is being used by bats. If there is significant bat use or use by certain bat species, it is recommended that the opening be grated, instead of completely sealed, permitting continued bat use. This long term project, in its first year, has attracted over 200 volunteers.

In the midst of these public-assisted successes, however, my mission to obtain the hard data and research we need to answer other questions has taken a back seat due to lack of funds: Is acid rain causing the decline we are seeing in our high altitude amphibians and reptiles, and if so, what can we do about it? What is the status of our neotropical migrant songbirds? What constitutes a viable population of lynx, or piping plovers, or wood frogs? What is the status of our mollusks and crustaceans (the only invertebrates considered to be wildlife under our statutes)? And then there

are the larger, more encompassing questions, such as what should be the Division's role in managing for biodiversity? How much habitat is needed to support healthy populations of endangered or threatened species?

When you consider that prior to the 1970s few nongame species were even paid any attention, it is clear that state and federal agencies have come a long way. However, when the above questions surface almost daily, it is easy to see that we still have a long way to go. It also appears I am accomplishing my personal mission at the same time that the mission itself continues to be redefined.

Judy Sheppard has been a wildlife program specialist for the Colorado Division of Wildlife for six years. As the terrestrial program manager of the Nongame and Endangered Wildlife Program, she has responsibility for coordinating activities related to nearly 450 species of birds and mammals in the state. She has also worked as a wildlife biologist with the U.S. Forest Service, The Nature Conservancy, National Wildlife Federation, Congressional Research Service, and Weyerhaeuser Company. Sheppard's Bachelor's is in Forestry (wildlife emphasis) from the University of California Berkeley, and her Master's is in Resource Policy and Management (wildlife emphasis) from the University of Michigan Ann Arbor. Her master's thesis focused on the utility of the concept of critical habitat under the Endangered Species Act.



Jane Difley will serve as president-elect in 1992 for the Society of American Foresters. She will become president in 1993. Difley is northern regional manager for the American Forest Council, responsible for AFC programs in 18 states. She began work with them in 1983 after working for the Society for the Protection of New Hampshire Forests, the Resource Policy Center at Dartmouth College, the Cooperative Extension Service, and as a consultant. Her Bachelor's is in English from Connecticut College, and her Master's is in forestry from the University of Massachusetts.

Hester Turner is the new president of the Forest History Society. She was formerly National Director of Camp Fire Girls, Inc., and past president of the American Forestry Association.

Maureen Finnerty, Superintendent of Olympic National Park in the state of Washington wants to tear out several large dams on the Elwha river in and near the park in order to restore the salmon runs and protect what she calls a "world-class watershed." The dams are privately owned by the James River Corporation. When Olympic National Park was created in 1938, the Glines Canyon Dam remained as a private inholding within the park. The Elwha Dam is located a few miles outside. Both supply electricity to pulp mills in nearby Port Angeles at 40 percent of the cost of the other available supplier. Finnerty's position is shared by other agencies in the U.S. Department of Interior and by years of research conducted by those agencies.

Ellen Weaver is president-elect for the American Women in Science Association. She is recognized for her work in plant physiology and the biophysics of photosynthesis. Her Ph.D. is from the University of California Berkeley. In an interview by Edna Kunkel in the AWIS Magazine (November/December 1991) she noted that it took her 20 years after the doctorate to get tenure, because of opposition from male faculty along the way. She recently retired as full professor from San Jose State University.

Roberta Moltzen, pictured left, is the new Forest Supervisor of the Black Hills National Forest in Custer, South Dakota. Prior to that, she was Deputy on the Boise National Forest in Idaho. She began her Forest Service career as a District Timber Management Assistant on the Wenatchee National Forest. She has been District Ranger on the Winema and on the Idaho Panhandle National Forests and Timber Staff Officer on the Gifford Pinchot NF. In addition, Moltzen has worked for Scott Paper Company in Alabama and Mississippi. Her Bachelor's in Forestry is from the University of Florida.

Linda Rundell is the new District Manager for the Las Cruces District office of the Bureau of Land Management. She is a 12 year veteran of BLM. As Manager she will supervise and direct operations covering eight southern New Mexico counties. Rundell had most recently been Program Analyst to Senator Pete Domenici in Washington DC. She started as a Range Conservationist in Nevada, but has worked most of her time with BLM in New Mexico in wildlife and natural resource programs.

Angela G. Evenden recently moved to the Intermountain Research Station in Missoula where she serves as the Natural Areas Program Manager for the Northern Region and Station. This is a new position which will increase emphasis on the natural areas establishment, management, monitoring, and research in the Northern Region. Natural area designations included in this program are Research Natural Areas, Botanical Areas, Zoological Areas, Geological Areas, old-growth areas, riparian areas, and Wilderness. She had been Regional Botanist for the Northern Region for four years, and was the first botanist one hired. Evenden was recently elected to the board of directors of the Natural Areas Association.

Bureau of Land Management botanist **Cheryl McCaffrey**, pictured right, has been named chair of the Oregon/Washington Interagency Endangered Plant Committee which oversees improved conservation of rare plant species independent of political or agency boundaries. The committee is now 15 years old, meets semiannually, shares program information, compares research, and coordinates activities. The committee intends to facilitate publishing a rare plant field guide for Oregon and Washington.

Carmen Pokorny de Marcet of Guatemala receivee the second Jean Giono Award of the American Forestry Association's Global ReLeaf Campaign for planting trees. She will receive \$1,000 as an award for her plantings of an urban forest of 50,000 annu-

ally in Guatemala City. She is head of the Division of Parks and the Environment and has been in that post since 1985. She is a landscape architect with a degree from the University of Illinois.

Alice E. Ingerson has been editor of the Forest History Society's *Forest & Conservation History* journal since 1984. She has resigned that position and is now director of publications for the Lincoln Institute of Land Policy in Boston. She is also cochair of IUFRO's tropical forest history group.

Laura Eaton is an environmental contaminant specialist in the Fish and Wildlife Enhancement New England Field Office. She recently received the Distinguished Federal Employee Award for professionals working in New Hampshire. The award originated with the New Hampshire Federal Executive Association.

Lonnette Edwards is a new ecologist in the Endangered, Threatened, and Sensitive



Wildlife in Southern Forests Unit in Clemson at the Southeastern Forest Experiment Station USDA Forest Service. Prior to this assignment, Edwards was assistant curator and laboratory manager in the Biology Department at North Carolina A & T State University. She has also worked in the herbarium of the Missouri Botanical Garden. Her Bachelor's is in biology from the University of Chicago and her Master's is in evolutionary biology and ecology from Washington University St. Louis.

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BIOLOGISTS STRIVE TO UNDERSTAND EACH SENSITIVE, THREATENED, OR ENDANGERED SPECIES. THIS MANAGER TELLS US WHY KNOWLEDGE OF THEIR HABITAT DRIVES HER SCHEDULE.

MONTANA SPECIES AND HABITAT MANAGEMENT

MARYNELL OECHSNER

Three Rivers Ranger District of the Kootenai National Forest (Montana) is large in size and diverse in wildlife species. Located in the very northwest corner of Montana next to the Canadian and Idaho borders, the Kootenai and Yaak Rivers drain the 650,000 acre district. Portions of the East and West Cabinet Mountains and the Yaak Ecosystem are found there. Elevational range is between 7700 feet at the Northwest Peaks to 1860 feet at the Kootenai River border next to Idaho.

Headquartered in Troy, Montana, the district has habitat unique to Montana. Mild, pacific coast weather brings abundant moisture, creating conditions favorable to species of plants and animals not often found elsewhere in the state. Here are 15 species of conifers, with red cedar and hemlock being the dominant habitat types. Eight big-game species and numerous small and nongame species make their homes here. There are 44 listed threatened and endangered and sensitive plants and animals known to occur.

Threatened and endangered species are managed under the authority of the Federal Endangered Species Act and the National Forest Management Act. Three Rivers Ranger District has three species listed as *endangered*: the bald eagle, the peregrine falcon, and the rocky mountain gray wolf.

The high profile *threatened* species on the district is the grizzly bear. The Cabinet Yaak Ecosystem has a small population of grizzly bears currently being studied by researchers of US Fish & Wildlife Service under a cooperative agreement with the US Forest Service and the State of Montana Fish, Wildlife and Parks. District biologists coordinate equipment needs and lend an occasional helping hand on the trapline or remote camera stations.

Sensitive species are those species for which population viability is a concern and

are recommended by the Forest Service's Region 1 Forester for additional management attention. The Three Rivers Ranger District has 40 species listed as sensitive, 22 of which are plants, six species of fish, five birds, six mammals and one amphibian.

Management of the habitat needs of these different species is the full responsibility of the three district wildlife biologists. The job is complex: we are tasked to maintain the integrity of the habitat for all of these species, while supporting a 70 million board feet timber sale program, hard rock mineral exploration, and development of an expanding recreational program.

As biologists, we need to know and understand the requirements of each species in order to properly manage the habitat. We have to recognize habitat associations and key components within those habitats. Specific physical characteristics, the key to distinguishing some sensitive species from "look alikes" must also be known. In our area, for example, the eastern long-toed salamander is often brought into the office by those who mistake its identity for that of a Coeur 'd Alene salamander, a sensitive listed amphibian. Habitat characteristics of the Coeur 'd Alene salamander are unique, so the chances of someone casually finding one aren't very good. Biologists use flashlights on warm, rainy, spring and fall nights to check moss-covered seeps for this elusive, fracture-rock dweller.

There is, in addition, a certain orderliness and time-sensitivity to our work. We schedule some endangered species work on an annual basis. The Kootenai National Forest has an expanding nesting population of bald eagles, with new territories being established. Annual spring aircraft flights are contracted to check for new nests and reaffirm use of historical nest sites. Each nesting territory has site specific information

collected and management plans written for the area. Personnel check the nests at least three times during the breeding season to document occupation, hatching, and fledgeling success. In January, we take boats down the frigid Kootenai River to census wintering birds as part of a state-wide effort. We monitor district lakes each spring for pairs of the sensitive-listed common loon and once a pair has been spotted, lakeshore searches for nests are done by canoe in May. The annual State of Montana "Loon Day" field count (July) verifies loon reproduction for the year.

Personnel scheduling and availability is critical when doing sensitive species surveys. We schedule the uncommon Harlequin Duck surveys in June when the brushy creeks of the District are flowing fast and wild at full bank because it is during this time that pairs of these ducks make their way up headwater streams to nesting areas. The secretive ducks' visibility is at its peak. One of the purposes of these surveys is to establish use patterns of the streams by the harlequins. But walking the district's thousands of miles of streams makes this nearly impossible during the short timeframe we have. Much of the work, therefore, is accomplished cooperatively with the Montana Natural Heritage program.

Another one of the sensitive species, the boreal owls, are surveyed in March. Biologists initiate snowmobile expeditions to high country—above 4,000 feet—to subalpine fir and spruce habitat types. After dark, "hooting" transects are done with tape recorders to elicit a response from the male boreal owls. Only at this time of the year are the males vocally establishing and defending their territories enabling biologists to easily locate them.

State fishery biologists and district biologists electroshock to survey streams for sensitive fish. The absence or presence of fish such as the torrent or shorthead sculpin can be determined in this manner. Some sensitive species of trout—inland rainbow and the westslope cutthroat—however, can not be visually identified in the hand as purebred stock. In some streams, these

species have hybridized with non-native trout species. In order to determine genetically pure stock, samples of fish, including all age classes, are collected and tissue is electrophoretically tested. (Electrophoresis is a laboratory process in which electrical current is used to separate proteins. Different stocks of fish have different bands of protein separation, enabling scientists to distinguish pure stock from hybridized, non-native fish.) Protection and management of identified sensitive fish as native, purebred stock is important in the maintenance of genetic biodiversity.

Forest Service employees and the general public frequently call or stop by the office with unusual wildlife sighting information. Recent pieces of information shared were the sighting of a fisher, a sensitive specie recently reintroduced to the Cabinet Mountains, and the sighting of an endangered wolf. After such reports, we then record the informant's specific information. A follow-up visit to the area may be warranted to verify the information. In the case of the wolf, sign including tracks, scat, recent kills or other evidence such as howling, are checked and documented at the site.

All this information collected on threatened, endangered, and sensitive species is shared by all interested agencies, most often by the Montana Natural Heritage Program and the US Fish and Wildlife Service. The district biologists compile and store all the information locally in the wildlife database. These data are used as a valuable source of information for management of the species themselves and to influence future land management practices on the species' habitats.

While writing this article, Marynell Oechsner was a wildlife biologist for the Forest Service at Three Rivers Ranger District, Kootenai National Forest in Montana (1988-91). Currently she is a district wildlife biologist, Teton Basin Ranger District (Driggs, Idaho) on the Targhee National Forest. She began her career (1977) as a research biological technician at North Central Forest Experiment Station in Rhinelander, Wisconsin. After that, she worked for three years as an Environmental Specialist with the Bureau of Reclamation, Bismarck, North Dakota. Oechsner's Bachelor's is in Biology from the University of Wisconsin River Falls.

Book Review of

Illiberal Education by Dinesh D'Souza

The Free Press (Macmillan) 1991

Reviewed by
Thomas A. Hennigan

Various vociferous reactions have greeted Dinesh D'Souza's publication of *Illiberal Education*.

These reactions range from charges of racism and fascism to plaudits for his egalitarian iconoclasm. Those who have known D'Souza through his past writings would, one thinks, agree that his true purpose for the book is neither so base nor so lofty.

Indeed, the purpose borders on the trite. And tritely put, D'Souza is a "sauce for the goose is sauce for the gander" sort of guy. It is in the spirit of this old saw that one should approach reading *Illiberal Education*.

The author has identified an evolving phenomenon on university campuses. He calls this phenomenon the "victim's revolution" and asserts that it has produced enclaves of "certified minorities." D'Souza's quarrel with the formation of these enclaves is two-fold. First, such minority groups as Jews and asians are not granted the certified status as are blacks, women, and American indians. Why? Because, in the jaundiced view of the university grantors, Jews and asians are too successful and are not victimized. Second, members and friends of the certified minority groups—such as blacks, hispanics, women—have the power to strangle debate on the policies they support. They accomplish this asphyxiation through branding as bigots those

who disagree with their own view on race and gender issues related to higher education.

In the book, D'Souza discusses three areas where the victim's revolution has adversely affected the university: (1) in admissions policies, (2) curriculum content, and (3) campus life. The book is arranged so each of the central chapters deal—in the main—with one of these three areas as seen on the campus of a major U.S. university. These chapters present a well-planned, scholarly investigation of that phenomenon which has come to be known as the "political correctness" movement (a term coined after the publication of D'Souza's book). A too-extensive background report on student protest at Howard University and a somewhat dichotomous discussion of minority faculty recruitment policy and deconstructionist criticism—meaning holding all assessments of literature to be equally subjective and therefore equally valid—at Duke represent flaws in this otherwise well-devised text.

The appeal of *Illiberal Education* will be, one fears, largely to those who want to relish—or deride—horror stories depicting the excesses of the forces of political correctness. D'Souza's book can be appreciated on that level. However, *Illiberal Education* is best taken as a reminder that protecting freedom of thought and speech is like crossing the street: one has to look both left and right to be safe.

Reviewer Thomas A. Hennigan is Video Production Manager in the Educational Technology Center at Lewis-Clark State College in Lewiston, Idaho. His Bachelor's is in Speech/Drama from LCSC, and his Master's is in Speech (Theatre) from Washington State University. He is co-author of a musical play "Cuchulain."

EVERYONE KNOWS ABOUT ENDANGERED SPECIES OF PLANTS, BUT WHAT ABOUT *ENDANGERING* SPECIES? ARE THERE PLANTS WHICH SHOULD NOT BE FURTHER INTRODUCED WHERE THEY CAN SPREAD INTO ANY REGION OF NORTH AMERICA? DO NATIVE PLANTS NEED MORE PROTECTION FROM INVASIVE EXOTIC SPECIES?

PLANT BULLIES CAN BE ENDANGERING SPECIES

RUTH PARNALL

Human settlement has delivered a double whammy to the Northeast native landscape when it comes to endangered plants. The first blow falls with the removal of native species by the bulldozer blade, the plow, the herbicide sprayer, the chainsaw, or the collector's spade. Some native plants are considered so useful to humans that they are consumed at a rate that outpaces regeneration. Some are grazed and trampled to extinction. Some are judged to be "junk" vegetation to be cleared in the name of progress. And now much of our historic native landscape exists only in places where humans have not yet seen fit to live or work.

With seemingly endless wooded mountains throughout large parts of the Northeast, one would think that there is sufficient refuge for beleaguered native species. Not true, say many environmentalists, who are seeing a second blow from human-wrought devastation that may leave no wild lands unaffected. Certain rampant exotic plant species, often called "bullies," are invading. They often outcompete and eventually eradicate native trees, shrubs and ground covers until a virtual monoculture results and the wildlife composition is altered. To the uninitiated, these invaded forests, wetlands, and other "natural" areas might look perfectly normal—that is, full of plants. But in fact they can become ecological monotonies where natural succession has been stalled.

Nearly everyone east of the Mississippi and west of the Rockies knows of purple loosestrife, which spreads through wetlands, replacing entirely the native emergent plants, thus forcing out the wildlife that depends upon them. It has been found to be extremely tough to eradicate by hand, machine, or chemical (Bleiler 1989). Not many designers will still show it in a planting plan (although many nurseries continue to sell it).

The invasive characteristic of a number of plants, however, seems not yet to be common knowledge. Two of the most popular plants in the landscape trade today are invaders: Norway maple and burning bush *euonymus*. Six more were introduced to the unwary by the USDA Soil Conservation Service: Russian olive, autumn olive, amur and tartarian honeysuckle, multiflora rose, and kudzu. Still another, Japanese barberry, can be found in the undergrowth of forests throughout the East and has on occasion been released by foresters for the enjoyment of wildlife.

Wherever there is development, invasive exotic plants have followed. *Anthropochorus* is the latin word—"dancing in the footsteps of man" (Bleiler 1989). Business and homeowners are landscaping their yards with these pests, whose berries and seeds are carried by birds, wind, or water into woodlands or disturbed soil. Many continue to spread vegetatively with aggressive, and frequently toxic, rhizomes. Eventually, even though it may take years to accomplish, these exotics displace the native vegetation in one or more of the follow-

ing ways: shading out, allelopathy, root/water competition, weighting down/deforming/shading, taking advantage of a longer photosynthetic season (Sather 1988). The ground layer, shrubs, saplings, and subcanopy all suffer. Most of the bullies are opportunistic in woodlands wherever light gaps occur, and once established, they prevent the regrowth of plants which would otherwise close the canopy. They create what has been called "exotic dis-climax" (Bratton 1982)

Many of the wild lands along the east coast already have invasions that are almost beyond control. It takes a lot of money to attack the bullies after they are established and these are times of public budget crises. In 1991, a conference, "Woodlands in Urban Parks," co-sponsored by the National Association of Olmsted Parks and the Fairmount Park Commission, focused on this issue. Delegates at the conference noted that volunteer "SWAT" teams have had to assume the task of battling these invaders in Philadelphia, Nashville, Chicago, New York City. Research continues to be done on methods of control, including herbicides, pulling, burning, mowing, grazing, and light deprivation. When there are other desirable species to be preserved or where the ecosystem is extremely sensitive, such as in wetlands, the choices narrow considerably (Evans 1984). Where these plants naturalize, the native flora and fauna become threatened and endangered.

What can individuals do in the face of established invasions and popular demand? Francis M. Harty wrote that "It is the responsibility of all natural resource professionals to provide proper and prudent management advice to private and public landowners and man-

agers. To continue to ignore the documented consequences associated with introducing exotic species in the name of soil conservation, wildlife management, reforestation, or landscape purposes would fall short of this obligation."

Natural resource managers can: a) find out which invasive exotics threaten the natural plant community in their area, b) learn to identify the species, cull them out, and recommend control whenever they are seen, c) help with community education and volunteer efforts to eradicate existing invasions, d) avoid creating opportunities for invasive exotics, such as opening forest canopy where invasives are present, e) avoid planting species that are known problems in the area or in similar biozones, f) promote the use of native vegetation for erosion control or wildlife food and cover (Sullivan 1991).

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The author thanks Maryellen Sullivan for the collection of certain source material through her student work.

Ruth Parnall is a Landscape Architect. She has worked for the City of Indianapolis (Planning and Zoning), for a civil engineering firm, and as a principle in Conway Design Associates, landscape architects. Parnall is now sole proprietor of an office under her own name. She has taught at the Conway School of Landscape Design and is an Editor of Women in Natural Resources.



PARTIAL LIST OF EXOTIC INVASIVE PLANT SPECIES IN THE NORTHEAST

This list contains plants that are commonly available and frequently planted. A number of other invasive exotics endanger northeast ecosystems, but they are not generally used in landscaping.

TREES

Norway Maple *Acer platanoides*
Sycamore Maple *Acer pseudoplatanus*
White Mulberry *Morus alba*
White Cottonwood *Populus alba*

SHRUBS AND SMALL TREES

Barberry *Berberis japonica*
Russian Olive *Elaeagnus angustifolia*
Autumn Olive *Elaeagnus umbellatus*
Winged Euonymus *Euonymus alatus*
Amur Honeysuckle *Lonicera maackii*
Morrow Honeysuckle *Lonicera morrowii*
Tartarian Honeysuckle *Lonicera tatarica*
Blunt-leaved Privet *Ligustrum obtusifolium*
Princess Tree/ Empress Tree
Paulownia tomentosa
Smooth Buckthorn *Rhamnus cathartica*
Shining Buckthorn *Rhamnus frangula*
Multiflora (Japanese) Rose *Rosa multiflora*
Rugose Rose *Rosa rugosa*

VINES

Porcelain Berry *Ampelopsis
brevipedunculata*
Oriental Bittersweet *Celastrus orbiculata*
Japanese Honeysuckle *Lonicera japonica*
Silver Fleece Vine *Polygonum aubertii*
Kudzu *Pueraria lobata*
Japanese Wisteria *Wisteria floribunda*

HERBACEOUS PLANTS

Purple Loosestrife *Lythrum salicaria*
Japanese Knotweed *Polygonum
cuspidatum*
Yellow Flag Iris *Iris pseudacorus*
Phragmites, Common Reed *Phragmites
australis*

This list is compiled from the following:
Invasive Exotics, an excerpt from Landscape Management and Restoration Manual (in progress) by Andropogon Associates, Ltd.

MACC Newsletter (Massachusetts Association of Conservation Commissions)
Natural Heritage and Endangered Species Program (Massachusetts Division of Fisheries and Wildlife)
Various articles in *Natural Areas Journal*
Element Stewardship Abstracts of The Nature Conservancy.

HOW THE MEN IN YOUR OFFICE REALLY SEE YOU

We invited five men (executive men in their 30s) from five major companies to tell us what was on their minds. We found that although they'd learned to talk the talk—politically correct language straight from the Handbook for Sensitive Males—there was still plenty of residual resentment and hostility. To be fair, all the men were aware of the hurdles women have had to overcome in the office.

Q. Do you think women approach work differently than men do? A. *Ken.* It's not a matter of working hard. Some women work as hard as men—sometimes harder. The problem is, it's on the wrong stuff. They obsess on getting one small thing right, and it's blown out of proportion. *Alan.* That's it...They don't understand the big picture—there's no sense of corporate mission...And whether you're the manager or you work for them, you constantly have to steer them away from that. *Tony.* Yeah. Men also tend to be more analytical, while women deal with whatever's at hand. What they have to focus on is the vision, not the details; those can always be filled in later.

Q. Do women get down to business fast enough? A. *Ken.* No. There's a lack of focus again. Things go all over the place. What could have been achieved in a 15-minute meeting turns into a 3-hour discussion about who-knows-what. If you try to bring it back to the central issue, you're accused of trying to minimize their authority.

Q. Does that have any affect on how the job gets done? *Tony.* If I sit down with

a woman who works for me and take apart her work, she always takes it as a personal rather than a professional critique. We have to get the box of tissues out first, and then maybe I can be constructive. With a man, I get "I understand. Let's go on from here." *Ken.* But if you take anyone into a room and rip them apart it's going to be traumatic. The woman's going to cry. The guy may not cry, but you don't know how he's going to act out later. If I ripped a guy apart and he showed no emotion, I would watch myself going into the parking lot that night. There's got to be a reaction. He's going to screw up somewhere, maybe sabotage something. I'd rather have somebody cry. At least then I see where it is. *Richard.* Men are better at being poker-faced, not showing their reactions or emotions. But inside they grind. Women show more emotion, and they tend to take it out more on other people. There are a lot of women out there who aren't happy with the way their life has gone. And they're not as good as men at concealing that anger or bitterness or the fact that they feel sorry for themselves. *Tony.* To me, emotional behavior in the workplace—except in very rare circumstances—is unacceptable.

Q. What do the women you know say about other women? A. *Richard.* I've heard lots of women who bitched about working for another woman. Women in middle management think their female bosses aren't doing anything to make their lives easier or aren't going to bat for them. I don't think older women want to help the next generation because they feel that they've paved the way and they want other women to pay their dues, too. *Ken.* On the other hand, you get women bonding together against men.

Q. Why do single women make you nervous? A. *Frank.* In some respects, men who have families resent single women. The perception among the top executives to whom we all report is that women who have less "meaningful" lives outside the company are better equipped to succeed. It's unfair. Look, as a husband and a parent, I feel that I shouldn't have to spend endless hours at work to be taken seriously. And no woman who is a wife and mother should have to do that either. I also don't think it's fair to give

women special dispensations. As hard as single women work and as tough as they are to compete with, as soon as they decide to start a family, they're no longer expected to work as hard as a man with a family. And they get away with it.

Q. Can we talk about women as managers? A. *Frank.* A woman manager has to be a lot more careful in how she treats a man's psyche and ego. Men have always been taught to see themselves as the ones in charge. *Alan.* Women managers tend to patronize you before they dress you down, especially if they're older. First they flatter you, then they try to make you feel less experienced or incompetent. It's always worse when a woman uses that strategy than when a man does.

Q. How do you handle that? *Ken.* Sexual tension is the basis of a lot of communication gaps in the workplace. Because when men and women work together, there's this need for the man to dominate, which is sort of natural. That stance is hard to maintain when you're reporting to a woman, when you have to be sort of passive. You have to be sophisticated enough to make it work for you. When I'm irritated about being pushed around, I make sure I know how to handle her. I say things like, "New haircut? It looks terrific." Or "God, you look great in red." *Alan.* "Have you lost weight?" That always works. *Ken.* It's the game. I'm pissed because she's a woman and she's trampling all over my masculinity...If I have to bullshit her, it's part of my job.

...Stephani Cook, *Working Woman*, November 1991

STUDY SHOWS NEWS MAGAZINES IGNORE WOMEN

Women, who comprise 52 percent of the U.S. population, remain substantially underreported in the country's leading news magazines, according to a study by Women in Communications, Inc. The findings of the study "The Invisible Majority" show that references to females averaged 13 percent while men were referred to 87 percent of the time. Magazines studied were issues of

(CONTINUED ON PAGE 47)

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BARBARA WEBER

AN INTERVIEW BY VINCENT Y. DONG

INTERVIEW

WiNR: As the first woman to be appointed a Station Director in the Forest Service, do you see yourself as a pioneer? And does this mean that the "glass ceiling," as it has been called, has been really cracked?

Weber: I don't think of myself as a pioneer, but I know others see me that way. Actually I try not to think about it very much, because it's frightening to think that I'm the first woman in this position throughout all of Forest Service history. I don't like the spotlight that puts on me. But to answer your question, in my opinion, the "glass ceiling" now has a crack in it, but it will not really be broken until the second and third women have reached the Directorial level.

WiNR: Now that we've identified you for readers, let's shift for a bit to your early life—where did you grow up and where did you attend school?

Weber: I was born in Prairie du Chien, Wisconsin, and was raised on a dairy farm near there. I was the oldest of 11 children. I grew up with a great interest in science and the out-of-doors and decided early on that I wanted to work at something that combined both of those interests. I attended a small, private, liberal arts women's college (Viterbo College) in LaCrosse, Wisconsin, getting a bachelor's degree in biology in 1969.

WiNR: Did you ever work as a seasonal for the Forest Service while in college?

Weber: I was first exposed to the Forest Service between my junior and senior years, when I worked at the Forest Service's Forest Products Laboratory in Madison, Wisconsin, in its Summer Student Intern Program.

WiNR: Did you go to work at the FPL after graduation?

Weber: No. After graduation, I worked for a few months as a quality control technician at a subsidiary of Miles Laboratories in Madison. I decided, however, that I wanted to continue my education so in 1970 I went to the University of Minnesota for a master's degree in entomology, with a specialization in forest entomology. I was my advisor's first female graduate student and the last I heard I am still the only female student who completed a degree under him. While working on my master's degree, I met and married my first husband, who was working on his master's degree in wildlife biology. After I finished my

master's degree in 1971, I worked for about a year at temporary jobs with the State of Minnesota and the University of Minnesota. In the meantime, my husband had completed his degree and took a permanent job with the State of Wisconsin. We moved to a very small town in Wisconsin, where I could not find a job using my technical skills. After about a year of unemployment, my graduate advisor helped me obtain a consulting job with the Minnesota Department of Natural Resources for a year. My new job was in St. Paul and my husband's job was 100 miles away in Wisconsin, so we began a commuter marriage in which I was in Minnesota during the week and returned home (about four hours each way) on the weekends. Then in 1973, I had obtained a permanent job with the Minnesota Department of Agriculture where I worked with local communities surrounding St. Paul on the then-rampant problem of Dutch elm disease. My marriage did not survive the strain caused by the long-distance commute. We divorced in 1975.

WiNR: You also hold a doctorate. When did you return to school for that degree?

Weber: It's rather an involved story. My job with the State of Minnesota was closely allied to that of an extension entomologist. I had no career ladder, except to move into my supervisor's position. And all supervisory positions were occupied by men who had been promoted because of their seniority. Because I did not feel challenged by the job itself and because I sensed little opportunity for advancement, I decided to explore other job options. Also, by that time I was interested in returning to school for a Ph.D. degree. I was tired of working for other people in technician-type roles, and I was interested in pursuing my childhood interest in scientific research. In each job that I had until then, I worked for other people on their projects, not my own. However, I knew that my only chance of being allowed to do independent work would be if I had a Ph.D. I knew it would be very difficult to move from being a project worker to that of a project manager without additional training.

In St. Paul I learned of a research entomologist position being advertised by the Forest Service with the North Central Forest Experiment Station's Forestry Sciences Laboratory at Carbondale, Illinois, and I applied for it. I did return to college—to Southern Illinois University, at Carbondale—where I received my doctorate in zoology in 1982 while I was also working full time for the Forest Service. The Government Employees Training Act provided that

opportunity. I was one of three scientists at Carbondale working on a Ph.D. while also working full time.

WiNR: How long did you stay at Carbondale? Did the work provide enough upward momentum to move you into the Director's position at Berkeley?

Weber: In 1975, I started as a junior Research Entomologist. Over the eleven and a half years I was there, I worked my way up to become Supervisory Research Entomologist, Project Leader, and Director's Representative of the Laboratory.

WiNR: While you were at Carbondale, on what did your own research focus? And do you take pride especially in one or two projects?

Weber: My first assignment was to study both the insect and disease problems of black walnut trees. Because of my background, however, I concentrated on the insect problems. I also managed several cooperative research agreements with universities to study both disease and insect pest problems.

My personal research focused primarily in two areas. The first—the subject of my dissertation research—was to study the biology of an ambrosia beetle and its effects on young black walnut trees. Ambrosia beetles are related to bark beetles, but normally they do not harm living trees. The species I studied, however, was introduced into this country and is much more aggressive than other species of ambrosia beetles in its attacks on trees. Little was known about it in this country—its hosts, its predators and parasites, the impact on host plants of its ambrosia fungus, and the identity and the beetle's relationship with its ambrosia fungus as well as with potentially pathogenic fungi. (The beetle grows its own food source internally which is the ambrosia fungus.) Therefore, I studied all aspects of its biology and its effects on growth of young black walnut trees. I concluded that the ambrosia beetle can severely attack three to five year-old trees, but that its long-term effects of tree growth and survival are insignificant.

In my second area of research, I collaborated with other project scientists to determine the long-term effects of walnut insect pests on tree survival, growth, and form. Insects can cause significant and alarming damage to young trees—especially in intensively managed plantations where every tree is managed as a potential crop tree. We hypothesized that the effects of insect attack early in the life of a tree can seriously affect its potential to become a crop tree. I left the project before the end of our planned long-term data collection. However, the results after about five years suggested that insect pests do not apparently cause long-term damage to tree survival, growth, or form, despite heavy populations and relatively heavy damage in some years.

Because so many trees in black walnut plantations are thinned out before the final harvest, we concluded that some insect damage could be tolerated. Enough potential crop trees could still be selected so that broad-scale chemical control of insect pests was not necessary.

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I take pride in my research contributions to an increased knowledge of black walnut pests in general and of the biology of ambrosia beetles in particular. Most researchers would like their study results to show some significant impact (to show how important their research is), but my overall conclusion was that insects are probably not serious pests of walnut. My research provided an honest evaluation of the role of insects in intensively managed black walnut plantations. Such an evaluation was needed because private owners of black walnut trees usually want to control every insect problem they encounter.

WiNR: Did your research afford an opportunity for what is commonly called "technology transfer?"

Weber: Yes it did. I often interacted with walnut growers to educate them about the various insects attacking their trees and to help them decide which ones truly needed to be controlled. That was a highly rewarding part of my research career—to transfer my knowledge and research results into practical information for walnut growers.

WiNR: Where did you go after your stint at Carbondale?

Weber: In 1986, I transferred from Carbondale to Washington, DC, to begin a Congressional Fellowship with the American Political Science Association. After spending nearly a year on Capitol Hill working for both the House of Representatives and the Senate, I returned to the FS as a legislative specialist on the Legislative Affairs Staff in Washington. In 1989, I was promoted to Staff Assistant to the Deputy Chief for Research, and then in January 1991 I was appointed Acting Director of the Pacific Southwest Research Station headquartered in Berkeley, California. Last September (1991), I was named the Station Director. And that finishes the chronology.

WiNR: Have you made serious sacrifices to make your way up the ladder?

Weber: I would have to say family and personal relations have suffered the most from my career ambitions—for example, my first marriage. I have tried hard not to let my career interfere with my second (and current) marriage nor with my relationship with my three-year-old son. However, that is not always easy, particularly when my job requires a great deal of travel. When my son was younger and I was still nursing him, I either took him with me when I traveled or I did not go. The biggest

Barbara Weber is Director of the Forest Service's Pacific Southwest Research Station in Berkeley—the first woman so named system-wide.



sacrifice occurred only recently when I was asked to become Acting Station Director at Berkeley. My husband stayed with our house and pets in Virginia, and I took our son with me to California. Since I did not have someone to care for him while I traveled, I arranged my schedule so I did not stay overnight at meetings. Or I took him back to Virginia so my husband could care for him while I went to meetings. The sacrifice for this latest career move has been two-fold: separation from my husband for nine months (another commuter marriage but one that has worked this time) and the expense of flying us back and forth to Virginia several times. I have also imposed sacrifices on my son for this career move, including separation from his father for as long as three months at a time and all the repeated day-care shuffling.

WiNR: What will be your personal emphasis in your first few years as Director? Traveling around to meet the folks, attending managers' meetings, orientation for yourself, planted behind the desk grinding out the work, what?

Weber: I need to do everything you've mentioned, but my initial emphasis is to get to know the Station as quickly as possible. Within the first five weeks on the job, I had visited each of our five field locations plus the headquarters, except one. That one I visited within four months of being on the job. I will continue to make frequent visits to the field. I believe it's very important for me to meet and personally know the people at the Station and for them to get to know me. They need to know that I'm a real person who is accessible and highly interested in what they're doing. If I'm going to be an effective Station Director, I want to be able to speak knowledgeably about individuals and their work. I also need to be able to represent the Station to others when I'm back in Washington or at meetings away from the Station.

WiNR: How would you describe your personal management style? And does it differ from the "traditional" style of managing Forest Service Research Stations?

Weber: I would say that my personal management style is open and participatory. The traditional FS style is probably less open and tends to be more autocratic. A particular style really depends on the situation and on the individual. I try to adapt my style to fit the situation, using an autocratic style only when the participatory style does not work to get the desired effect.

WiNR: Do you like supervising people?

Weber: I like supervising in the sense that I like to find a person's strengths and build on those strengths, and yet at the same time work around a person's weaknesses. What I don't like about supervising is the personal energy it takes to deal with interpersonal conflicts or with people who have no thought for anyone else besides themselves. I am also rather reserved and have a strong sense of responsibility to my job, which sometimes makes it hard for me to "manage by wandering around." My thought when I do is that other people are busy, too, and do not want to be interrupted by someone whose only agenda is finding out how things are going. I recognize, though, that most people appreciate being asked how they are and how the job is going.

WiNR: Are the people in FS research educated quite differently than other FS folks? In what way, if so?

Weber: Well, I think it's pretty well agreed upon that people in the Research Branch are generally more highly educated than those in other branches of the Forest Service, although the number of people with master's and Ph.D. degrees in the National Forest System (NFS) and State and Private Forestry is increasing. Education for research scientists has historically started with a bachelor's degree in forestry and then proceeded on to specialization in some related technical field for the advanced degrees. This pattern is changing somewhat as more scientists are now entering the FS without a forestry degree. I did, for example. I know one woman with a bachelor's degree in fine arts, who decided painting wasn't a well-paying job and went to work for the FS. She is now a District Ranger, but not before she went back to school and obtained enough forestry credits to qualify her for a forester position. I know another woman with a Ph.D. degree in education who is working her way into the higher ranks of State and Private Forestry. Having said that, however, it is still true that those in the FS still tend to have forestry degrees.

WiNR: As long as we are talking about education, let me ask you if you think degreed students coming out of college are as well prepared to do research as you want them to be? If you were to advise faculties on how to better prepare students, what would you tell them?

Weber: The new people we hire into research positions have Ph.D. degrees. People with newly earned doctorates are not always as well equipped as we would like—particularly if the graduate advisor has not pushed them to publish the results of their research dissertation. We find that these

students are slower to get started in their own research programs and are often slower to get results published. "Post-docs" are much more experienced with starting research programs and publishing research results. Because of the large number of people now available in the job market with Ph.D.'s, we generally do not hire below that level for research scientist positions. However, we do hire at the master's level for professional positions, which require specialized technical skills. Professionals always work with a research scientist.

WiNR: Doesn't that create ceilings beyond which professionals can't go?

Weber: Sometimes it does. But we have also sent some of our technician and professional employees back to school for further education and advanced degrees. At the Station, we recently converted a woman employee from a professional to a research scientist position. In her case, one of our research work units experienced a vacancy when one of its research scientists accepted another position. Although funding was tight, we advertised it as an entry-level research scientist. This was sufficient for a woman professional within the same research work unit to qualify for the position because she had a Ph.D., substantial research experience, and some publications.

WiNR: Do you interact with universities about what you need? And if not, should you not do so?

Weber: We do interact with universities about the kinds of students we need, primarily about the technical skills needed, but not necessarily about the research skills needed. We still leave that up to the graduate advisors. A natural sorting process is at work here, in that Ph.D. students without a strong research background or with a poor publication record are considered less qualified. I think the FS, including the Station, needs to interact more often with colleges and universities to help keep school curricula relevant to its needs.

I also think we need to do a better job of communicating outside the traditional schools from which we recruit students, in order to increase the diversity and talent pool of our employees. We are beginning to do that—to interact on a more formal basis with 1890 Historically Black Colleges and Universities to help them develop programs that will help qualify their students for careers with the FS. The Station and the FS Regional Office in California recently signed a memorandum of understanding with the Oakland School District, Merritt College, and the University of California at Berkeley to work with a select group of urban, minority high school stu-

dents. We intend to expose them to FS employees and the kind of work we do. We also intend to work with the schools in developing the curricula and positive experiences the students will need throughout their high school, college, and post-graduate years so that they will want to consider a FS career after they graduate, whether it's in natural resources or on the administration/business side of the organization.

WINR: How is research in the FS organized—by Region, too? How many people are in research Service-wide? How many of those are women? Are there enough women?

Weber: Forest Service Research is organized into eight regional research Stations and the national Forest Products Laboratory. The boundaries of the Stations do not correspond to the boundaries of the Regions of the National Forest System. The Deputy Chief for Research oversees the Research Branch, which has six technical staffs in Washington, D.C. The six staffs deal with Forest Environment Research, Forest Fire and Atmospheric Science Research, Forest Insect and Disease Research, Forest Management Research, Forest Products and Harvesting Research, and Forest Inventory, Economics, and Recreation Research.

In Research, the number of permanent employees nationwide as of July 1991 totaled 2,439, of whom 724 are research scientists. Of the 2,439 total, 42 percent are women. And among the 724 research scientists, 94 or nearly 13 percent are women. The Pacific Southwest Research Station has 222 employees, and 55 percent of them are women. Of the 59 scientists at the Station, 15 are women, and four of them are Research Project Leaders as well.

These statistics for Research contrast with the Forest Service as a whole. Of the 33,781 permanent employees in the FS, 38 percent are women, primarily in the clerical and administrative series. As for whether there are enough women in Research, no, I do not believe that there are enough—particularly in the higher grades.

WINR: Is there a pecking order in the Research Branch? That is, are certain professions on a faster track to the top than others? Is some research work considered more important than others? And are there certain elite Research Stations and certain kinds of work that have a higher profile than others?

Weber: Foresters were traditionally the ones who could expect to advance to the highest levels of Forest Service Research. If it seemed that a non-forester had made it to those levels, a deeper look into his background showed that he (and they were usually males) had started out as a forester or had the requisite degree in forestry. This has changed just in the past 10 years or so as more non-foresters have entered the organization.

Research economists are advancing well today and are probably disproportionately represented in higher positions. And a number of research entomologists and pathologists have attained higher positions. But, I attribute that to funding cuts in insect and disease research work units during the 1980s, which caused many positions to be closed out. Some of those scientists not eligible for retirement shifted into administrative positions and are now moving up the ranks. A budget cut in my research work unit in Carbondale is what caused me to look for other jobs within the Forest Service. I really believe that because the organization had to cut out lower priority research during the budget crises of the 1980s—and so many cuts were made—that only high priority research is left. All of it is important.

WINR: Research Stations have been around for a long time now. Over the years, have any of them gained wider support or attention than others?

Weber: Our eight Stations and the Forest Products Lab have all been in existence for many years. For example, the Pacific Southwest Research Station recently celebrated its 65th anniversary. Some Stations

have a higher profile because of the management issues within their geographic boundaries; the Pacific Northwest Station, for example, has high visibility because of the scientific and management issues surrounding the northern spotted owl. The territory of the Northeastern Station includes West Virginia, which receives a lot of attention and money due to Senator Robert Byrd's influence in the Senate. The Southern Station includes the Institute of Tropical Forestry in Puerto Rico as one of its research locations, which has received lots of Congressional support in recent years as tropical forestry issues have gained greater attention. Those of us here at the Pacific Southwest Research Station are noted for tropical forestry work in Hawaii and the Western Pacific Islands, and for fire research on urban/wildland interface issues in heavily populated California. Other Stations are considered highly desirable for other reasons, such as the location of the headquarters office, proximity to mountains or water, or the relatively lower cost of living there.

WINR: Would you say that the future for individuals going into FS research is brightening or holding or declining? And specifically, why?

Weber: The future for individuals in research is brightening as environmental issues gain in importance. And that is because within the Forest Service, the Research Branch is being looked to for answers to many of the management and resource problems affecting the National Forests. For example, research wildlife biologists are making significant contributions to the management issues surrounding threatened and endangered species, such as the spotted owl and the red-cockaded woodpecker.

WINR: How is your funding determined? By activity, numbers of people, numbers of projects, or other criteria?

Weber: Well, our budget process is very complicated. Planning budgets for future fiscal years is based on the previous fiscal year's appropriated level, the previous year's President's proposed budget, and a benchmark level, which is an internal planning level. Budgets are planned and developed at five different planning levels and pass several layers of approval. These include the Washington Office Research technical staff; FS Program Development and Budget Staff; the Chief; the U. S. Department of Agriculture; and the U. S. Office of Management and Budget. Final approval of our budget, of course, is by Congress.

Research is planned and budgeted as projects fit within the national strategic plan, which was developed between the Station



Weber with Congressman Doug Walgren of Pennsylvania.

Directors and the Deputy Chief for Research, with concurrence from the Chief. The national strategic plan emphasizes three broad areas of research: understanding ecosystems; understanding people and natural resource relationships; and understanding and expanding resource options. Each Station has also developed its own strategic plan for research, with Station strategic plans fitting within the national strategic plan. The Pacific Southwest Research Station has six research emphasis areas that fall under the national plan. Our short titles for them are: global change, forest and wildland ecosystems, water resources and aquatic environments, tropical forestry, fundamental sciences, and social aspects of natural resource management.

WiNR: What was your funding in the last fiscal year compared, say, to 1985?

Weber: The Station's funding level for FY 1991 was \$14.9 million. This compares to \$8.6 in 1985, in 1985 dollars. Even though our budget appears to have significantly increased since 1985, in actual dollars we are just keeping up with inflation.

WiNR: Are there any major new projects you are asking money for, or any on a decline to phase out?

Weber: We don't have any major new projects for the near term, other than the ones already identified as our six areas of research emphasis. And no, we have no plans to phase out any of our current research programs, unless future budgets compel us to do so.

WiNR: Are politicians ever helpful to someone in your position? Do you have to clear everything with your boss if you "go" political? How much leeway do you have to wheel and deal? Do women do that well as a rule?

Weber: Politicians are very helpful to us in that they vote on the Research budget, and they express interest in the Station's research programs within their district or their jurisdiction. I notify the FS Washington Office before I meet with a Member of Congress or his or her staff, and I report briefly on the meeting afterward. I am not restricted in what I say to that Member, as long as I do not lobby for money or make statements in opposition to FS policy or official Department positions on a particular piece of legislation. That still leaves me plenty of room to provide information, answer questions about our research program, or discuss potential expansion of current programs or new research areas. And I'm not really sure how I would define "wheeling and dealing." I think of it as



being very aggressive in getting what one wants, with a certain lack of scruples in the process. If that's how it is defined, then I don't think women do it well. If, however, "wheeling and dealing" were defined simply as being able to reach a compromise decision in the midst of conflict and turmoil, then I think women do that extremely well.

WiNR: Because of its location in northern California, the Pacific Southwest Research Station, it is said, lacks the visibility to be truly effective or to be able to compete with its "neighborhood" research organizations. How do you react to such impressions?

Weber: I guess I'm an optimist on this one. But it is true the Station must compete—for visibility, dollars, and people—with major California universities, Silicon Valley companies, and several major research laboratories in the northern California area. I suppose this competition can be viewed as a problem, because we are certainly much smaller in comparison. I see it as a challenge, however, particularly in the area of public affairs and public outreach. And for the most part, we carry out very specialized research in areas in which we have few competitors. We also have strong supporters in certain areas. I am not aware of any really serious problems recruiting people to come work for us. Cost of living is one of the reasons why people might decide not to work for us, but that impacts the other larger organizations equally.

WiNR: Anyone in California has to answer some Consent Decree questions. In the long run, will the agonies over the Decree be worth it?

Weber: The Forest Service has learned a great deal from the Consent Decree, and the Station has benefited over the long term. We now do a much better job of reaching out

to and recruiting women. Our improved ability can be used to expand recruitment opportunities for minority groups as well. We are now also much more sensitive to issues affecting the work environment, for both women and men. After recruitment and outreach, retention is our next biggest area of emphasis within the Station.

WiNR: Has there been any backlash from white males in your Station?

Weber: Within the Station I have not detected any significant backlash from white males. Of course I have heard of concerns about preferential treatment for women or the corresponding complaint about lack of a woman's qualifications. I don't think there are many who feel that way. My own management team is extremely supportive of the Consent Decree in general and to making it work for the Station. The support is already there for the Consent Decree, and that is largely due to efforts by the previous Station Director, Ron Stewart, before I arrived.

WiNR: How much time, if any, do you spend on affirmative action issues or in litigation involving discrimination?

Weber: I spend almost no time on issues related to discrimination, because discrimination complaints at the Station are rare. As for affirmative action issues, we are working to implement the national FS report on Work Force Diversity. We intend to use the model the Station developed to implement and carry out actions under the Consent Decree for expanding multicultural diversity.

WiNR: Will that be tough for you to do?

Weber: No. My role is to show strong support for increasing Station diversity in all senses of the word "diverse." I need to become aware of what it means to become

culturally diverse and to understand what different people think it means. I need to know where potential problems are and act immediately to prevent them from becoming impediments to diversity. Basically, I need to become even more sensitive to people and their concerns about relationships with their co-workers. My role as Director is to set the tone and climate for the Station in which all employees feel valued for who they are and for the work they do.

WiNR: You are the first Station Director who we know of who must also care for a small child. Is the problem of day-care something the Forest Service should be concerned about?

Weber: The FS—and all of government—should be concerned with the problems associated with day-care for children, and I might add for the elderly as well. Working parents are now the norm for most families. The biggest problem is for single parents who do not have a back-up person to help care for the children. I have become highly aware of single-parent concerns over the last several months while I cared for my three-year-old son in California and my husband had to remain in Virginia. Any parent, whether Station Director or not, has concerns about who will take care of the children during the day and how good that care is. Additional concerns for single parents include overnight travel; meetings or training sessions that start or end at times other than the usual start/stop hours; sick children; and missed social or educational opportunities or both that either provide relaxation or career enhancement. Many of these same prob-



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lems apply to those who care for their elderly parents or another dependent. The Forest Service is making some changes, but its policies still favor the traditional family way of life.

WiNR: How have you been able to balance a full-time professional career with family responsibilities? And what is your husband's role currently?

Weber: I have been able to balance my professional career with family responsibilities with a lot of juggling of my personal and professional life, and a lot of compromises along the way. I have also had some guilt about what I have done or am doing to my son and my husband with my career moves. So far, my husband is supportive, and my son thinks this hectic life is normal. My husband, Jim Doolin, just recently joined me in California. He left Virginia with a fresh bachelor's degree in biology, which he has pursued full time over the past two years. He does not yet have a job and is still looking. At the same time, the home we bought needs a lot of work, which could occupy him full time for the next several months. He is experienced in home improvement because he was employed in the home improvement retail sales business several years ago. He now finds his career interests returning to that area, although more along engineering lines than in retail sales. Jim very likely will return to school for an advanced degree within the next year or so.

As to how we divide up work at home, we have settled into certain roles without a lot of discussion because they feel natural to both of us. I am the primary caregiver to our son, Michael. Jim takes on that role when I am traveling, and he enjoys the time alone with his son. Since I hate housework and since Jim actually enjoys it and is the neat one, he is the one with primary responsibility for that. We both do laundry, cooking, and dishes. Because my husband is younger than I am, we have jointly agreed that my career takes precedence now. But as his career begins to take off and I am ready to phase back my own, then probably we will follow his career.

WiNR: As Station Director, you serve "at the pleasure" of the Chief of the Forest Service, and have no "Civil Service" protection in that capacity. Do you find any cause for concern in light of what has happened to Regional Director Lorraine Mintzmyer of the National Park Service and Regional Forester John Mumma of the Forest Service?

Weber: Since becoming a member of the Senior Executive Service (SES), it's true that I serve at the pleasure of the Chief, and that I am subject to different rules now than before I became Station Director. The rea-

son the situation is unsettling right now is that SES members have generally not been transferred to other positions, except by personal request. Now it appears that managers may be exercising more often the option that has always been available to them. I have no particular concerns for my own job now, however, as a result of the recent controversy over Lorraine Mintzmyer and John Mumma. SES members understand that upper management has a right to place people where they will be most effective. Of course, no one believes that this could happen to oneself.

WiNR: What will be next for you?

Weber: I am very content to stay in place for a while as Station Director. That has been my career goal for some time. Now that I've reached it, I don't feel the urgency or interest to begin immediately planning for the next step up. Also, I am still relatively young (as a Station Director), and I'm not in any hurry to get to a different place or position. I want to get to know the Pacific Southwest Research Station well and to do a good job as its Director. That will take some time.

Interviewer Vincent Y. Dong is Station Editor, Pacific Southwest Research Station, USDA Forest Service, Berkeley, Calif. He earned journalism degrees at the University of Minnesota. He has been a FS Station Editor since 1968, and earlier was a Senior Editor at Field Enterprises Educational Corporation in Chicago. His profile of Forest Service scientist Marjorie C. Falanruw appeared in Vol. 3, No. 3 (1986) and of Jacqueline L. Robertson appeared in Vol. 9, No. 4 (1988) of Women in Natural Resources.



IMPERILED SPECIES DEPEND ON THE CAREFUL SURVEY WORK OF COMMITTED PEOPLE. WHEN DOES THAT COMMITMENT APPEAR IN ONE'S LIFE?

WENDY PHILPOTT: WILDLIFE TECH

KRISTI KANTOLA

Six California spotted owls stare down at visitors from Wendy Philpott's living room. They are part of a collection of photos of sensitive, threatened, or endangered species that line a wall. Also featured are a San Joaquin Kit Fox, a blunt nosed leopard lizard, Kern Canyon Slender Salamander, and a Shirley Meadows Mariposa Lily. All are species Philpott has worked with during her years in various wildlife aid and wildlife technician jobs.

Since her early years, while growing up in Sanger, California, Philpott knew she wanted to be a wildlife biologist. "I spent hundreds of hours as a child reading books about wildlife, and especially about raptors," she said. By the time she was eleven years old she had worked out a plan to become a wildlife biologist. It included getting a Bachelor of Science Degree in wildlife biology and going to work for the Forest Service. "I had an uncle who worked for the Forest Service, and as a child I listened to him talk about his work. I made up my mind early about what I wanted to do."

The route she took is rather indirect, however. After high school, she managed pet stores, clerked for United Parcel Service, and officiated at basketball games. "I wasn't ready for college right away and I was not able to get any financial assistance for college, either," she said. During her free time, she volunteered at the Fresno and San Francisco zoos.

Her mother saw an advertisement for a lab assistant working on an endangered species study. Philpott was hired for that work by E.G. & G. Energy Measurements Inc. (Elk Hills, California) and began working on a study funded by the Department of Energy. She worked on oil and gas sites (Naval Petroleum Reserve # 1). Her study concerned the San Joaquin Kit Fox and their reproduction rates, dispersal distances, home range size, mortality rates, and distribution. To be able to study them, she trapped and



radio collared or ear tagged them for identification purposes, and gathered weight, condition of teeth, sex, and body measurements information. Using radio telemetry, she monitored daily movements and mortality rates. She found their home range by triangulation methods. To discover the presence of the kit foxes, she would set up scent stations using scent tablets to lure in animals. Then during the early morning hours, she returned to read the animal tracks. Her work also included: trapping, toe clipping, weighing, and taking measurements of the Giant Kangaroo Rat, and reporting sightings of blunt nosed leopard lizards.

Since September 1988, Philpott had taken courses at Bakersfield College and California State University at Bakersfield while working full time. "I realized that the only way I was going to accomplish my goal of ever becoming a wildlife biologist was to go to school." In 1992 she will become a junior at California State University Fresno.

Currently Philpott is a wildlife technician on the Greenhorn Ranger District of the Sequoia National Forest. Her first summer (1990) she collected data on the California Spotted Owl (reproduction, habitat type, and population), trained temporary personnel, and wrote reports. During every owl sea-

son—March through August—she spends her nights hooting for owls. For the 1991 field season, she recruited, hired, trained, and scheduled all of the crew and determined logistics for all of the wildlife projects. The crews worked in areas to be surveyed for spotted owls, snags, condor trees, and furbearer camera stations. At the end of summer, she checked paper work and wrote reports.

Planning for the 1992 work has already begun and she is doing literature reviews on goshawks and researching management recommendations for seeps and springs. Other tasks are continuations with variations of the 1991 schedule. There are seven S & T & E species on the District. The number of years of survey and research work varies with each species. Some have taken 10 years to bring to listing, so there is no dearth of scheduling activity.

Her work provides the highs and lows associated with most field work, plus the usual humorous ones. Her hooting has attracted growling black bears and she has spent more than one night sleeping in the cab of her truck in the field because she was too tired to drive. She receives strange packages like urine scented tablets which have not helped her maintain friendships around the office. Although working hours that are set by owls does not make for much of a social life, Philpott says her work is great and she would not give it up. "I love what I'm doing. It's what I've always wanted to do."

Kristi Kantola is currently the Interpretive Services Group Leader for the Alaska Region of the Forest Service. Her Bachelor's is in Recreation from California State University Fresno. She began working for the Forest Service as a seasonal interpreter while still in college in the 1970s. She worked for six years on the Sierra National Forest, then in 1977 transferred to Alaska to work for four years as the Regional Environmental Education Specialist. For nine years after 1981 she stayed home (in Alaska) to raise her children. In 1990, she became Public Affairs Officer on the Sequoia National Forest where this article was written.

SOME ENDANGERED SPECIES LIVE IN SPECTACULOUR SURROUNDINGS. BUT SOMETIMES THOSE PLACES ALSO ENDANGER THE HUMANS WHO WANT TO STUDY AND PROTECT THEM. BUTTERFLIES MAY NOT BE AS GLAMOROUS AS GRIZZLY BEARS BUT THEY ARE JUST AS IMPORTANT TO THE ECOSYSTEM.

MADAME BUTTERFLY

ELAINE ZIEROTH

I transferred to the high country of Colorado with the US Forest Service in 1979. Soon after my arrival, the Forest Biologist briefed me on my wildlife and fisheries duties. He was finishing his list when he remembered something which brought a smile to his face.

"I almost forgot the butterfly," he said with a chuckle. "Supposedly two researchers from Yale University were hiking to the top of Mt. Uncompahgre in the Big Blue Wilderness Area and found a new species of butterfly. It lives at 13,600 feet in elevation and only survives as a butterfly for two weeks every year. You will need to check this one out."

I thought, here we go having some fun with the new kid. What a story. But as I rattled through my new desk, there was the report by the scientists from Yale. They described the Uncompahgre Fritillary Butterfly *Boloria acrocneuma* as a small, drab, orangish-brown critter that you probably would never notice. It lives on snow willow, which is a tiny plant that hugs the alpine tundra. The butterfly flies low to the ground and lays its eggs on the willow. Its whole life consists of hatching from the egg and living a few days as a larvae, then waiting until the next summer to emerge as a butterfly for a brief fling of sex and egg laying. It may only travel a few feet in its brief lifetime. It has the smallest range and population of any butterfly in North America.

I had to time my first pilgrimage to the mountain carefully so I would not miss the flight season. I had to drive to Lake City and then take an old mining "road" to the trailhead. The road was almost as wide as the jeep in places and featured several memorable stream crossings. Any wrong moves would be rewarded with a 2,000 foot drop to the bottom. If you encountered another vehicle on the road, you doubled the hair-raising quotient by going in reverse over the treacherous terrain.

The trailhead was at 11,000 feet in elevation and the trail made a steep three and one-half mile ascent to the top of Mt. Uncompahgre, the tallest peak in the San Juan Mountains at 14,309 feet. The trail crosses fields of alpine flowers, cold streams flowing straight from glaciers and patches of late July snow. The oxygen seems to give out long before you reach the top of the peak. Indian artifacts, however, have been found on this peak. Since there is no cover for game and no obvious reason for them to climb this high, you can only speculate that the Utes sought some spiritual or aesthetic prize here.

The butterfly habitat is an undramatic side slope just below the knife-edge ridge making the final ascent to the top, the coldest, wettest part of the mountain. The trail goes right through the habitat, but since the slope is steep, most hikers do not stop here. Sheep have grazed the mountain for almost 100 years, at times in very large flocks. There does not appear to be any damage to the habitat due



to grazing, however, and it is possible that grazing actually maintains the important plant species.

The population of butterflies had been estimated at 700 and no additional colonies were known when I started puzzling over what to do next. The species is apparently related to an arctic species that comes no farther south than Canada. This population appears to be a glacial isolate, which is a species that migrated south with the glaciers and got stranded on the top of a mountain when the glaciers receded and surrounding areas became too warm. Over the centuries of isolation, it evolved into a separate species.

In 1979, citing the Endangered Species Act of 1973, the butterfly was proposed to the U.S. Fish and Wildlife Service as a candidate endangered species. The species was gaining some attention by 1980, mainly due to an article published by Dr. Larry Gall, the finder of the colony. The article published exact locations of the colony and alerted every butterfly collector in the country. In the meantime, the U.S. Fish and Wildlife Service ruled that the fritillary appeared to be a candidate species but more data was needed and they did not have time to deal with it then. I was faced at that point with protecting a rare species that had a market value of several hundred dollars per specimen, with no legal authority or budget to back me.

I had read stories about the lengths to which collectors would go to get butterflies and bird eggs for collections, but I began to meet some characters myself. One mysterious, bearded man—wearing pink tennis shoes—camped at the trailhead. He showed me his



VOLUNTEERS CLIFFORD LEE AND CRIS DIPPTEL

collapsible butterfly net that fit into a pocket. This was nicknamed the "Park Service Special" since it was designed to sneak rare specimens out from under the watchful eyes of Park Rangers. He admitted capturing many specimens. He also marked with a felt-tip pen the wings of individuals that were not perfect specimens before he let them go. He would then record any individuals that were recaptured and get a rough population count. The population was low in 1981 and I wondered if the handling, marking, and collecting had an influence.

In time, I became aware that the population had a two-year cycle and that even-year populations were totally separate from odd-year ones. This accounted for the wide fluctuations in populations from year to year. The odd-year population from Mt. Uncompahgre may now be extinct. Electrophoretic studies done in 1989, after I left Colorado, revealed low genetic variability, which indicates poor ability to adapt to changes in the environment. The species is literally subject to the whims of weather. A late season snowstorm or extreme drought could wipe out most of the population.

I was having fun figuring what to do with the butterflies and my colleagues were having fun with me: I was already the butt of many office jokes. I received a pink lace butterfly net and tennis shoes at the Christmas party and people started to call me "Madame Butterfly." The District Ranger publicly complained that he felt it was unfair that we got a butterfly rather than a grizzly bear or wolf population. Butterflies are not glamorous as rare species go.

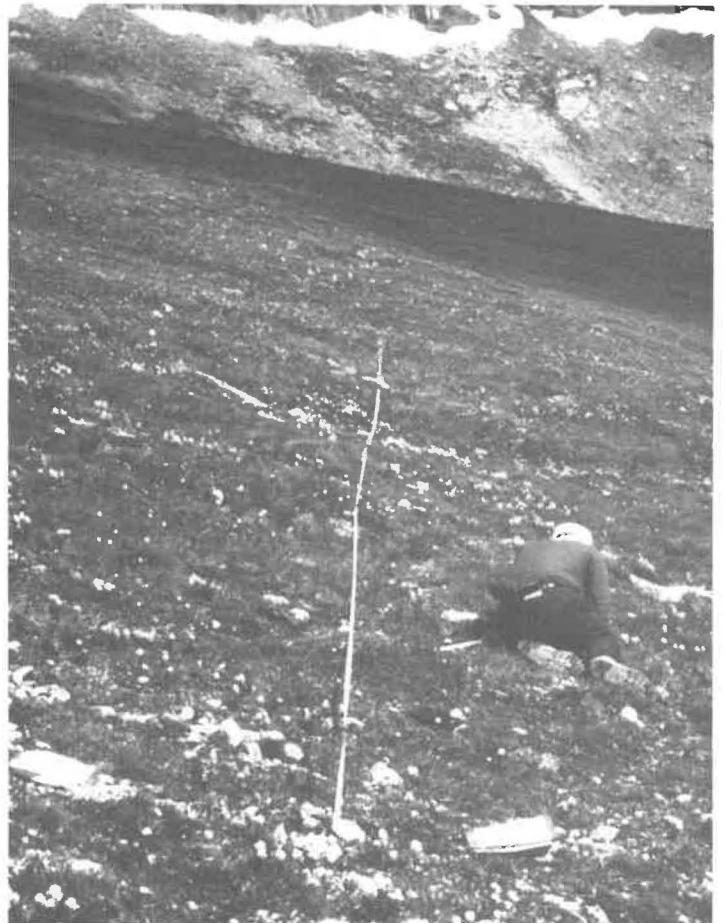
By 1982, I had a strategy. I had found two very small colonies elsewhere on the mountain and noticed that they too were on steep, northfacing slopes near the top of ridges, just like the original colony. These were probably colonization attempts or wind-blown butterflies and I never found specimens at these sites again. The significant thing I learned, however, was that the butterflies appeared to prefer certain characteristics of the habitat. I used topographic maps and aerial photos to locate all sites on peaks within 50 miles which matched these habitat conditions. I ended up with about 14 potential habitat areas.

That same year, I talked to Dr. Seth Adams at Western State College which was near our office in Gunnison. We worked out an agreement where biology students could volunteer to work on various projects during the summer and compile their results for college credit. We started three of the students monitoring butterflies. They camped out at the trailhead to check the habitat area every day during the flight period, gathering information about the plants and animals. We wanted to know about potential predators and disturbances to the site. We also gathered information about

food plants, cover, and human impacts. The presence of the students also helped to prevent collection from market hunters.

Adams also had a summer school class who helped me search for colonies on other peaks. I hated to share the fun of tackling the 14,000 foot peaks myself, but with only two weeks to find butterflies each year, I needed help. We did not find any new colonies. I began to doubt my new system when Dr. Gall made another trip out from Yale. He asked if there were any potential habitat areas left for him to check out. I could only think of one with potential that I had not checked out because it was under Bureau of Land Management jurisdiction. Dr. Gall returned two days later, very excited, because he had found a large colony right where I had put the X on the map. He estimated there were 500 butterflies in all. I had a difficult time convincing him to keep the location of this site a secret.

In 1983, Dr. Adams and I brought a new bunch of eager students to the mountain. I remember hiking to the top of Mt. Uncompahgre with all of them and the students' pet marmot Albert. We soon saw one of those fast moving, violent thunderstorms developing. These storms can be dangerous, especially when lightning hits the tops of the peaks—so we started back down. We warned two men heading up, but one of them gave me a spaced out look and said "Yah, I know, isn't it great? That's why we plan to camp on top tonight." Visions of helicopters and body bags flashed through my mind, but I never heard anything more about them.



CLIFFORD LEE MEASURING ALPINE VEGETATION ON MT. UNCOMPAGHRE

By the time we reached the trailhead, the rain was coming down in sheets, reminding me that butterflies were not the only creatures endangered by weather in these mountains. Adams and I left the students in their tents and we headed down in the jeep. Part of the road had slumped away and we were forced to drive at a frightening angle on the sidehill where half the road was gone. Just as we reached the good part of the dirt road, we were stuck crawling along behind a large Caterpillar: at every wide spot, he hogged the center and would not let us pass. I figured that he was one of the local miners and maybe this was his statement to the Forest Service. Adams, usually very temperate, contemplated violence as we crept along for miles. We rounded a corner, however, and saw the reason for the Cat operator's behavior. The entire hillside had slumped onto the road and he had been sent to clear it. He did not want our vehicle to get between him and the work.

I began to work with the BLM in 1983 to draft a Conservation Agreement to identify critical habitat needs for the butterfly and begin to protect the colonies from human-caused disturbances. When we checked out the new, secret colony, I was dismayed to find a note left on my truck from some collectors who beat us down the trail. They were bold enough to leave their names and the number of butterflies they had bagged. They assumed that with no formal listing of the species, they were safe from legal action. I was concerned about how they discovered the location.

After some detective work, I tracked the collectors to Salt Lake City, Utah, and found to my surprise that they were Forest Service employees. They had somehow abused the internal information system to get the location of the colony. Talking to them directly made no impression so I went to their supervisors. I was further dismayed to get no reaction from them. "Who cares about a bunch of silly butterflies" was the only response. Clearly we could not protect the butterflies without formal listing by the US Fish and Wildlife Service, but we were able to put a closure on the Mt. Uncompahgre site that would prohibit their collection. In addition, the Colorado Natural Area Program worked to get the original colony declared a Natural Area which afforded additional protection. BLM regulations, however, did not allow for such a closure on the colony under their jurisdiction.

After this activity, we started receiving letters from scientists from all over the world. The efforts to get the species listed as endangered brought support from lepidopterists from as far away as England and Australia. I was amused at the detailed accounts from these scientists who never came within 100 miles of the colony. We pretty well knew everyone who had climbed the mountain during the flight season since the species was discovered, and none of these specialists was on the list.

After more prodding, US Fish and Wildlife sent a botanist out from the east. This man was in his 50s and not a field person, but he would not be persuaded to ride a horse. He thought them devious. He hiked almost to the top before telling me that he had undergone open heart surgery some years before. We were within one half mile of the top when he told me that he had altitude sickness. When we got to the site, he collapsed on his back and closed his eyes. Visions of helicopters and body bags again! Fortunately he revived in 20 minutes and I couldn't get him out of there fast enough.

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FROM LEFT: PAUL SENTENEY, DALE SHANHOLTZER, ELAINE ZIEROTH, RAY EVANS

There were other incidents, some of them again due to the difficult terrain, and some due to my taking advantage of unwary colleagues. For example, one time I drove a BLM biologist to the Uncompahgre trailhead and watched the usual nervous shaking the whole seven miles. At the end of that stretch, I spied an old mining trail and a bridge with only two rotten logs remaining across the creek. I asked him to get out and guide me across. At that point he cracked, refusing to go on. Once I started to laugh, I decided it best to lock the doors on the jeep for a few minutes until he got over his violent notions.

I transferred from the area in 1984 just after finishing the Conservation Agreement with the BLM. The USF&WS never would sign the agreement, stating that more protection was needed. I felt that since the colonies were in wilderness or wilderness study areas, most disturbing factors were controlled. The biggest threat was from collection—formal listing as an endangered species would only bring more publicity and a higher price on their heads.

A few months ago (summer 1991), I received a document from the USF&WS that proposed formal listing of the butterfly. I had to chuckle. For 12 years we have been trying to get people interested in this species and have struggled to learn about it and protect it with no budget. I even joked once about selling a few butterflies to raise a few dollars for expenses. Now, suddenly, there is enough concern to give the species the highest protection under the law. Sheep no longer graze the area and the trail has been completely rerouted.

Additional data were collected in 1987 by Dr. Peter Brussard. The population numbers appear to be even lower than before and several drought years may have caused additional stress. The species has limited ability to adapt or respond to changes in the environment. With or without interference by humans, the outlook for the species is not good. It seems that the butterflies have clung to the top of the mountain under the harshest of conditions for centuries, only to be discovered on the brink of extinction.

Elaine Zieroth is District Ranger on the Tonasket Ranger District, Okanogon National Forest in the state of Washington. She has worked in wildlife biology in California and Colorado since 1972. Zieroth is an editor for Women in Natural Resources.

SINCE THE ENACTMENT OF THE ENDANGERED SPECIES ACT OF 1973, A LOT HAS BEEN LEARNED ABOUT SOME SPECIES.

THE BALD EAGLES OF NORTHERN CALIFORNIA: A STUDY

KATHERINE L. GRAHAM

The bald eagle has been listed as endangered in the United States since 1973 in 43 states and has been listed in California since 1974 (Forbis 1975). Some researchers (Amadon 1981) doubted whether the bald eagle should be separated into two subspecies. Other researchers, however, have divided them. For the purposes of this study, the data relates to the breeding behavior of the Southern bald eagle subspecies in northern California. The Southern bald eagle described by Bent in 1937 showed a decline in their nesting success (Heinzman 1961 and Snow 1973).

The population status for the Southern bald eagle for the 48 contiguous states as of 1981 was approximately 1400 to 1500 pairs. Of that number there were an estimated 265 breeding pairs in the Pacific northwest states of Washington, Oregon, and California. Fifty-seven of the 265 pairs were estimated to nest in California (Green 1982). The breeding season runs from January or February to early September (Forbis 1975).

This study was part of a continuing study done on a bald eagle pair established in the study site since 1984. As of 1991, the study was still ongoing, conducted by volunteers under the supervision of Forest Service personnel (Uhd 1991).

Objective

The objective of the 1986 study, of

which I was a part, was to describe the breeding behavior of a bald eagle pair established in the territory since 1984. These eagles were in their third year of breeding. Sexual maturity begins at an age of five or six years. The pair, at the time of the study in 1986, was assumed to be about seven years old. Another pair of eagles had occupied the nest site in 1980-81 until the female eagle disappeared sometime in 1981. The present pair moved into the nest tree in 1984 (Mendez 1986 and Uhd 1991). Data were collected to determine any correlations between food supply, time of nesting, and fledgling success. Human disturbance and its possible effect on nesting success was also studied.

Study area

The nest site region in California was characterized by a Douglas-fir forest. Elevation was at 3130 feet and within 505 feet of a nearby reservoir which ran approximately north and south and is a quarter to half mile wide at the widest point. The reservoir was used for recreation, fishing, boating and camping during spring and summer, with some use year-around. Loggers were cutting timber in nearby sales, but not along the reservoir shoreline.

Spring temperatures ranged from 30F degrees to 84F in May, and 40 to 90F degrees in June. Spring precipitations ranged from .09 to 11.50 inches.

Douglas-fir, ponderosa pine, Oregon white oak, California black oak, Pacific madrone, and manzanita were the predominant vegetation within the study area. The nest tree, a Douglas-fir and the largest tree in the timber stand, was approximately 203 feet in height by 6.7 feet dbh and

situated on a ridgeline above the surrounding trees. The nest, constructed in a forked area on the tree bole, was about 164 feet above the ground. Foliage provide shade and cover to the nest from above. Diameter of the nest was 57.2 inches by 59.1 inches, and 26.7 inches deep (Lehman 1984). The nest was approximately five to six years old.

Methods

I observed the behavior of the bald eagles March 1 to July 2, 1986 between the daylight hours of 8:30 to 5:30. I used a 60X spotting scope, 130X Questar telescope and 10X binoculars. Data were recorded every five minutes using a micro-recorder and ad lib notes.

Observations were made about one mile northwest of the nest site. Since size dimorphism (differences between sexes) was not apparent, the female was assumed to do most of the incubation and brooding and behaved aggressively toward the male.

Results and Discussion

Timing of breeding season

Two eaglets hatched and fledged successfully in 1986. In 1986, the incubation phase started two weeks earlier than in 1985 and four weeks earlier than in 1984. The period between hatching and fledging was shorter in 1986 than the previous two years. The incubation phase took 34 days while the previous two seasons had a 35-day incubation. Heinzman (1961), Hensel and Troyer (1964) and Brown (1976) also reported the same 34-35 day time periods for bald eagle incubation.

A possible explanation for an

earlier breeding season than the previous two years could be ascribed to warmer weather and a readily available food supply in 1986 compared to 1984 and 1985. In 1968 Howell noted that temperature and rainfall influenced laying and that warm, dry weather was associated with earlier layings. Although the 1986 temperature data show a slight increase from 1984 to 1986 in February and a significant increase from 1985 to 1986 in March, the precipitation data show 1986 to be significantly wetter during February and March than the previous two years. Therefore, it is not possible to confirm Howell's 1968 observations concerning the effect of temperature and precipitation on laying dates. In any event, more observations will be required.

Nest building and breeding

Bald eagles mate for life unless one dies. They use the same nest tree year after year, building onto the nest each year. Nesting materials were frequently brought to the nest throughout the incubation and brooding phases. This material consisted of various sized branches, foliage and moss. While both adults worked together placing nesting material, the male bald eagle was assumed to spend the majority of the observed time prior to incubation working on the nest. Gerrard et. al. (1979) and Newton (1979) also reported that the male bald eagle mostly worked alone at building the nest. Foliage and branches were brought by the adults during the post-brooding phase when the eaglets were about 64 days old.

Six possible loafing trees were noted during this study. Hensel and Troyer (1964) and others had noted that territory boundaries were marked by loafing trees and that these trees provided perch and feeding sites (Stalmaster et.al. 1979 and Cline et.al. 1980). Anthony et.al. (1982) noted that large old-growth trees were selected by bald eagles for nesting and roosting sites in the Pacific northwest.

Breeding took place with our eagles during nest building and early egg laying. Two copulations were observed prior to incubation, once during the early morning in the pilot

tree and again in the late afternoon in the nest tree.

Incubation and brooding

Bald eagles usually lay one to four eggs—two on average—and incubate the eggs from 35 to 46 days. The behavior of the incubating adult (described by Brown 1976 and Newton 1979) signaled the hatching time of the eggs. The female acted as though she were listening to the eggs with head cocked, looking sideways at them. She also appeared reluctant to leave the nest at the time of hatching and the male was not allowed near the nest. Although both nesting adults pursued a bald eagle intruder, the female quickly returned to the nest.

The parents split the incubation and eaglet rearing phases of nesting, although the female spent a total of 71 percent of the time on the nest to the male's 29 percent; this agrees with other researchers' findings (Forbis 1975 and Gerrard et.al. 1979). The parents rarely left the eggs unattended. Although nest exchanges took place between both parents several times a day, there were no nest exchanges on the day of hatching.

During the first 10 days after hatching, at least one parent was at the nest 100 percent of the time. This decreased to 97 percent of the time when the eaglets were fully feathered at 44 days old. This concurs with Heinzman's findings (1961) that eaglets were fairly well feathered between 35 and 49 days of age. As the eaglets approached fledging status, the parents spent less and less time at the nest or watching it from a nearby tree.

Fledging

After fledging, eaglets remained near the nest tree for the first three weeks. One eaglet was later observed in the area six weeks after fledging. This correlates with Brown (1976) where a six week to a two and a half month period was noted.

Feeding and prey

Both adults fed the eaglets after nine days following hatching. Prior to nine days, the female fed the eaglets. After seven weeks, the eaglets fed themselves on cached prey either left

at the nest or kept in a loafing tree nearby and brought in later by the adults as Newton also observed in behavior (1979). Two short trips from the nest tree and subsequent returns with prey was noted during the post-brooding phase. Feeding of the young usually occurred for three to eleven minutes during the mid-morning and late afternoon or early evening.

Bald eagles prey mainly on fish but researchers also consider them opportunistic feeders (Dunstan and Harper 1975 and Todd et.al. 1982). Brown bullhead catfish was the main prey available to the eagle pair (Lehman, 1984) and probably came from the reservoir (Vigg 1979 and Lewis 1981). Other possible prey at the reservoir were mallards, buffleheads, common mergansers and a stray Canada goose observed on April 13th.

Aggressive encounters

Aggressive interactions took place during incubation and early brooding. Another mature bald eagle flew twice in one day toward the nesting territory along the ridgeline. Both nesting adults chased the intruder once, and the male alone the second time. Ravens were chased off when the eaglets were newly hatched, and turkey vultures were chased away when they were 64 days old. No physical contact was observed with either. Hunt heard vocalizations in 1985 at the site, but no vocalizations were heard during this year.

Aggressive actions occurred during the chipping time of the eggs and feeding of the young eaglets. During those times, the female would drive the male away from the nest by lunging at the male with open beak and outspread wings.

Effect of human activity

Although some researchers (Anthony et.al. 1982 and Stalmaster 1975) have noted a decrease in nesting success due to human activity, that was not the case in this one. Several times gunshots were heard across the reservoir within one mile of the nest site when the eaglets were about six weeks old, but the adults showed little response—probably as a result of presence conditioning since humans

have been living in the area for years. This finding correlates with studies done by others (Grier 1969 and Mathisen 1968).

Author's Footnote

Since the completion of my part of this study in 1986, observations have continued yearly. Monitoring wildlife biologists report that the same bald eagle pair have produced two young each year. Those young have all successfully fledged (Uhd 1991).

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Katherine L. Graham is a Resource Area Wildlife Biologist for the Bureau of Land Management, Battle Mountain District, Nevada. She worked for BLM as a Wildlife Technician and a Reclamation and Compliance Technician prior to that. Her Bachelor's degree is from Humboldt State University, Arcata, California and the research done for this paper—in collaboration with the Forest Service—was part of her senior thesis.



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HACKING: THE TIME-HONORED TRADITION OF FALCONERS. THE TECHNIQUE HAS ASSISTED BIOLOGISTS WHO SPEND A LOT OF TIME AND MONEY TO MAKE SURE THE YOUNG ONES GET STARTED RIGHT.

REINTRODUCING THE PEREGRINES

KATHRYN M. BOULA

Ever-so-slowly, the man reaches down into a cardboard moving-company box while his companions remain silent, watchful, and motionless. The click of camera shutters and a stiff breeze make the only sounds.

Equally slowly, the hands reappear, this time gingerly holding a half-feathered, half-downy, wild-eyed bundle with huge feet. Through a trap door, into a screen-fronted box goes that bundle, followed by four more like it: the newest recruits in a long battle take up their positions. Five juvenile peregrine falcons begin their new life in the wild.

The man with the gentle hands is a biologist for the Peregrine Fund, a non-profit organization out of Boise that raises peregrine falcons in captivity for re-introduction programs. Biologists from the Mt. Hood National Forest and Oregon Department of Fish and Wildlife, a photographer, and two "hack site" attendants complete the entourage. The scene just described is both beginning and culmination—the end of captivity for the juvenile falcons, and the beginning of a re-introduction program for peregrines on the Zigzag District of the Mt. Hood National Forest in Oregon.

The peregrine falcon *Falco peregrinus* was listed as an Endangered Species by the U.S. Fish and Wildlife Service in 1970. Since that time, hundreds of captive-bred juvenile peregrines have been released to restore viable wild populations to their former ranges.

The process called "hacking" allows for the natural physical conditioning of young birds in a wild setting. This method, used by falconers for centuries to train hunting birds, has been adapted for use in the Peregrine Falcon Recovery Program. A large wooden box, with a grate front, solid top and sides, a feeding hole at the top, is placed in a high, relatively inaccessible location. Young birds are placed in the closed box and provided with a steady supply of food. When the young are fully feathered and able to fly, the front of the box is opened and the birds are allowed to come and go freely.

Hack site attendants, who remain at the site for eight to ten weeks, provide food for the juveniles, who continue to return to the box until their hunting skills have improved to the point that they can fend for themselves completely. Young birds usually abandon the hack box completely by late summer.

The first hacking program on the Mt. Hood National Forest was initiated on the Columbia Gorge Ranger District in 1986 as a cooperative venture between the Mt. Hood National Forest, the Oregon Department of Fish and Wildlife, and the Peregrine Fund. Approximately 20 young birds were released on the District between 1986 and 1989. In the spring of 1990, a pair of peregrine falcons were observed in territorial behavior at the Columbia Gorge site, and an attempted nesting was suspected. The male of the pair was a return from the 1988 release group. Given the return of adult birds to this location, it was decided to move the hacking program to the Zigzag District to a location that provided good visibility, potential for future nest sites on nearby cliffs, consistent flying winds, and hopefully, little disturbance.

In 1990, three crew members backpacked in pieces of the hack box, hand tools, and bags of gravel. Within a few hours, the four foot square box, complete with gravel floor, guy wires, and a fantastic view, was ready for occupation. On July 23rd, the five juvenile falcons, a three-day supply of frozen quail chicks (standard fare for captive birds of prey), spotting scopes, tents, lanterns, jugs of water, and trail closure signs arrived with the release team.

Getting the birds safely transferred from their traveling boxes to their new home proceeded smoothly. All five eyases (the falconry term for young falcons) were calm and docile. Other releases had not gone as well: the birds overstress from too much heat, jostling, or radical changes in environment. Wing and leg bones are fragile, as are the still-developing flight feathers. Piercing shrieks and hissing leave no doubt that you are dealing with an unhappy falcon. The talons of a peregrine—even at five weeks—can get the attention of any human attempting to handle it.

Once installed in their box, the juveniles have but one more week to endure captivity as they stuff themselves with quail and jump up and down testing their wings. During this time, the hack site attendants diligently monitor their young charges, watching for signs of dehydration, external parasites, and lack of appetite.

Aside from their foster-parent duties for the falcons, the attendants provide security in other ways. Hikers and mountain bikers, understandably curious, often want to get a closer look, not realizing that the birds, easily spooked by human presence at this point, might fly away and never return. At this age, not yet self-sufficient, the young birds could starve or be killed in an accident or by a predator. Loss of a single bird, besides the obvious set-back to the recovery program, is expensive. Each juvenile has cost the Peregrine Fund about \$2,000 by the time it reaches the hack box.

In order to reduce interference and protect the birds, a seasonal trail closure is annually implemented. Trail monitors are stationed at the trail closure points to turn back folks who just can't resist the temptation to sneak past the signs. Most hikers and bikers on the National Forests cooperate and are considerate.

A week after their arrival, the new residents were ready for release. The front of the box was removed and the juveniles were on the wing. The attendants reported that all were flying well, engaging in mock battles with each other and harassing three young golden eagles in the area. In order to give these birds the best possible chance and to assist the young who will follow in the re-introduction program, they will continue to "babysit" and document the birds' activities for another month.

Author's note: The same procedures were followed in 1991 as in 1990. In 1991, five birds were placed, all survived to fledging, but one was lost the first day of release. This successful and publicly popular project will continue for another three to five years.

Kathryn Boula is a Wildlife Biologist, Mt. Hood National Forest. She has worked for the Forest Service for 10 years. She has an Associate Degree in Horticulture from the University of Minnesota, a Bachelor's and Master's in Wildlife from Oregon State University.

CANADA'S T & E RANKING SYSTEM

WILLIAM T. MUNRO

In 1980, the first vertebrate species were designated endangered under the Wildlife Act of British Columbia. The criteria used to determine the species to be included were presented in the "Preliminary Plan for the Designation of Threatened and Endangered Species" by W. T. Munro and D.J. Low (in Stace-Smith, R., L. Johns and P. Joslin. 1980, editors of *Threatened and Endangered Habitats in British Columbia and the Yukon*).

The Wildlife Branch does not consider for designation as endangered or threatened species which are not native but have been introduced into British Columbia or neighboring regions (exotic) or those which are common elsewhere but whose range barely extends into British Columbia. The reasons for not including exotics are: 1. they have been introduced by humans and are not a part of our historic wildlife heritage. 2. they may compete with native species of fauna. 3. they may not be adapted to conditions found in British Columbia. 4. the effort to maintain viable populations of some of those species can be more profitably directed to native species.

The reasons for not including peripheral species which are common in neighboring jurisdictions are: 1. such species are at the edge of their range

and often increase or decrease markedly as a result of climatic trends, habitat availability and inherent biological adaptability. 2. such species are common elsewhere and will expand into British Columbia if conditions become appropriate. 3. the effort required to maintain viable populations of some of those species in the face of natural reductions can be much more profitably directed to species truly threatened or endangered. We will not ignore peripheral species, we will protect those species and their habitat and let them fluctuate according to nature.

All designations are applied in a provincial context and not on a local basis. Designations are made on a provincial basis because that is the geographic and political boundary within which we operate. If one chose small enough local areas, every species could likely be considered endangered somewhere in British Columbia.

Thus, a species will not be designated as threatened if it is considered threatened in one area of British Columbia but exists in viable numbers elsewhere in the province. However, local populations, exotics, and peripheral species, while not being designated as endangered or threatened, will continue to be of management concern and will be considered under general management and protection programs.

Species which may be designated as threatened or endangered by other administrations elsewhere in Canada or the world will only be designated as such in British Columbia when it is warranted by their status in British Columbia. For example, while the Bald Eagle is rare and officially classed as an endangered species in Ontario, it is abundant and not considered endangered in B.C. A species status else-

TABLE 2: Red List - Species being considered for designation as endangered or threatened.

Tiger Salamander	Sharp-tailed Snake
Short-horned Lizard	Anatum Peregrine Falcon
American White Pelican	Canyon Wren
Burrowing Owl	Flammulated Owl
Common Poorwill	Marbled Murrelet
Forester's Tern	Spotted Owl
Prairie Falcon	Cascade Mantled
Thick-billed Murre	Ground Squirrel
Keen's Long-eared Myotis	Fringed Myotis
Pallid Bat	Sea Otter
Spotted Bat	Townsend's Big-eared Bat
Western Small-footed Myotis	Vancouver Island Marmot
White-tailed Jackrabbit	Wood Bison

where is one factor weighed, however, when considering its status in British Columbia.

Originally subspecies, except for those where there was significant public concern for their separate management, were excluded from designation. Upon review, we found the arguments put forward for their inclusion sufficiently strong to change our policy. Subspecies are now included for designation as threatened or endangered.

Recently, the Wildlife Branch reviewed and modified the criteria for designating species as threatened or endangered. The revised criteria and rank are presented in Table 1. A numerical value for a species is derived by adding the rank value for each criterion. A value of 36 or more places the animal on the *red* list where its status is carefully reviewed and consideration is given to designating it either threatened or endangered. A score of 24 to 35 puts it on the *blue* list where its status will be evaluated and the species upgraded to the red list or remain on the blue list as a sensitive species to be monitored regularly for any change in status.

Table 2 lists those species which are presently on the red list and are being considered for designation. The only species yet designated as endangered under legislation in British Columbia are the Vancouver Island Marmot, Sea Otter, American White Pelican, and Burrowing Owl.

Table 1: Criteria and rank for provincial designation of threatened and endangered species.

CRITERIA	RANK				
	12	9	6	3	0
1. Abundance # of individuals breeding in B.C. Examples:	VERY LOW ≤ 100 <i>Burrowing Owl</i> <i>Spotted Bat</i>	LOW ≤ 500 <i>Vancouver Island Marmot</i> <i>White Pelican</i>	LIMITED ≤ 1000 <i>Badger</i>	MODERATE ≤ 5000 <i>Cougar</i> <i>California Bighorn</i>	COMMON
2. Distribution Examples:	VERY RESTRICTED (1 ecoregion) <i>Townsend mole</i> <i>Sea Otter</i>	RESTRICTED (1 ecoprovince or 2 ecoregions) <i>Gyrfalcon</i> <i>Rattlesnake</i>	LOCALIZED (2 ecoprovinces or 4 ecoregions) <i>Western Grebe</i> <i>Mountain Beaver</i>	GENERAL - LOCALIZED (narrow niches, clustered distribution) <i>Eared Grebe</i>	WIDESPREAD
3. Habitat Integrity Confined to habitat currently occupied and includes all environmental threats. Examples:	SEVERELY THREATENED (>50% of habitat liable to be destroyed in 10 years) <i>Marbled Murrelet</i>	THREATENED (>10% of habitat liable to be destroyed in 10 years) <i>Ancient Murrelet</i>	DETERIORATING (major long term degradation /alienation) <i>Grizzly Bear</i> <i>Bald Eagle</i>	AT RISK (degradation likely within 10 years) <i>Fisher</i>	NOT AT RISK
4. Population Trend In B.C. over a period of at least 3 generations or 3 cycles. Examples:	BELOW MINIMUM VIABLE POPULATION <i>Burrowing Owl</i> <i>White-tailed Jackrabbit</i>	RAPIDLY DECREASING (>10% per generation or cycle) <i>Marbled Murrelet?</i>	SLOW DOWNWARD TREND <i>Grizzly Bear</i> <i>Fisher</i>	STABLE (± 5% per generation or cycle) <i>White Pelican</i>	INCREASING
5. Reproductive Potential Average annual number of young per female over life of female. Examples:	VERY LOW <1 <i>Grizzly Bear</i> <i>Marbled Murrelet</i>	LOW 1 - 2 <i>Ancient Murrelet</i> <i>Thinhorn Sheep</i>	LIMITED 2 - 3 <i>Marten</i> <i>Osprey</i>	MODERATE 3 - 4 <i>Beaver</i> <i>Prairie Falcon</i>	HIGH
6. National and International Status Done at species level only.	UNIQUE (Total world population in B.C. or endangered everywhere) <i>Vancouver Island Marmot</i>	MAJOR (> 20% of world's population in B.C. and rare elsewhere OR only Canadian population and rare elsewhere) <i>Keen's Myotis</i> <i>Spotted Bat</i>	SHARED (> 50% of world's population in B.C., common elsewhere) <i>Barrow's Goldeneye</i> <i>Thinhorn Sheep</i>	UNIQUE IN CANADA (Only Canadian population, common elsewhere OR >25% of world's population in B.C., common elsewhere) <i>Flammulated Owl</i> <i>Harlequin Duck</i>	COMMON

William T. Munro worked 12 years in eastern Canada for the Canadian Wildlife Service on waterfowl and waterfowl habitat. Since that time he has worked for the Wildlife Branch of the Ministry of Environment as the bird and endangered species specialist. He represents British Columbia on, and is currently chairperson of, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which provides the official national status of species at risk in Canada. The article and tables first

appeared in BioLine: Official publication of the Association of Professional Biologists of British Columbia (Vol 9, No. 3: Summer 1990).

IN AN ERA OF TIGHT MARKETS FOR TIMBER PRODUCTS, MANY MILLS ARE GOING UNDER. TWO NEW YORK WOMEN WHO CAME TO MANAGEMENT UNDER DISTRESSING CIRCUMSTANCES ARE EXAMPLES FOR OTHERS.

CONNIE SMITH AND DIANE PLATT

NANCY R. HOLMES

Women in the male dominated forest products industry are not very common. Women who own and operate sawmills are even less common. In 1987, within four days of each other, Connie Smith and Diane Platt, became widows. With little financial choice, the two women became the Presidents of sawmills previously owned and operated by their husbands. The circumstances were anything but pleasant. Their stories are inspirational.

In 1940, Charles Smith, Connie's father-in-law, started his first water-powered hardwood sawmill, in Central Square, New York. The Smith children grew up helping in the sawmill. In 1966, Seymour, Connie's husband, joined his father full time in the mill. The mill continued to expand near the original mill site, but was no longer dependent on water for power. Twin Mills Lumber Company was incorporated in 1971, and in 1979, a new pallet mill was added. Seymour bought out his brother around 1982, and became the plant's primary owner and President.

During their 22-year marriage, Connie learned the business from the ground up. She began by "keeping the books" but eventually learned how to operate nearly every piece of equipment associated with the mill. Seymour was a good teacher and he would listen to Connie's opinions, but he always made the decisions. He was the boss.

When Seymour was diagnosed with cancer, the doctors told Connie that he had six months at most to live. He would not give up, however, and continued to go to the mill every day for over a year. Connie remembers: "As he got weaker, I got stronger."

Part of her strengthening during this period came about because circumstances forced her to act. Connie knew she had to buy a new log truck and loader probably at a cost of just under \$100,000. She sat down with the company's mechanic and the driver and asked what specifications each wanted in a new truck. Then she called several local dealers for quotes. Most of them wanted to

play games, especially with a woman, and did not take her seriously. Finally she told a regional dealer, "This is what I want. I don't have time to play games. Give me your best price the first time around and if it is a fair price, I will purchase from you." The dealer came back with the quote. Connie felt that it was fair. Seymour had become too weak to go to the mill, so she showed the quote to him one night. He looked at it for a long time and then asked Connie who had developed the specifications. When she replied that she had, Seymour said, "I could not have done better myself." Connie replied that she had an excellent teacher. He only asked her one question. "Do you think you can handle the payments?"

When it came time to sign the papers for the new truck, Connie asked the dealer to come to the house, so that Seymour could sign. Seymour read through the papers and the dealer told him where to sign. He handed the papers to Connie, and said, "You sign, since you are the one who will have to pay for it." Not long after that, Seymour died, and by the end of 1987, Connie was the sole owner of Twin Mills.

One of Connie's major fears after Seymour's death was that she might lose many of her 22-person staff because they would not work "for" a woman. Twin Mills' trained staff was one reason that the mill had developed a loyal clientele. Connie met with her staff separately and in groups. When-



Connie Smith in the office



Smith with pallets

ever, she would encounter a negative comment about "working for a woman," she would reply, "You are not working *for* a woman, you are working *with* a woman." To her credit, Connie did not lose one employee or one client after Seymour's death. Twin Mills first pallet customer of 20 years ago, is still a customer. Connie says that "quality and service" are what holds her business customers. What holds *her* in the business is more subjective: "I love it. I thrive on it." Her household income went from two incomes to one, however, and her salary level is not yet at what Seymour's had been before his death.

In addition to quality and service, Connie stresses safety. Employees can take advantage of First Aid, CPR, and mill safety courses. Twin Mills received the New York Lumberman's Insurance Trust Fund's Outstanding Safety Award for 1990.

Connie continues to make mill improvements: she added a section to the garage to enable the entire cab and truck to be under cover during repairs and she added a 7,000 square foot addition to the pallet shop. A computerized set works to a new carriage, a replacement chipper, and a new \$100,000 truck tractor are all recent improvements.

High utilization of each hardwood log that passes through the mill is a primary concern to Connie. About three million board feet of hardwood lumber is sold to furniture manufacturers each year. She sells chips to a paper mill and smaller pieces of lumber are made into customized pallets from the pallet mill. Some sawdust goes to farmers for bedding, some bark is sold for mulch, and the excess sawdust is used as fuel for a boiler which heats the pallet shop.

Connie takes the time to participate in industry associations and community organizations. She is on the Executive Committee of the Empire State Forest Products Association and is the Vice President of the local Rotary Club. Twin Mills is the largest permanent employer in the local area.

Connie Smith's mill and Diane Platt's mill are about 20 minutes from each other. The two women knew each other before their husbands died. The two couples would go out to eat periodically and would see each other at industry functions. Their husbands' deaths, however, really brought them close together. Diane says, "We are closer than sisters."

Since Twin Mills is a hardwood mill and G.W. Platt & Sons LTD. is a softwood mill, the two mills do not compete for wood. This allows Connie and Diane to learn from each other and to cooperate.

Gerald and Diane Platt started out their marriage as dairy farmers although Gerald had spent much of his life associated with the forest products industry in some way. As a boy, he cut pulp and bowling pin lumber. While farming, he still cut pulp for the local paper mills, but in 1976, Gerald started a log cabin stock mill. The mill produced red pine cabin cants for New England log homes.

On Christmas Eve, 1985, the Platt family started operations at their present location with all new buildings and new equipment from the debarker to the chipper. The primary product was landscape timbers.

Gerald had always felt that women could work "fair and equal" to men. Diane was his partner for 25 years in life and in work. From the beginning, Diane managed the money and the books. This gave her a good perspective on the financial aspects of the mill. For economic reasons—one less employee to pay—Diane also worked in the mill. She learned every piece of equipment and operation firsthand. She was Vice President before Gerald died in a truck accident and therefore did not take over the mill "cold" which, Diane says, would have been all but impossible.

She did, however, take over the mill with a large debt, because of the new machinery that had been purchased some two years before her husband's death. Immediately, Diane faced financial crises as lenders backed away from any loans or financial support. Diane says almost everyone in the industry thought that after Gerald died she would declare bankruptcy and walk away from the mill and her huge debt. But they were mistaken. Diane says that she could not walk away from the mill, because everything she and Gerald owned was tied up in it. Her family pulled together and her grown four sons and daughter worked almost non stop to keep the mill alive.

Diane does all the timber buying. The mill has two of its own logging crews, in addition to two subcontracted crews. Thirty percent of the mill's wood is purchased from loggers, another five percent of Red pine is purchased from private timber sales, and the

rest comes from public lands where Platt is a successful bidder. Almost all of the wood (95 percent) is Red pine coming from a 100 mile radius of the mill. The rest is White pine and Hemlock. The mill now sells about seven million board feet of timbers wholesale each year. For the past several years, however, the domestic market has been very poor.

The major product produced at the mill is Red pine landscape timbers in a variety of sizes. Diane does all the product marketing and has developed new markets for "dressed" landscaped timbers in Canada. In response to those new orders, Diane added a planer to the operation. Other marketed products include: sawdust from the mill's operation used at the New York State Fair, bark sold as mulch, and paper quality chips sold to International Paper (IP) Company's mill in Ticonderoga, New York. In 1990, IP recognized G.W. Platt & Sons LTD. as a Certified Chip Supplier. There are only six such suppliers. The certification recognizes them as "A supplier responsible for their own quality, continuously looking for improvement and open to advice." The certification is important, because it means that Diane's mill is one of the last to be cut off when IP is oversupplied with chips. About 32 percent of the mill's income is derived from these "waste" products.

Since most landscape timbers are chemically treated to help them resist decay, Diane contemplated adding a pressure treating facility to the mill. The environmental regulations, however, are extensive and compliance too expensive for the mill to handle. Diane has also added a large maintenance



Diane Platt in the office

Platt with timbers



facility to the operation. Waste oil from the trucks and heavy equipment is used as the heating fuel.

The tremendously hard work is beginning to pay off for Diane. The mill has substantially reduced its debt. Financial institutions are now less likely to turn down Diane's loan applications. But, like Connie's situation, her household income has dropped to exactly half of what hers and Gerald's combined salaries had been.

She is very committed to ensuring jobs for her 22 employees, including several of her children. Her mill is one of the largest employers in the Westdale, New York area. Just like Gerald's work was his life, Diane's work is her life: she puts in devastatingly long hours. "It's very interesting," she says. And then adds, "I never was a typical woman."

Connie Smith believes that she and Diane Platt have become accepted by their peers, especially since the recession has closed many much larger mills that were run by men. She jokes that she and Diane are called the "lumber ladies" at industry meetings. At a Sawmill Seminar recently held at the Northeastern Loggers Expo, someone asked Diane the secret to her success. She replied, "I don't know that I have one. You just work hard and pay your bills."

Nancy R. Holmes owns her own environmental and natural resources consulting company (NRH Associates, Inc.) in Swanton, Vermont. Her company currently is involved in assisting forest products companies export their goods around the world. She has a Bachelor's in Outdoor Recreation from Colorado State University, a Master's in Resource Utilization from the University of Maine at Orono, and an M.B.A. in International Business from Fairleigh Dickinson University. Holmes is an editor for Women in Natural Resources.

IN THE LONG-LEAFED PINE COUNTRY, FIRE AND NEW PLANTING TECHNIQUES ARE BEING USED TO MAKE LIFE EASIER FOR A BURROWER.

GOPHER TORTOISES ON THE DESOTO NATIONAL FOREST IN MISSISSIPPI

LYNN STACEY

The gopher tortoise, *Gopherus polyphemus*, is a medium-sized (6-14 inches) terrestrial turtle with very powerful, fleshy front limbs that it uses to construct extensive burrows in sandy soils. Its half-moon shaped shell is responsible for the distinctive shape of its burrows. Tortoises are vulnerable to activities that involve ground disturbance because of these burrows.

Populations of gopher tortoises are found throughout the coastal plain of the southeastern United States from South Carolina to Louisiana and are associated with the longleaf pine (*Pinus palustris*) ecosystem. They prefer open areas where sunlight reaches the ground and, consequently, are often forced to move out of forested areas when canopy closure is greater than 60 percent. Natural fires have been the primary factor in maintaining grassy, open conditions in tortoise habitat. An open, pine canopy with little hardwood midstory allows sunlight to reach the ground which incubates tortoise eggs laid near the burrow entrance. These conditions promote establishment of preferred vegetation such as grasses, legumes, and low forbs. Scat analysis of tortoises on the Black Creek Seed Orchard, DeSoto



National Forest, found that tortoises eat leaves or seeds of *Galactia*, *Hypericum*, *Lespedeza*, *Panicum*, *Paspalum*, *Quercus*, and *Tephrosia*. The seeds of these species are then disseminated throughout their habitat.

In 1987, the gopher tortoise was declared a federally threatened species west of the Tombigbee and Mobile Rivers in Alabama because there was evidence that the species was likely to become endangered within the foreseeable future in this portion of its range.

Several researchers have worked with them: Ren Lohofener, then with Mississippi State University, was instrumental in having the tortoise listed as threatened and Dr. Craig Guyer and his graduate student, Ed Wester, from Auburn University (Alabama) have conducted research on gopher tortoises throughout the southeast. Still, very little is known about tortoise populations especially in south Mississippi.

Population decline on the DeSoto has been attributed to:

1. forestry practices: management for dense pine stands and the absence of fire.
2. human caused deaths: harvesting individual tortoises for food and vehicle caused mortalities.
3. habitat destruction and fragmentation of habitat.
4. increased predation.

In order to reverse the decline on the Black Creek Ranger District, habitat management for tortoises has become a consideration in many silvicultural activities. Site preparation, for example, that normally would have included shearing and piling with heavy equipment has been replaced in tortoise colonies with



herbicide injection of smaller hardwoods, reducing hardwood competition for the longleaf pine seedlings. District personnel plant containerized longleaf tubelings by hand instead of planting bare-root seedlings with machines. These methods protect burrows, hatchlings, and eggs.

The gopher tortoise is a very important part of the longleaf pine ecosystem which has been greatly reduced in the last century. Fire historically had been an integral part of this ecosystem since both the longleaf pine and the tortoise rely on fire for their existence. As a result, the Black Creek district has increased the amount of prescribed burning it does.

Funding for tortoise management on the DeSoto National Forest has increased since the species was listed. Larger percentages of T & E dollars are allocated for Red-cockaded woodpecker management, however. What may help keep the tortoise off the endangered species list is the increased attention the woodpecker receives since both species inhabit the longleaf pine ecosystem, and both species will benefit from similar management.

Lynn Stacey is a Wildlife Biologist with the USDA Forest Service. She is currently doing Red-cockaded woodpecker habitat management on the Kisatchie National Forest in north-central Louisiana. Previously, she worked on the DeSoto National Forest in south Mississippi where she did woodpecker and gopher tortoise habitat management. Her Bachelor's is in Wildlife and Fisheries Science from the University of Tennessee Knoxville and her Master's is in Wildlife Ecology from Mississippi State University Starkville.

NEW MITIGATION MEASURES HAVE NOT HAD THE TIME TO BE EVALUATED. THE SOCIAL AND ECONOMIC COSTS ARE ENORMOUSLY HIGH.

SALMON AND THE FOREST PRODUCTS INDUSTRY

CHARLES H. BURLEY

Introduction

Threatened and endangered species is an increasingly common story in the news. The Pacific Northwest has been the subject of intense debate over the spotted owl for years. Now the region will have another major issue to address when the National Marine Fisheries Service (NMFS) decides next year whether or not to list several stocks of salmon as threatened or endangered under the Endangered Species Act.

Throughout these debates, we lose sight of the fact that the forests of the Pacific Northwest are some of the most highly productive forest lands in America. Furthermore, we possess the knowledge and technology to meet growing consumer demand from these lands while protecting the forest resources.

The issues surrounding the salmon are far more encompassing and directly affect more industries and people's lives than the spotted owl issues have. Included are the forest products industry, power producers and consumers, commercial, recreational and tribal fishing interests, agriculture and irrigators, the ports along the Columbia River, aluminum producers. The list goes on and on.

This article reviews the recent developments surrounding the effort to list certain salmon stocks and how the forest products industry may be affected. First, I will provide some facts about our industry and its role in the regional, national, and global economies.

Then I will discuss the issues and recent measures taken to address the concerns about salmon. These measures reflect compromises by the forest products industry such as land withdrawals and increased forest practices regulations. Some of these measures have been implemented over the past 20 years while some have been implemented more recently with the final forest plans. Now it is time to allow these measures to work and demonstrate their effectiveness.

The Forest Products Industry of the Pacific Northwest

Forest products from the northwest are of vital importance to both domestic and foreign markets. This country has benefitted from affordable housing that to a large extent came from materials produced in the northwest. Today, our small region provides lumber for nearly half of all new housing starts in the country.

The forest products industry is the second largest sector in the state of Washington's economy and the largest sector in Oregon's economy. In 1990, there were approximately 130,000 people employed in the industry in both states. According to the Oregon Department of Forestry, 38 percent of Oregon's private, basic employment is generated by this industry. (A basic industry is one which produces for customers *outside* the state. It brings in new dollars without which the state's economy would not grow.)

The industry contributes to the states' economic activities not only by employment but also direct payments through taxes and other timber payments. In 1989, receipts from the sale of federal timber returned over \$320 million to local governments for roads and schools in Oregon and Washington.

Over \$2 billion worth of forest products are shipped out of Columbia River ports annually. These products include lumber, plywood, logs, woodchips, pulp, paper, and newsprint. The U.S. Forest Service estimates that by the year 2040, total U.S. wood fiber consumption will increase by 40 percent. This demand will be evenly split between lumber and paper products.

The forest products industry is concerned for the well being of the salmon. We also believe that the survival of the salmon can be assured without the destruction of the region's economy. The industry is ready to assist in developing a viable, comprehensive plan that will strengthen stocks of salmon while preserving the vitality of the economy of the northwest.

The Listing Process Under the Endangered Species Act

In April, 1990, the National Marine Fisheries Service received a petition from the Shoshone-Bannock Tribes to list the Snake River sockeye salmon under the Endangered Species Act. Then in June, 1990, the Service received four more petitions. These were submitted by Oregon Trout, Oregon Natural Resources Council, Northwest Environmental Defense Center, the Idaho and Oregon chapters of the American Fisheries Society, and American Rivers. These last four petitions were to list the Snake River spring, summer, and fall chinook and the lower Columbia River coho.

In April, 1991, National Marine Fisheries proposed listing the Snake River sockeye as endangered under the Act. In its findings, NMFS stated that the Snake River sockeye has declined to dangerously low numbers citing factors such as hydropower development, water usage, and commercial fish harvest.

Two months later in June, the Service proposed listing the Snake River spring, summer, and fall chinook as threatened under the Endangered Species Act. In its notice, NMFS cited the following as factors leading to the demise of the spring, summer and fall chinooks: 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 2) overutilization for commercial recreational, scientific, or educational purposes; 3) disease or predation; 4) inadequacy of existing regulatory mechanisms; and 5) other natural or manmade factors. With regards to the habitat, two principal causes are dams blocking access to and inundating habitat and the withdrawal of water for irrigation and other uses.

In the case of the spring and summer chinook, its habitat is also affected by mining, logging, grazing and farming. The fall chinook's habitat is not affected by these activities to the same extent because its spawning habitat is mostly in the mainstem of the Snake River.

Also in June, NMFS decided that the biological evidence did not warrant listing the lower Columbia River coho. In essence, NMFS declared the wild segment of the lower Columbia River coho as extinct. In the information considered in its decision, NMFS stated that the demise of the lower Columbia

Table 1. Final Land Allocations in Forest Plans Columbia River Basin Forests.

Description:	Million Acres
Net National Forest	14.2
Tentatively Suitable	7.8
Suitable	5.9
Full Management	3.3
Restricted Management	2.6

Source: Final Forest Plans and Environmental Impact Statements.

River coho is attributable primarily to over-harvesting of the stock and an aggressive hatchery program.

NMFS has one year from the date of the proposed listings to weigh the biological evidence and issue a final decision on these stocks. The ESA expressly prohibits considering anything but biological data in making a listing decision. However, in preparing a recovery plan and designating critical habitat, the ESA does allow the introduction of other information such as economics and social impacts.

Between the time of these proposed listings and any final rule next year, the Endangered Species Act imposes new requirements on federal agencies. The potential effects of any federal action on these species must be evaluated. In addition, the initiating agency must confer with NMFS if the proposed action is likely to jeopardize the continued existence of the species. The conferencing usually results in modifications to minimize any adverse effects.

Salmon Issues Affecting The Forest Products Industry

Forest Management and Fish Habitat

There are many issues surrounding the salmon that directly and indirectly affect the forest products industry. The one most commonly associated with the industry is habitat. A majority of anadromous fish habitat is located on forest lands in both public and private ownership. A large portion of these lands have been and should continue to be managed for the sustained production of forest products.

There are many who claim that logging has caused the demise of the fish through habitat destruction. This is simply not true. Redd counts (a redd is a spawning nest) show greater declines in some streams in wilderness areas such as the Middle Fork of the Salmon River than in streams in managed watersheds. Also, it is estimated that 40 percent of all available anadromous fish habitat on national forests is currently not utilized. An analogy would be that the hotel is open but the guests are not arriving.

Even with existing habitat not being utilized, we still can not afford to turn our backs on the habitat issues. Anadromous fish rearing and spawning habitat, in terms of water quality and flow, is essential to the continued existence of wild and naturally producing stocks. It is therefore incumbent upon all parties to ensure habitat presently available for spawning and rearing is not permanently degraded by surrounding land uses. In addition, where habitat has been degraded due to past practices, it is also incumbent upon all parties to restore this degraded habitat.

When one speaks of habitat, several issues are encompassed. These include riparian management, water quality, cumulative watershed management, and access to private lands intermingled with other ownerships. These issues transcend ownership boundaries which compounds the problem.

The habitat issues surrounding the salmon are very similar to those of the spotted owl. Consequently, the reaction is also very similar. The first response is to withdraw lands from growing trees that will provide necessary products for millions of people today and in the future.

As will be discussed later, vast acreages of public lands have already been withdrawn from multiple-use management for various reasons including water quality, riparian area protection and fish habitat. We must resist the initial urge to simply withdraw more lands and instead look closely at how we manage our lands and still provide multipleuses.

Because the public generally associates the forest products industry with habitat and the management of forest lands, there is a tendency to overlook the manufacturing side of the industry in discussing the salmon. As stated earlier, in Oregon and Washington, the industry is the first and second largest industry respectively with over \$2 billion worth of forest products shipped out of Columbia River ports annually.

Manufacturing and River Dependency

Many of the proposals to save the salmon have potentially large impacts on the industry. Several proposals would limit barge traffic and could cost the industry millions of dollars in increased transportation costs. Annually, three million tons of woodchips are shipped by barge down the Columbia River to feed the many pulp mills. Barge is the least cost method with a cost advantage of nearly \$10 per ton as compared to truck or train. In addition, there is no assurance that other modes of transportation, such as rail cars, would be available.

Manufacturing and River Dependency

Pulp mills, in addition to requiring large quantities of water to operate, have pollution discharge permits which regulate effluent discharge based on river flows. Some proposals increase river flow at certain times of the year to flush the salmon down the river. This would require premature releases of water from upstream storage facilities thus reducing water availability during the rest of the year. Any reduction in flows could cost a pulp mill half a million dollars a day due to curtailments. Electricity rates may increase by as much as 30 percent. One pulp mill has estimated that for every 0.1 cent per kilowatt hour of increased electric costs, the cost at its site will increase an estimated \$75,000 per month.

The industry is very cost competitive. Aside from timber, the availability of electricity, transportation, and other resources at low cost is one reason the industry is located in the region. It is also essential to the industry's ability to remain competitive in domestic and world markets.

Are There Adequate Protection Measures For Fish Habitat?

Oregon pioneered the regulation of forest practices on state and private lands with the passage of the Forest Practices Act in 1971. Washington and Idaho have similar acts. These acts are not static but constantly evolving as new and better information becomes available. For instance, in 1991 in Oregon, the legislature passed an amendment to the Forest Practices Act. Some of the relevant provisions include limiting the size of clearcuts, adding a third stream category for additional stream protection measures, requiring replanting of more trees per acre, and leaving buffer strips between harvested units.

On federal lands, both Forest Service and Bureau of Land Management, water quality, riparian management, and fish habitat are major issues addressed in the land management planning process. Over the past ten years, the national forests have been developing comprehensive and interdisciplinary land and resource management plans. These issues have surfaced on every national forest in Region 6 (Oregon and Washington), Region 4 (Idaho), and Region 1 (Montana).

One decision of these forest plans is land allocations. Table 1 shows the forest plan land allocation for the forests that affect the Columbia River basin in Region 6. There is a total net acreage of 14.2 million acres. Of this, 7.8 million acres were tentatively suitable. Tentatively suitable lands are both technically and legally capable of producing a sustained yield of forest products. The difference, 6.4 million acres, are lands in Wilderness areas, national recreation areas

or other designations prohibiting forest management.

The suitable acres, 5.9 million acres, are those determined appropriate to produce forest products in a multiple-use context. What happened to the 1.9 million acres when we went from tentatively suitable to suitable? These acres were allocated to benefit such things as riparian protection, visual and scenic quality, roadless areas, wildlife protection areas, etc.

Of the 5.9 million acres determined to be suitable, not all is available for what is considered full yield management. Some of the suitable acres are restricted in that the forest management practices must incorporate long rotations or some other measure to protect non-timber values.

So out of 14.2 million acres total, only 3.3 million acres or 23 percent are actually available for full yield management. The remaining lands, over three quarters, are managed to benefit non-timber values. These allocations are *before* any further set asides currently proposed for protection of the northern spotted owl.

For those lands suitable for forest management, activities and practices on the ground are closely regulated to assure resource protection. Each forest plan reiterates the fact that Best Management Practices (BMPs) are the primary mechanism to enable the achievement of water quality standards. In fact, the Forest Service has a memorandum of understanding with the respective states to ensure compliance.

To further respond to concerns over these issues, each of the national forests have developed management requirements that guide land management activities. In many cases, these exceed state standards such as calling for harvest dispersion and wider stream buffers with no harvesting allowed. As a result of these management requirements, the allowable timber sale levels in the final plans are significantly less than previous levels.

The allowable sale quantities (ASQ) and associated reductions from recent levels for each national forest in Region 6 that influences the Columbia River anadromous fisheries are displayed in Table 2. Also included in Table 2 are the reductions in ASQ attributable to the management requirements to protect riparian areas and water quality. As you can see, the percent of total reduction attributable to the management requirements for riparian and water quality range from 15 percent to 85 percent of the total reduction.

It is readily apparent that the reductions called for on these forests is significant overall. What is most striking is that the portions attributable to management requirements for riparian areas and water quality account for 15 percent to 85 percent of the overall reductions.

Table 2. Reductions in Allowable Sale Quantities (ASQ) Attributable to Riparian and Water Quality Management Requirements (MR).

Forest	FY 86-89		Percent Change	Volume	% of Total
	Average Harvest*	Plan ASQ*		Reduction Due to MR	Reduction Due to MR
Colville	103	123	19	-10	NA
Gifford-Pinchot	367	334	-9	-12	-36
Malheur	230	200	-13	-18	-60
Mt. Hood	312	189	-39	-57	-46
Okanogan	102	63	-38	-6	-15
Umatilla	130	124	-5	-5	-83
Wallowa-Whitman	170	144	-15	-10	-38
Wenatchee	175	136	-22	-33	-85
Willamette	675	491	-27	-54	-29

* In Millions of Board Feet (MMBF)

Source: Final Forest Plans and Environmental Impact Statements.

What do these management requirements look like? Both time and space limit the ability to completely enumerate these. An example is taken from the Umatilla National Forest. According to the final plan and environmental impact statement, to maintain water quality, the Umatilla National Forest will: 1) disperse timber harvest through time and space to avoid potential for cumulative impacts; 2) maintain sufficient shade producing vegetation along streambanks to maintain stream temperatures within acceptable limits; 3) implement Best Management Practices in road construction, timber, and other harvest activities; 4) carefully manage riparian grazing activities; and 5) control acid mine drainage where legally and technically feasible. The industry may not agree entirely with the management requirements in so much as it believes they are excessive. Notwithstanding these differences, these management requirements are in place now and must be given time to demonstrate their effectiveness in achieving the goals of improving fish habitat and water quality.

Summary

The forest products industry is committed to the development of a comprehensive and balanced plan to protect, restore and enhance salmon. We have taken responsible actions such as introducing legislation to strengthen stream protection in Oregon's Forest Practices Act and participated faithfully in developing the Timber-Fish-Wildlife (TFW) Agreement in Washington and the ensuing Sustainable Forestry Roundtable.

The Timber-Fish-Wildlife Agreement provides for a viable forest products industry while protecting fish, wildlife, water and the cultural resources of the Indian tribes. Representatives of state agencies, industry, tribes, and environmentalists are all signatories to the agreement. The Sustainable Forestry Roundtable was discussions between the same interests in 1990 to address those issues not covered by the TFW Agreement.

In addition, a memorandum of understanding between the Oregon Department of

Fish and Wildlife, Oregon Department of Forestry, and Oregon Forest Industries Council has recently been signed. This memorandum of understanding endorses and supports the Stream Enhancement Initiative that will increase the voluntary commitment to fisheries enhancement projects on forest lands in the State of Oregon.

These measures alone will not save and restore the salmon. There must be a commitment from all users of the river system to do what's necessary to strengthen the runs. With nearly 95 percent cumulative mortality of downstream migrants at the dams, something must be done to improve passage.

Additional measures must include regulation of ocean harvesting, reductions in mixed-stock harvesting in the river, changing fishing technologies to ones that allow release of weakened stocks, and drastic improvement in fishery management—particularly the hatcheries. In many cases, hatcheries have had an adverse effect on salmon by spreading disease and interfering with natural genetic evolution.

One point we must not ignore in our quest for the solution is that people count too. The Endangered Species Act requires the decision to list be based solely upon biological evidence. That's fine. However, the Act also requires that social and economic evidence be considered in developing any recovery plan and determining critical habitat. Whatever solution surfaces, it must be balanced by including the social and economic impacts. Furthermore, a final solution must be based on broad public understanding and support.

Charles H. Burley is Director of Forest Policy for the Northwest Forestry Association of Portland, Oregon.



HOW WONDERFUL TO HAVE SPECIES GO THE "OTHER" WAY. FROM EXTINCT TO ENDANGERED AND THEN—WHO KNOWS?

PURSUING THE ELUSIVE MIRABILIS

RON BONAR

Botanists now scour the wilds of Hells Canyon in the Pacific northwest in pursuit of the surviving remnants of MacFarlane's four-o'clock, a floral relic that scientists thought extinct for two decades. Though they approach the situation from different angles, and entered the pursuit at different periods, Paula, Marty, Rachel and Roy all agree that the quest to preserve this endangered plant is well worth their efforts. Paula Brooks is botanist for the Wallowa-Whitman National Forest working out of Baker City, Oregon. Marty Stein is botanist for the Wallowa Valley, Eagle Cap and Hells Canyon National Recreation Area Ranger Districts working out of Enterprise, Oregon. Roy Sines was a District Ranger from 1965 to 1979 stationed in Wallowa, Oregon, and Rachel Sines is his wife. Both of the latter are botanists by avocation.

"How great it is to have a career doing what you passionately enjoy. You feel like you're doing your part to preserve the earth's biodiversity for future generations," says Paula. A 1985 graduate of the University of Oregon, she began her professional career conducting threatened and endangered species surveys for the Bureau of Land Management out of Salem, Oregon. Paula's main task is timber support, that is, managing a program to search proposed timber sale areas to make sure that no threatened, endangered or sensitive plants are impacted by timber harvest. "By getting out and doing this work," she says, "we've often found that these sensitive plants are more abundant than we thought. For example, as a result of the 1990 field season, we were able to recommend the removal of two species from the Regional Forester's sensitive species list. This allows us to focus our limited time and money on the species that really need our attention."

Despite this early success, she views her position in a much broader perspective.

46 WOMEN IN NATURAL RESOURCES

Paula says that Forest Service employees, from the top line and staff officers, to the seasonals, all need to have a better awareness of the laws, regulations—and appreciation—of botanical resources for both their inherent and natural values. To help out co-workers, she is developing a guidebook to identify the 69 sensitive plant species that grow on the Wallowa-Whitman National Forest. This book will include drawings, color photos, descriptions and habitat information and it will also give non-botanists, and others who want to learn more about the botanical resources on the Forest, sufficient information to help them to identify rare or sensitive plants in the field. She is also building a standardized database for ranger districts to monitor the occurrences of sensitive plant and animal species.

Paula is a new employee who has the opportunity to start a new botany program. She finds particular pleasure in her role as Forest-level coordinator for the various partners which have cooperative studies with the Forest Service in T & E management. These include the Baker Resource Area of the Bureau of Land Management, the Oregon Department of Agriculture, the Nature Conservancy, and the Native Plant Society of Oregon. "We now have tremendous opportunities to increase the awareness of rare



plants in other groups, and manage plant populations cooperatively when they cross administrative boundaries. That is the case with our most notable plant, MacFarlane's four-o'clock."

In northeast Oregon and west central Idaho, the Hells Canyon National Recreation Area (HCNRA) is home to the only plant listed as endangered (under the Endangered Species Act of 1973) that occurs on National Forest land in the states of Washington and Oregon. Scattered colonies of MacFarlane's four-o'clock *Mirabilis macfarlanei* grow exclusively in a few portions of Wallowa County, Oregon and Idaho County, Idaho. The latter are separated from the Oregon colonies by only 10 miles, but those few miles are split wide apart by the deepest chasm of North America!

The canyonlands of the Imnaha, Snake, and Salmon River drainages now provide some of the longest growing seasons and mildest climatic conditions east of the Cascades and west of the Rockies—sufficient apparently to allow this rare and beautiful flowering plant to survive. Botanists believe that in the Pacific Northwest, this genus is a relic of warmer climate plants that survived the meteorological changes that occurred thousands of years ago. As conditions cooled, MacFarlane's four-o'clock survived, but only in these warm and protected canyonlands.

Plants grow between 1200 and 2700 feet in elevation as scattered individuals on steep (50 percent) sunny slopes. Soils are sandy to gravelly overlain by talus, generally on southeast, south and west aspects—although populations are known to grow on all aspects. Associated species are most often bluebunch wheatgrass (*Agropyron spicatum*), cheatgrass (*Bromus tectorum*),

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Paula Brooks

hairy milk-vetch (*Astragalus inflexus*), threadleaf phacelia (*Phacelia linearis*), Cusick's milk-vetch (*Astragalus cusickii*), yarrow (*Achillea millefolium*) and prickly-pear cactus (*Opuntia polyacantha*).

Four-o'clocks are tropical to subtropical plants whose flowers open in the late afternoon. The genus name, *Mirabilis* is the Latin word for "wondrous." And *Mirabilis macfarlanei* is quite a showy herbaceous perennial. Four to seven funnel-shaped magenta-colored flowers, each approximately one inch in diameter, sit clustered above bright green oval-shaped leaves. Each flower only remains open for one or two days in May, and if pollinated, can produce one fruit and one seed.

The flashy flowers and bright green foliage contrasted against the surrounding grassland make this plant easy to spot from the air. Since much of the actual and potential habitat for MacFarlane's four-o'clock is extremely rugged and difficult to survey on foot, some surveys for this species have been done from a helicopter. The botanists have to work quickly, because the plant blends into the background as soon as the blooms fade.

Lincoln Constance and Reed Rollins, the two botanists who first published the botanical description in 1936, were led to a specimen by Ed MacFarlane, a veteran river boat pilot on the Snake River, and they named the flower after him. Other populations were discovered during the 1940s, but futile searches for this plant after 1947 led botanists to believe that MacFarlane's four-o'clock had possibly become extinct.

Enter Rachel Sines. In 1965, the USDA Forest Service transferred Roy Sines to Wallowa, Oregon as District Ranger. Rachel began exploring the many nooks and crannies of Wallowa County. "It was just a hobby. I was entertaining myself," she says. When the road ended and her old truck was parked, packing botany books and a camera, she

hiked miles and miles over some of the roughest country in North America, including the Eagle Cap Wilderness and Hells Canyon. While roaming the Imnaha River Canyon in May 1970, she photographed a beautiful wildflower, and after consulting with the USDI Fish and Wildlife Service, realized her find. Based on Rachel's and other later discoveries, MacFarlane's four-o'clock moved from "possibly extinct," to being officially listed as "endangered" in 1979.

Roy retired in 1979, and since 1980, both he and Rachel have logged 11,500 hours as Forest Service Volunteers. They lived 15 months at Kirkwood Bar, a living history ranch on the Snake River near one of the colonies. They have also completed rare and endangered plant surveys in the Elkhorn Mountains, elk and mountain goat habitat studies in the Eagle Cap Mountains, and natural vegetation rehabilitation projects on overused campsites in the Eagle Cap Wilderness. Even with all these activities, Rachel and Roy continue monitoring the *Mirabilis* populations in the Imnaha River drainage as members of the Native Plant Society of Oregon.

Joining the "team" in 1989, Marty Stein, a 1981 graduate of the University of Massachusetts, has worked on and off for two years searching for and monitoring *Mirabilis* populations. Six of the 12 known colonies are on the Hells Canyon National Recreation Area where he is stationed. Earlier, while a Peace Corps volunteer in the Philippines, he saw other *Mirabilis*.

He and Paula have initiated a five-year cooperative program with the Oregon Department of Agriculture to begin the collection of baseline data on two of these colonies. "We need to know if the present populations are stable, increasing or decreasing, and we also need to increase our basic knowledge of this rare plant," says Marty. "For example, how is it pollinated? Are there

really allelopathic (inhibitory) effects on seed germination, growth and development caused by cheatgrass? How is it affected by its natural enemies?" MacFarlane's four-o'clock is attacked by a fungus, two species of spittlebug and the larvae of a previously undescribed moth *Lithiarepteryx* [no species yet]. Marty says that "the moth is actually rarer than the plant it attacks, which goes to show you that every species has its own role in the ecosystem, no matter how rare or insignificant."

Since ecosystems are dynamic, plant populations will change in size, numbers and location naturally. This fluctuating status of the known colonies, as a result of competition, natural succession and human-caused events, needs to be monitored. Since MacFarlane's four-o'clock grows in areas that have been grazed for the last century—and there is some evidence to suggest that grazing may affect the plant's recovery—Marty has worked with Forest Service range specialists to incorporate *Mirabilis* monitoring plots into the Range Allotment Management Plans.

Marty is also working with the Idaho Natural Heritage Program in a cooperative effort to survey potential four-o'clock habitat on the Idaho side of the HCNRA. He anticipates finding new populations, identifying likely sites to attempt artificial regeneration of this plant, and gaining additional knowledge of its distribution, all of which will be useful to moderate potential impacts arising from any proposed management activities.

Paula, Marty, Rachel and Roy exemplify teamwork at its best. Each performs a needed job that complements the work of the others. Each also shares the same long-term goals for this unusual, brilliantly beautiful plant. They want this species to survive, and they want its population to increase to the point that it no longer needs to be listed as endangered.

Ron Bonar is the Reforestation and Animal Damage Control Forester on the Wallowa-Whitman National Forest, USDA Forest Service. Prior to this assignment, he was Assistant Area Ranger on the Hells Canyon National Recreation Area. His Bachelor's is from the State University of New York College of Forestry at Syracuse.



Sandy Reed scans the shore of Thief Reservoir for eagles

Newsweek, *Time*, and *U.S. News & World Report* published during August 1991.

References to women ranged from 10 percent in *U.S. News & World Report* to 18 percent in *Newsweek*. Compared with results of a survey in 1989, references to women in both *Newsweek* and *U.S. News & World Report* increased, while *Time* references decreased.

The appearance of females in photographs increased slightly this year in all three magazines compared to 1989 results. *Newsweek* photos featured women 37 percent of the time; *Time*, 27 percent; *U.S. News & World Report*, 23 percent. Female bylines were highest in *Newsweek* at 37 percent and lowest in *U.S. News & World Report* at 29 percent. Although these figures show increases from the initial study in 1989, they are low compared to female representation in the population.

.... *Women in Communications, Inc.*, November 1, 1991

WHO RUNS THE CONSERVATION MOVEMENT?

Ask minorities and many will say that the movement is driven by a white elite who resist change. Whatever the reasons, the fact remains that the white conservation profession is a predominantly white male work force. Regardless of the viewpoint, the need to diversify is clear.

The Conservation Leadership Project (CLP) conducted by the Conservation Fund in 1989 surveyed more than 500 conservation leaders. The project noted that "virtually none of the mainstream groups...works effectively with, or tries to include people of color, the rural poor, and the disenfranchised." Among the six distinct strategies to improve organizations' effectiveness at all levels of the conservation movement, the CLP report noted the need for participation...

Women and minorities have been rarely placed in upper management positions. Second, the organizational priorities of many organizations do not actively address or value the issues and environmental concerns of the minority community. Third, minorities have often depended economically on the very organizations and corporations that environmental organizations seek to change.

Finally, the cultures of many of these organizations are not prepared to embrace, celebrate, and manage the strength and productivity that a diverse work force can offer.

....Marta Cruz Kelly, *Earth Work*, September 1991

NEW STUDY ON WOMEN IN THE WORKPLACE HAS SOME OLD NEWS AND SOME GOOD NEWS

Women at Thirtysomething: Paradoxes of Attainment is a report issued by the Office of Educational Research and Improvement of the U.S. Department of Education. For many women, more education has not necessarily meant more money....

Clifford Adelman, the author, director of the Division of Higher Education at the U.S. Department of Education, found that women for the most part made greater investments in their educations than men, investments that should have paid off for them in the labor market but did not--or at least by age 32.

The study shows, with regard to academic performance—"one of the principal elements of the quality of human capital investment" in the labor market—that women consistently outperformed or equaled their male counterparts:

- the women's mean high school class rank exceeded that of men by a minimum of 10 points;

- contrary to findings about women's mathematical achievement standardized tests, women who took a college prep curriculum in high school that included a solid background in math or science did just as well on the SAT as men who had the same curricular background;

- women were more likely than men to have won scholarships during the first two years following high school;

- unlike the men, women's actual educational attainments exceeded their aspirations and plans even though they were less confident than men about their abilities to achieve their goals;

- no matter what field they studied in college—even science and math—women had higher GPAs than men;

- a higher percentage of the women continued their education between the ages of 30 and 32;

- more of the women than men believed that they benefited from higher education and were happier with their opportunities to use their education in their careers....

Despite the fact that women's investment in their education generally did not pay off as it did for men, women said that they were more satisfied with their opportunities to use their education on the job. Women—in general—were also slightly more satisfied with certain aspects of their jobs than men.

They were not, however, as satisfied as men were with their career advancement...

.... *On Campus With Women: Association of American Colleges*, Vol 21 No 2, Fall 1991

SECOND MARRIAGES: STUDY SHOWS THEY ARE BETTER

When I got married I thought it would be forever. Door to door, I lived for 18 years with my ex-husband. Most of my 20s and all of my 30s were spent in his company. He put me through law school. I saw him through the writing of the book that gave him tenure. We had a child together...Now I feel a bit like a political refugee. In one and the same moment I find myself embracing the heady freedom of the new land and longing for the familiar constraints of the old.

I envy my friend Olivia. She married after 15 years as a single mother and had no illusions about living happily ever after. She gave up her name (actually her ex-husband's name) but kept her job. "I knew I loved him and wanted to marry him," she said, "but I also knew that if it didn't work out I'd be all right. A second divorce didn't scare me. I was looking forward to marriage but not because I hated being single.

This is not to suggest that all second chances invariably involve remarriage—for some, marriage is the best way to kill a relationship—but it remains the sentimental favorite for most veterans of the divorce wars. They stay the marrying kind. At every age they are more likely to marry than their never-married counterparts.

It took my friend Robert three tries--and a dose of psychotherapy--to get it right. "When my second marriage ended," he said, "I took myself to a therapist. I told him, 'This is what I do. I glom on to angry, punishing women. Help me out of this trap.'" Something in the therapeutic process turned the key, and his third wife finally sprung him.

In a study by psychologist Judith Wallerstein (and a recent book based on the study *Second Chances: Men, Women and Children a Decade After Divorce* written with Sandra Blakeslee), the author notes: "Although folklore has it that people are fated to make the same mistakes in their second marriages, most of those in the study did not." For both men and the women studied, there was a conscious decision to behave differently in the new marriage. And better.

....Susan Rieger, *Lear's*, December 1991

HOW TO HELP YOUR CAREGIVER

Fast-track parents do not deal well with caregivers because they suffer from latent guilt for leaving the child to begin with. Get over your guilt, begin to supervise the caregiver as you would a professional employee. Make it clear that you want your child treated as *you* would--with discipline and with an interest in teaching the basics of self sufficiency to the child.

....Andree Aelion Brooks, *Bottom Line*, November 30, 1991

The Tropical Forest History Group of the International Union of Forestry Research Organizations (IUFRO) will sponsor several sessions on the environmental history in Africa at the fall 1993 annual meeting of the African Studies Association in Boston. For information on papers contact Alice E. Ingerson, Forest History Society, 701 Vickers Ave., Durham, North Carolina 27701 (919-682-9319).

The White Pine Symposium will be held September 16-18, 1992 in Duluth, Minnesota. Program chair is Bob Stine, Cloquet Forestry Center, University of Minnesota, 175 University Road, Cloquet, Minnesota 55720 (218-879-0850).

The Fourth Annual Society for Ecological Restoration Conference will be held in Waterloo, Ontario Canada on August 9-14, 1992. For more information write them at 1207 Seminole Highway, Madison, Wisconsin 53711 (608-262-9547).

An International Agroforestry Symposium will be held April 28-May 5, 1992 in Nanjing, China. For

information, contact Li Rongshen, IAFS, Nanjing Forestry University, Nanjing 210037 China. The phone is 025-501389; the FAX is 025-502936.

The Symposium on Society and Resource Management will be held on the University of Wisconsin campus on May 17-20, 1992. The focus is social and biological sciences interactions on environmental issues. Contact Donald Field, School of Natural Resources, University of Wisconsin, 1450 Linden Dr. Madison Wisconsin 53706 (608-262-6968).

The Forest History Society has Alfred D. Bell, Jr. travel grants for 1992. The grant is for up to \$750; seven grants were awarded last year. Write them at 701 Vickers Ave., Durham, North Carolina 27701 (919-682-9319).

The American Fisheries Society's focus for its September 1992 meeting is "Will we be ready technically, socially, politically." It will be held in Rapid City, South Dakota. Write AFS 5410 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814-2199 (301-897-8616).

The Northwest Fire Prevention Cooperative's workshop in Fire Prevention Education will be held February 10-14, 1992 at Gleneden Beach, Oregon. The Co-Ops are made up of city, rural, federal and state agency representatives. Write Lou Gugliotta, Jackson County Fire District # 3, 8333 Agate Rd., White City, Oregon 97503 (503-826-7100).

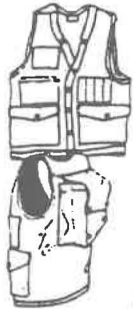
The Wildland Recreation and Urban Culture Research Project of the USDA Forest Service's symposium on social aspects and recreation research February 19-22, 1992 at Ontario, California. Write Lisa Caro, Pacific SW Research Station, 4955 Canyon Crest Drive, Riverside, California 92507 (714-276-6556).

The American River Management Society will meet April 28-May 2, 1992 in Portland, Oregon. Write Conference Assistant, Oregon State University, College of Forestry-Peavy Hall 202, Corvallis, Oregon 97331 (503-737-2329).

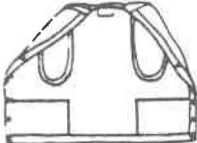
The North American Wildlife and Natural Resources Conference will be held in Charlotte, North Carolina on March 27 to April 1, 1992. Contact the Wildlife Management Institute, 1101 14th St., NW Suite 725, Washington DC 20005.


At the Society for Range Management meeting to be held in Spokane Washington February 9-14 1992, there will be a Professional Women's Breakfast on February 11th. Speakers will address the topic "Different Leadership and Communication Styles." Members of the panel are Elaine Zelinski, Deputy State Director, BLM, Oregon State Office; Susan Giannettino, Forest Supervisor, Wasatch-Cache National Forest (Utah), Forest Service; Linda Hardesty, Assistant Professor, Forest and Range Management, Washington State University. The moderator is Dixie Ehrenreich, Editor of *Women in Natural Resources* and Research Scientist, University of Idaho. For more information on the conference, contact SRM at 1839 York Street, Denver, Colorado 80206.

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TO SUBMIT SHORT DEPARTMENT ITEMS: Copies or originals with author, source, date, and submittee are all that is required.

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