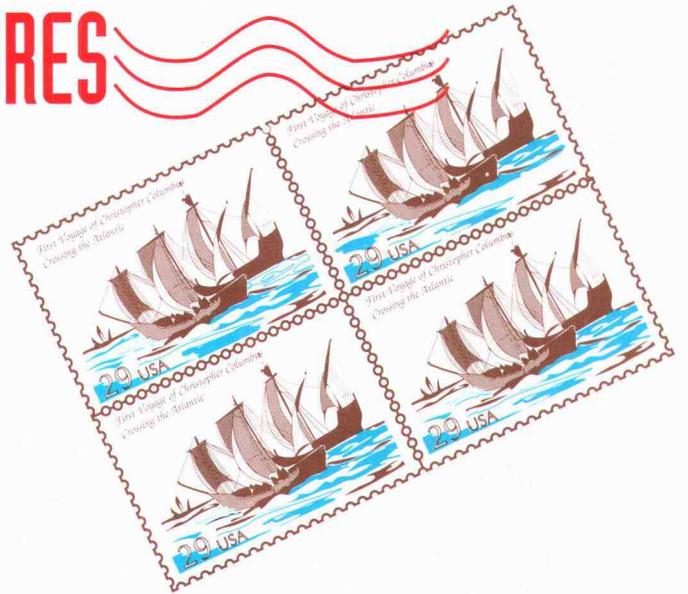


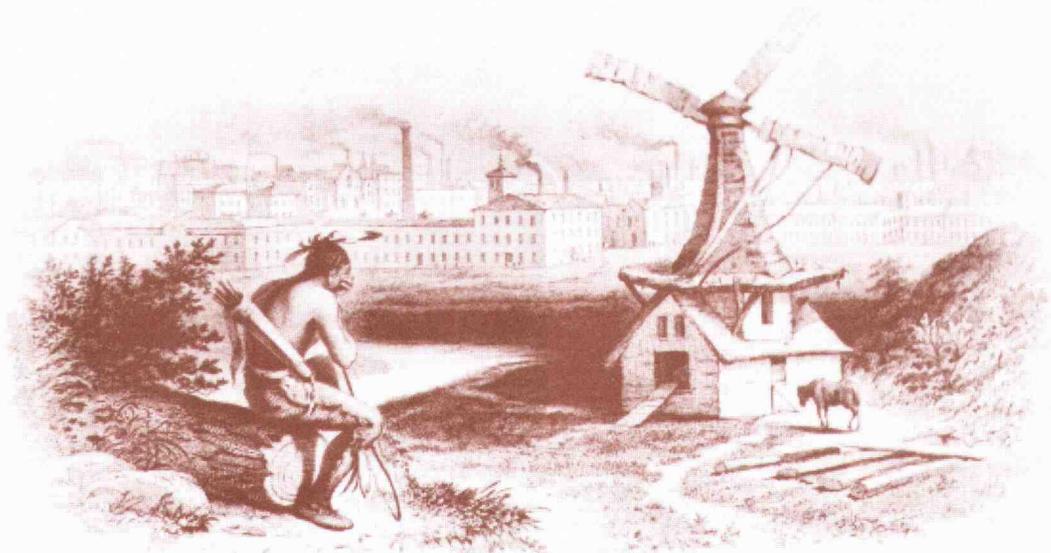
CORNALLIS, OR 97331  
1992

CULTURE and NATURAL RESOURCES  
**STARKER LECTURES**



# Culture and natural resources

Compiled by  
Bo Shelby & Sandie Arbogast



COLLEGE OF FORESTRY  
OREGON STATE UNIVERSITY  
CORVALLIS, OREGON

## ACKNOWLEDGEMENTS

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## FOREWORD

**T**HERE IS A STRONG LINK between culture and natural resources. Cultures are shaped by the resource context in which they occur, but they in turn form the resources around them into their own image. We hope to capture this interaction and tension with the theme of this year's Starker Lectures, "Culture and Natural Resources." Our speakers represent diverse views of both cultures and resources.

MARC REISNER is a writer, lecturer, and conservationist. He contends that our use of resources in the American West has traditionally fallen short of sustainability; moving toward that ideal will require giving up some cherished myths of the frontier.

WINONA LADUKE is the Executive Director of the White Earth Land Project and a member of the Anishinaabe Tribe of White Earth, Minnesota. Her presentation considers a number of resource issues in light of the concept of "mino bimaatisiwin," which defines the reciprocal relationship of indigenous peoples with the land.

DR. DAVID PEARSON is Research Professor of Zoology at Arizona State University. His presentation highlights the plight of tropical rain forests and the need for cooperation among

cultures to save both the forests and cultures they support.

DOUG MACCLEERY is the Assistant Director of Timber Management for Forest Inventory and Planning with the U.S. Forest Service in Washington, D.C. He uses a historical perspective to discuss trends in land allocations and uses since the settling of the United States by Europeans.

DR. MARGARET SHANNON is Corkery Professor of Forest Policy and Law at the University of Washington. She offers a feminist's insight into the ways in which the views of women can affect resource management and policy.

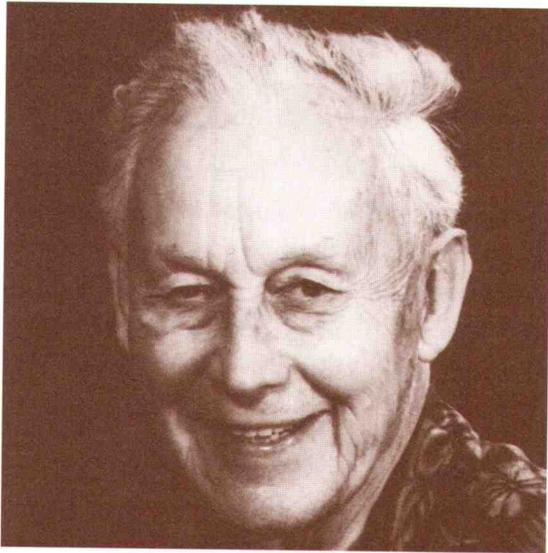
This year's Starker Lecture Committee decided to encourage greater diversity in the formats for the write-ups presented here. Accordingly, the presentations by Marc Reisner and Margaret Shannon are derived from transcripts of the presentations they gave in their public lectures, resulting in a more conversational style. In contrast, Winona Laduke, Doug MacCleery, and David Pearson chose to convey the essence of their public presentations in a more condensed format.

We hope you enjoy this diversity.

*Bo Shelby,*  
Professor, Forest Resources

T.J. & Bruce Starker

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## DEDICATION

**T**HURMON JAMES STARKER (universally known as T.J.), was born in Kansas and lived his youth in Burlington, Iowa (hometown of Aldo Leopold). He moved with his family to Portland in 1907. He began working in and studying forestry, graduating in the first class of foresters at Oregon Agricultural College in 1910. He then studied two years for an M.S. degree in Forestry at the University of Michigan and returned to Oregon to work for the U.S. Forest Service.

Subsequent employment with the forest products industry and a variety of summer jobs while he was teaching forestry at O.A.C./O.S.C. gave T.J. broad and thorough experience in all aspects of forestry. T.J. began purchasing second-growth Douglas-fir forest land in 1936, the beginnings of the current Starker Forests. Through his work experiences, teaching forest management and extensive civic involvement, T. J. had a major influence on sound forestry and community development in Oregon.

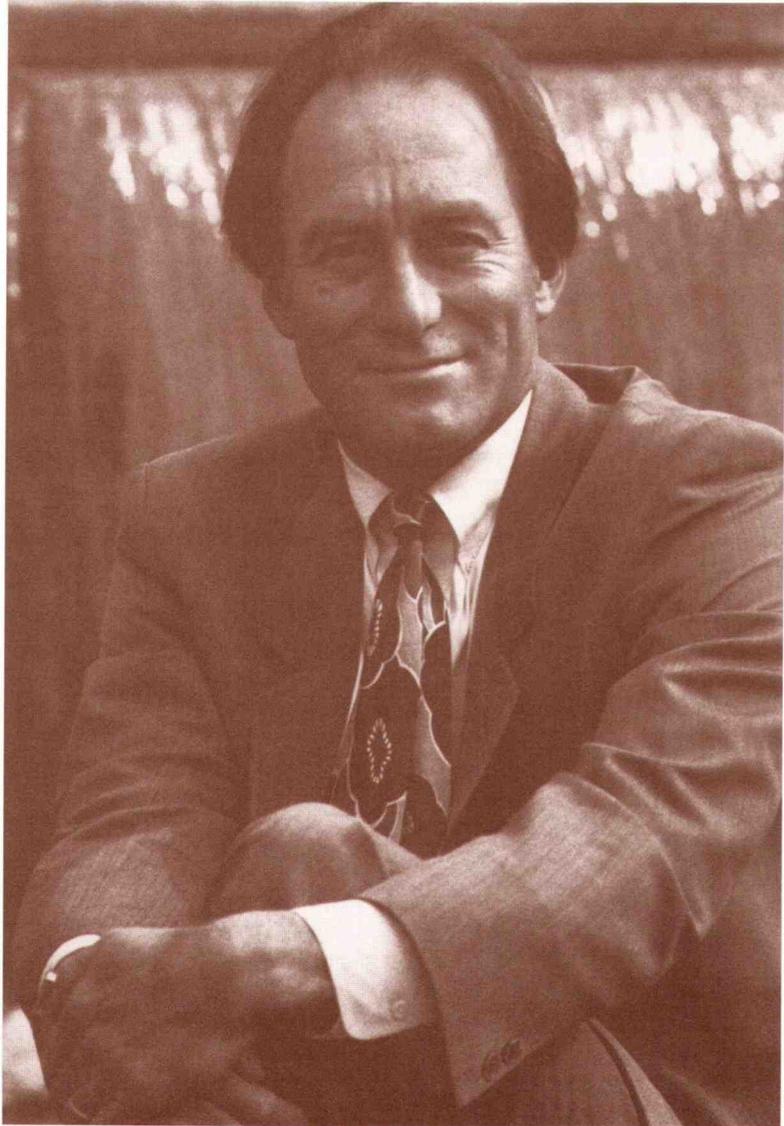
**B**RUCE STARKER studied for a forestry degree from O.S.C. in 1940 and an M.S. in Forestry in 1941. After service with the Coast Guard, Bruce joined his father in acquiring and managing Oregon forest land, always with an eye for sound reforestation, management and conservation for multiple benefits and values. He worked with university, state, and federal forestry agencies, as well as with private industry, to advance

**The sound, progressive forestry and community spirit of T.J. and Bruce Starker continue today.**

reforestation, management and equitable taxation to encourage private forest management. Bruce continued the family tradition of active community service in many ways, including civic activities, regional forestry work, and contributing to writing the Oregon Forest Practices Act.

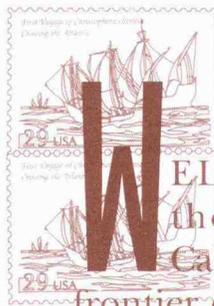
Forestry in Starker Forests has changed with advances in knowledge, technology and public environment, but the constant value of tending the land is unchanged.

MARC REISNER



# We Killed The Frontier, Now Let's Bury The Myth: Sustainability In The American West

By  
MARC REISNER, writer, lecturer,  
and author of *Cadillac Desert* and  
*Game Wars*



WELL, I'VE COME ALL the way up here from California to run down the frontier ethic and talk about sustainability—which may strike some of you as ironic, since California was in its time probably the foremost example of a frontier mentality. Oregon was settled by

The planet is not a shmoo. It's becoming a matter of life or death for the planet that we figure out how to stay wealthy and how to sustain the planet that makes us so.

Presbyterians. California was settled by prospectors. And now California is a monument to wretched excess—certainly not to sustainability. Los Angeles is going to run out of air even before it runs out of water. But, as Yogi Berra said, “You can observe a lot, just by watchin.” California is where I live, and, even if what I experience everyday has nothing to do with sustainability, the concept is always on my mind.

## Marc Reisner

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I just turned 44 a few days ago and, so I'm sort of an old geezer now, I guess—at least my nieces think so. But, in my lifetime, which we'll call it half a lifetime—although I don't know that many 88 years olds—the world population has almost doubled from about 3 billion when I was born to almost 6 billion. It's going to be 6 billion by the end of this decade. So there, in a nutshell, is the real sustainability problem. We have too many people on the planet. We can't sustain life on earth with continued human population growth at this rate. I happen to believe that we need negative population growth. I know I just offended some of you who may be Catholics or Evangelical Christians out there. But I also know that I'm going to offend a lot of people here today, so I might as well start with you. It's our choice between mass suicide and sustainability—that's what the population issue is. There—that's the pessimistic part of my speech. Now I'm going to turn into a little bit of an optimist.

The concept of sustainability is nothing new. It's as old as time and it's something that we all have to practice all the time. It's something that rich and poor have to live with on a personal level.

People who settled the Plains had to worry about not eating the seed corn when they got desperately hungry because that was what they were going to live on the following year. That's one form of sustainability. If you were a Pharaoh in Egypt or mogul in India, you had to worry about sustaining 300 concubines—and your sex drive too, which is another form of sustainability. Personal moderation—which we all practice preferably in moderation, as Mark Twain said—that's another

kind of moderation or sustainability that we have to live with...at least if you want to be old. The moral, I guess, is that we're used to sustainability on a personal level. But the idea of planetary sustainability is really a new, bizarre, alien concept to most of us. We can't seem to fathom fully the destructive energy of six billion humans scrambling for wealth.

When I was a little kid I don't remember anybody talking about sustainability—questioning whether the human race could survive on this planet. I remember in 1970 when I got into the environmental business there was some talk about the fisheries perhaps collapsing world-wide, but the idea of the forests being logged at such a rate that they might all vanish—the rainforests and all of this kind of stuff—of agriculture eroding so much top soil that someday we might have nothing to eat—this was all completely beyond the horizon. And now, just in the last ten or 15 years, these issues have become THE environmental issues of our time. And because we haven't begun to solve them, I think they are going to remain the environmental issues of our time for a long time to come. What you really ought to do after I get done with you here is go up to Portland and hear Jean-Jacques Cousteau's son, Michelle give a talk. He says that worrying about clean air, clean water, sewage treatment, and all these things that the environmentalists usually worry about is sort of like being the cleanup crew after a hurricane has gone through. Sustainability—it's something we're going to have to tackle, and we don't know how.

I want to talk, I guess, about three places I know—at least I know something about them and the sustainability issues they

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raise. Now, what usually happens when human beings impose themselves on a landscape is that we—because we're so smart, you know, we're so devilishly inventive and smart—we figure out how to take a raw resource and make something magnificent out of it. Something richer in a very different sense than what used to be there. But we sacrifice something in the process, and usually what we sacrifice is something that could have been sustainable and what we create is something that often isn't sustainable. So I'm going to give you three examples going from bad to worse, of this kind of phenomenon.

### COLUMBIA RIVER

I'm going to start close to home with the Columbia River. The Columbia used to be the premiere salmon river in the world, supporting a run of maybe 15, maybe as many as 28 million spawning fish that came back up the river every year, even after fishing had gone on for some time. Some of these were the biggest salmon in the world. The "June hogs" weighed 80 lbs, 100 lbs—they were super fish.

Now, in 1928,—I think it was '28; maybe it was '24—the first dam was built on the Columbia River. And since that time about 36 more big dams have been built on that river and its main tributaries. And out of this dam construction came two types of riches. One, of course, was hydropower—something like 25 thousand megawatts of hydropower. It is the most intensively developed big river for hydropower in the world. And I think it produces more than any other river except maybe the Paraña in South America.

The dams also gave people the oppor-

tunity to take a lot of water out of the river. This wasn't possible before the reservoirs were there. So the other form of riches that we created with that river was irrigated agriculture. And there are millions of acres in Idaho, Washington, and Oregon that are irrigated now and produce a lot of wealth with water that used to flow down the river.

The poverty that we created, on the other hand, was a loss of the salmon. And I don't have to tell you what a huge issue that is up here. Anywhere from a million to a million and a half returning spawners are left, so the run has been decimated—I think that is the only word you can use—reduced by about 90%, at least. And going downhill all the time. There are something like a hundred separate salmon runs in the watershed, and many of them are either endangered or threatened species, or strong candidates to join the list. Enormous sacrifices are going to be asked of the power companies, the irrigators, and perhaps the logging industry to keep this vanishing resource from disappearing altogether.

Now there's always a value judgement involved in these kinds of equations. We started off thinking we need power, we need irrigated land, there're plenty of fish so let's not worry about them. And before we know it we're almost out of fish there — and we find that we're running out of fish everywhere. Then we decide the fish are so valuable, sentimentally and economically—even religiously, in a sense—that we want the runs restored.

Meanwhile, we have a whole society, whole industries, and lots of jobs that are based on the things that took the fish away. Getting the fish back is going to be very, very difficult. But it's possible and I think it is

## Marc Reisner

probably going to happen, and it may not even involve all that much sacrifice on everyone's part.

### SAN JOAQUIN VALLEY

Now, in California, we have a similar situation going on where we diverted about 70-75% of the water that used to go into San Francisco Bay every year—the spring and summer runoff from all the Sierra Nevada rivers. And we decided it made better sense to put that water in the San Joaquin Valley to irrigate agricultural crops. As a result, the San Joaquin Valley is now the richest agricultural region on earth, growing anywhere from 150 to 160 different kinds of crops. The value of agriculture in California has been estimated at about 17 billion dollars, which is more than the GNP of some African countries. And about half of that comes out of the San Joaquin Valley. There's also a lot of hydropower development on those rivers, but the main impact there was caused by taking out an incredible amount of water that used to be in the rivers. So, there we have lost a big salmon fishery, though it wasn't as big as what used to exist on the Columbia. But, we've also lost the best waterfowl habitat that ever existed on earth, except in Southern Louisiana. It was mainly in the Sacramento Valley, but also in the San Joaquin. Tulare Lake used to be the sump where the four rivers in the southern Sierra Nevada—the King, Kaweah, Tulley, and Kern—would end up. There was no outlet to the sea there, so they just pooled. And during years of extraordinary run-off, Tulare Lake was the biggest lake west of the Mississippi River—bigger than Tahoe. But it was shallow, so it was explosively productive habitat for water fowl.

There used to be thousands of people who made their living down there hunting waterfowl for the markets in Los Angeles and San Francisco. Wild ducks used to be cheaper than domesticated chickens, as recently as 1905. Now, that's entirely gone, there's not a vestige of Tulare Lake left. Ninety-eight percent of the wetlands are gone in the San Joaquin, and 94% in the Sacramento Valley. There, we lost not just a big salmon fishery, but a terrific amount of habitat that supported at one time probably 80 million over-wintering ducks and geese. We have about two million, three million left.

What makes this situation a lot worse than the Columbia crisis is the alternative economy, the manmade economy that supplanted the natural economy, is not seemingly sustainable. A lot of that land that got irrigated, it turns out, is highly alkaline, poisoned with salts and with selenium—which is a natural salt but a very toxic one. On top of that, even with all that water being taken out of the rivers and brought down there in canals and aqueducts, the demand for water just grew and grew. Now, Bo was mentioning some of these agricultural groups I talk to down there. I always love to compare them to cocaine addicts—which of course they really like to hear. But it's true: they can never have enough water. The only answer to more water is still more water. That seems to be a suicidal course that's being taken down there. Despite all the water being diverted out of the rivers, about 40% of all the water used in California is ground water. So, you have an aquifer under the San Joaquin Valley that in normal years is being depleted at a rate of about 700 billion gallons a year. During the drought that we've all been experiencing for years—we have for about six years in

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California—the overdraft has gone as high as six million acre feet a year, which is two trillion gallons of water.

Now these numbers, you know, with big government and a mass society. . .million, trillion, billion don't mean anything anymore. But, somebody once explained to me what a billion dollars is. If you took two dollar bills and taped them end-to-end and ran them all the way around the earth and then ran them all the way around again and then ran them all the way around again, and then tied a big bow tie thirty miles into space, you'd have a billion dollars. And we're talking about trillions of gallons of water that are being overdrafted, pumped up beyond the rate of natural replenishment. And one relatively small value. Between the overdraft and the contamination of the soil—with selenium, with salts, with boron—it is now estimated that at least a million acres of some of the most productive agricultural land in the world is doomed. It will not be rescued. The only way to rescue it really is to bring the Columbia River down there. . .which will not happen, I guarantee you—because you won't let it happen. Right? Please don't let it happen. But that's the kind of rescue we're talking about—if even that would work. So, we created a short-term, highly profitable industry out of an eternally sustainable natural resource. And the industry that we created is now in the early stages of grand-scale collapse.

### MISSISSIPPI RIVER DELTA

Now, Exhibit C, The Mississippi River Delta. I wrote a book that Bo, my agent, my new agent, just mentioned. It's about an undercover game warden. The guy is based in Louisiana. His name is Dave Hall, and he's

lived there all of his life and he's, as any undercover agent is, he's a crazy person—you have to be crazy in that business. He infiltrates rings of poachers,—ivory, alligator, and crocodile poachers—all over the world. Bad people; it's work that makes you crazier than you already are. But, nothing has driven Dave Hall crazier in his life than the loss of the Louisiana Delta which he grew up in. Now this, I think, can accurately be described as the single worst environmental calamity occurring on this continent today, and hardly anybody knows about it outside of the state. What's happening...well, let me tell you what used to happen.

What used to happen is the Mississippi River, which drains the third largest watershed on earth, would flow down, and it would overflow spectacularly. When De Soto came through there—he was the first white person who came through, back in the 1400s—he ended up dying of a fever in a tree because the Mississippi at the time was estimated . . . of course the Spanish were always a little bad on statistics, but they estimated the river was sixty miles wide. And in 1928, even though it was regulated to some degree, it was forty miles wide. So it could have been true. It may have been wider than sixty miles. All the Indians were sitting up in trees and fishing for gar with pieces of drowned animals as bait. That's how they survived during Mississippi River floods. What those floods did was, they brought down the Middle West—and the East and West, too. The eroded topsoil from Shelby, Montana to Ceasar's Head, So. Carolina to Tucumcari, New Mexico—that's the extent of the watershed. All of that water bringing all of that silt to Southern Louisiana.

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It's estimated that in the time of Sumeria, maybe four thousand years ago, the Gulf of Mexico was at Baton Rouge, which is now about 80 miles inland. When Christ was born, probably it was around New Orleans, now about 50 miles inland. It won't be inland for long.

14 What's happened is this: we decided we could improve the Mississippi River and its tributaries. First, by building levees along the river to protect New Orleans, which I think by any measure was an asinine place to locate a city—all the mosquitoes, it's below sea-level, it's right in the world's foremost hurricane path, but the French, by God, went in there and said, "We're going to build a city here and we're going to make nature conform to our plan." So, they invented the science of, or re-invented the science of building levees. And then, when the Corps of Engineers got involved—anybody here from the Corps? Come on, raise your hands, there must be somebody here. Anyway, they got involved and they had the federal treasury at their disposal, and they mined it with a backhoe—and they spent billions and billions of dollars and they build some serious levees on that river. They love, they used to love, to take people around—before they became the world's number one protector of the environment—and explain how the levees were so big that each linear inch outweighed an elephant—or two elephants. I don't know if they were Indian or African elephants. Anyway—big levees. So big that hang gliders practice takeoffs on them. But what those levees also do is they constrain the river and they don't allow those forty-and sixty-mile-wide floods to occur anymore.

Now working hand-in-glove with those levees, you have a whole lot of dams on the tributaries. The Tennessee River, which is sort of like a sausage chain of reservoirs. The Missouri River, which is by far the biggest contributor of silt, is also dammed repeatedly. If you've ever flown across the country, you've flown across those huge lakes on the Missouri which are 100 to 150 miles long. Those are some of the biggest dams in the world. In fact, I think, about six of the top 20 in size—not in height, but in mass—are on the Missouri River. Those dams have already stopped billions and billions of tons of silt. It comes to a dead halt behind those dams. I once sat down and calculated—you know, again, huge figures don't mean much. So I converted tonnages to trucks and took a two and a half ton truck, which is sort of a U-Haul truck, as my standard, and figured out that the Mississippi River used to bring down 262 thousand U-Haul trucks of silt every day. What we're down to now is maybe 60 thousand, maybe 70 thousand. It sounds like a lot, but it's not nearly enough to maintain the old dynamic equilibrium of land and sea. So, even if the levees weren't there, there is not enough silt left in the river to build the land. What used to happen—this is dynamic equilibrium—was a constant war between the sea and the Mississippi River. The Mississippi would bring down silt. It would build up land. The Gulf of Mexico would charge in, especially during hurricanes. It would eat up the marshes; the saltwater would kill the marshes; the sea would advance. The sea has also been rising at a rate of a couple of centimeters a century, I think, since the last Ice Age. But despite that, the Mississippi in its limited sphere of influence

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over-matched the Gulf. It created new land. About one-third of Louisiana was formed within the last three or four thousand years. And now, the whole process has gone in reverse—because of the levees, because of the dams, and because of...oil.

Now, some prospector went through Louisiana—some Texan, of course—in 1929, not very long ago, and had a funny feeling about a piece of Louisiana marshland. They hadn't gone into these marshes yet to look for oil because it was just too damned difficult. The only way to get around in the marshes is to be an alligator or to be a Cajun—because you have to kind of walk and swim and slither at the same time. I mean, this is seven million acres of drowned land down there. But this Texan, whose name was Haywood, thought there's got to be oil under those marshes, and he dug a well. And of course a gusher went up. So oil became a huge industry just within the last fifty years in Louisiana. Now, the oil companies had the same problem—getting around in the marsh. How do you get in there to lay all your equipment in and dig the wells and so on and so forth and bring the oil out? Well, you get rid of the marsh. It's real simple. You dig what used to be called tranasses. This is how the Cajuns got around these marshes. They dug these little channels with little flat-bladed shovels that were just wide enough for their pirogue, which was a little hollowed-out cypress-tree boat. Well, the oil companies said that's a great idea. But let's build these tranasses about two hundred feet wide so we can get some serious equipment in. And that's what they've done. In the last fifty years about ten thousand miles of canals have been dug through these marshes.

Now, this is very fragile coastal marsh—it's ephemeral. It comes and it goes, and nothing kills it faster than salt water because it's mostly freshwater marsh. It's on the coast, but it's freshwater marsh. So, between the saltwater coming in the canals and killing the freshwater marshes and the canals widening—some canals have started out a hundred feet wide and are now half a mile wide—and the dams stopping the silt and the levees, the big levees, Louisiana's disappearing off the face of the earth. The land loss is about a hundred acres a day. Think of that. About 50, maybe 60 square miles a year are disappearing underwater. Plaquemines Parish, which is one of the parishes south of New Orleans along the Mississippi, is scheduled to go entirely out of existence by the year 2035. Now of course, if we have a few big hurricanes, they can accelerate this process dramatically—even exponentially.

Now in terms of natural resources, what does this mean? Well, we built the dams so we got river regulation, we got fewer floods, we got a little bit of navigation out of the Missouri River, we got some hydropower out the dams—we got a lot of hydropower out of the Tennessee. The levees, of course, protected New Orleans and allowed the city to be a port because you can have deep draft ship traffic in there. The oil that comes out of the marshes is valued at billions of dollars every year. But this is an example where the natural resources that were supplanted or destroyed—and it's getting worse all the time—were so valuable that by some calculations, the loss will soon be equal to the gain.

There's a professor at Tulane Law School named Oliver Houck—he used to be chief counsel at the National Wildlife

## Marc Reisner

16 Federation—who has made this the kind of obsession that Dave Hall has made it. He has calculated—and whether you believe him is up to you—that about 14 or 15 billion dollars worth of productivity comes out of, is the result of development of southern Louisiana—the levees, the oil exploration, and so on and so forth. But about 10 to 11 billion dollars is the loss: the loss in water fowl, the loss in fish, the loss in shellfish. It used to be when you went into a bar in New Orleans you ordered a beer which cost maybe a nickel and they gave you a plate of oysters free. I think a 20 lb. bag of crabs, blue crabs, was about a dollar. Cray fish were cheaper than that. I mean it was the fat of the land. There were probably 150 million overwintering waterfowl down there. It was the most spectacular waterfowl habitat anywhere on earth. Half of that is scheduled to disappear within the next 25 years. All of it could ultimately disappear. The city of New Orleans will drown unless we somehow figure out how to protect it, because the ocean is advancing. But protect it at what cost?

You can dip your finger into the marshes just to the east of New Orleans and taste saltwater and brackish water today. Ten years ago, you had to go 20 miles further east to taste it. Again, a big hurricane could make it all happen faster. So, what we got was a short-term economy, and our descendants are being mailed the bill. We got dams that are going to silt up maybe in . . . oh, depends on whom you believe, 75 years, 200 years, 300 years. On the Missouri River, which drains a highly erodable watershed, they'll silt up fast. Then the reservoirs are going to be good farm land, but not usable for much else. We got oil that's going to run out probably in 30 to 50

years, depending how much we import, and we've got shipping that depends on the port of New Orleans. Oliver Houck says New Orleans is going to be at the door of the Gulf in about the year 2040, which is 50 years away, unless something is done.

Now the marshes, you know, create a hurricane buffer which is no longer there when the ocean is at your door. What the Corps of Engineers is talking about now is building enormous ring levees around the city. Sort of a vertical moat to keep the hurricane floods from coming in. Ringing Morgan City, which is just a little, tiny city down there, they estimate would cost about half a billion dollars. So ringing New Orleans is going to cost billions and billions and billions of dollars if that even works; nobody knows if it does. The only other answer really is to tear out the levees, at least below New Orleans, tear down the dams on the Missouri River, or plug up all those canals, which will not happen because there's too much wealth being generated by those things operating as they do. So, I raise this, I guess, as an example of non-sustainability that we can do almost nothing to correct.

The problem with human beings is we have such capability—so much capability and so little foresight. We can't figure these things out before we get in so deep that we don't know how to climb out of the doo-doo. And there are examples after examples of this. Now, sooner or later, I have to get into the forestry issue. (Must have been sooner.) You know, I don't tell lies about things I don't know much about, and I don't know much about forestry. I've read a lot of documents coming out of the environmental business

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that say we are logging our forests in the Pacific Northwest at a rate that can't be sustained. I've read industry documents that say just the opposite. I think it depends a lot on whether you're talking about private land or whether you're talking about National Forests. But there certainly is evidence that lands that have been logged are not regenerating at the rates they were expected to. In California, there is evidence that what used to be coniferous forests are chaparral because, believe me, we logged like nobody ever logged down there. That was back during the time of the Gold Rush. When these forests were logged, with our extremes in climate—which means terrific rains in the winter and no rain at all in the summer—a lot of topsoil probably eroded and the forests as they were never came back. Now, I'm not going to get into an argument with some of you who know much more about this than I do. But I think a case can be made, at least worldwide, that we're logging at a rate beyond sustainability—that we're grazing at a rate beyond sustainability, and, in the case of Los Angeles, where you have a city that is going to run out air before it runs out of water, we're settling beyond sustainability. We're putting too many people in confined places—that simply can't sustain them.

Again, sustainability is a new idea. It's a new concept when you apply it at this macro level. We're way behind the learning curve. We really don't know how to make human activity sustainable. We are mining almost everything.

### MOVING TOWARD SUSTAINABILITY

Now, to begin to draw this to a close on a happier note, I think that there are some

examples that you can point to where we can make our actions more sustainable and still provide lots of wealth and lots of employment. One of my favorite examples happens to be a project that I'm a consultant to so, of course, I'm going to say nice things about that. In the Sacramento Valley, we have about 600 thousand acres of land that can only grow rice. Now, when I wrote *Cadillac Desert*, I did some follow-up research and I discovered that the five biggest water users in California are in this order: irrigated alfalfa, irrigated pasture, irrigated cotton, irrigated rice, and Los Angeles. Everybody used to think Los Angeles used 90% of the state's water. Not true. Los Angeles uses actually only two million acre feet. Alfalfa uses twice as much and produces a lot less wealth.

### RICE AND WATERFOWL HABITAT

The ultimate example, to me, of mis-allocation of water was rice, because there's a crop that grows in standing water in the Sacramento Valley, and if you've driven down Interstate 5, you know it hits about 190° down there in the summer time. It just didn't make any sense to me. So I built a kind of cottage industry around attacking the rice crop in California, and I made some pretty good money at it. Then, one day, I got a call from the rice growers' association, who invited me out on what they called, with no trace of irony, a "good-will" tour. So I went. I went on the theory that you should always get to know your enemies, in order to hate them more. And, of course, I had 20 or 30 growers all lined up in the room like a country church, and they all formed in a semi-circle around

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me and let me have it. But they did convince me of several things

18 First of all, that the rice acreage supports a lot of waterfowl. Secondly, that it supports a lot of other species as well. Third, because of the nature of the soils, that they can't grow anything else but rice on that land. The rice acreage is what used to be the wetlands. Wetlands are by definition poorly drained. And this was all the alluvial overflow from the Sacramento River. The fine silt that settled down over eons became this so-called adobe clay soil, which is virtually impervious. It doesn't drain. It rains on that soil in the winter time and it just sits there. The evaporation rates are greater than percolation rates, which is very rare in agricultural soils. So, some poor farmers came out from Nebraska in the late 1800s, lured by the railroads, and were told that they could have a wonderful life in California growing all these wonderful crops, and they dumped them in the Sacramento Valley on some soil where they couldn't grow anything. Everything they tried to grow didn't. But, they finally figured out that rice thrived—and they probably had never eaten rice in their lives! They're all Swedes. Anyway, there developed in that region a rice economy of about 450 thousand acres. And these guys convinced me that if it weren't for the rice, there would be only one other possible crop, which is safflower, which is of no use to anyone except bees, I guess. Those were the options.

So, we've created a project now where we're going to try to borrow—we being the Nature Conservancy and some other conservation groups that I'm working with—we're going to try to borrow their land in the winter

time and we're going to flood it. We're going to give the rice growers more water, not take water away from them, but try to give them more, in the winter when diversions don't harm the salmon fishery. When you get the rivers really going in the winter time, instead of five thousand to six thousand cubic feet per second in the Sacramento River, you get 300 or 400 hundred thousand at times. We're going to try to divert that water. There should be no impact on the fishery at that time of year. We're going to flood that rice land and create "de facto" wetlands. You get a huge amount of waterfowl food production when you flood these wetlands, not just the leftover rice, a couple hundred million pounds of it after harvest, but snails and invertebrates and copepods and all kinds of other creatures, and shoots that waterfowl have to eat in order to survive the migration back north.

So at least theoretically it works out beautifully. You grow rice in the summer, you harvest the crop, you make money on the crop. Then, you grow waterfowl in the winter. Our consulting hydrologist and biologist think we could actually double the population of the Pacific flyway—add about five to ten million ducks and geese by flooding a couple hundred-thousand acres of land, which we hope to do. Then, just as the waterfowl are beginning to go back north, you drain the lands and grow rice again. You don't have to spend hundreds of millions of dollars buying land to create refuges. And, in fact, with unemployment rates about 25% there, most people are violently opposed to the idea of buying land for refuges because you inevitably take agricultural land out of business. So we hope that we've come up with a scheme that

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restores nature and allows business as usual to a large degree. We don't lose any jobs; we create jobs.

### LEAVING WATER IN THE RIVERS

It used to be in the West that the whole idea of what you did with a river was you took all the water out of it because that was the only way you did anything useful with it. It was no damn good in the river, but it could make you a lot of money if you took it out. It started with hydraulic mining in the canyons when they got where they couldn't pan the gold anymore. It was all panned out; then they started attacking the walls with these enormous hydraulic hoses and whole canyon sides collapsed. You know about that. That's how the doctrine of western water law got established. Appropriated rights doctrine means you take water out of the river, you don't leave it in there. It's not a beneficial use under the law or it wasn't until recently if the water was in the river. But it was a beneficial use if you took it out. So it was illegal, in effect, for water to be in the river! Now, that's beginning to change. But the main problem for those of us who've argued for better in-stream flows is that we can't come up with a good economic rationale for them. Now, Bo Shelby, as a kayaker, knows something about this. He'll argue the river's beautiful with water in it and it's ugly with water out of it. We, kayakers, like to go down the river and we spend some money. You know, we buy snacks and twinkees and stuff. So we add to the economy of the region. But compared to a guy who's growing, let's say, a hundred thousand acres of cotton on what used to be a river, it's tough to make economic arguments. Lately,

though, our values have begun to change, in part because our economy has begun to change. It's beginning to make better economic sense to leave water in the river rather than take it out.

I just gave a talk to the Rocky Mountain Institute to a bunch of business and utility leaders—tried to convince them that what I was saying here was true. When you take a crop like alfalfa, which uses 25% of all the water in the state of Colorado, and figure out what it's worth, it's only worth \$170 million which, you know, is nothing anymore. Right? Then you take tourism, which is largely water dependent in that state. People don't come to Colorado to watch alfalfa fields being irrigated. They come to fish the rivers, to kayak the rivers. The Arkansas River is now the most popular white-water river in the world. Well, the tourism industry is worth about five billion dollars to the state of Colorado, as opposed to the \$170 million that alfalfa is worth, and alfalfa takes 25% of all the water used in the state. So doesn't it make sense to leave more water in the rivers so people can actually use it in the rivers? So they can fish it, kayak it, spend some serious money, not just buy some Twinkees, but you know, stay in a motel and help the local economy get going. I'm being tongue-in-cheek, but water tourism is becoming a very important industry: rafting along the Arkansas River, the upper Delores, and fishing—especially fishing 'cause the fishermen, you know, spend \$170 million in a couple of weeks on lures, flies and alcohol. On top of that, if you leave the water in the river, you create potential hydropower downstream that you lose when you take water out to irrigate crops. The rule of thumb in

agriculture is, if you take out 200 cubic feet per second to irrigate alfalfa, about 100 cfs manages to percolate back and become the river flow again. The rest is evapotranspired. Well, you calculate the loss of 100 cfs over a three thousand foot drop, which is what you have below you in Colorado. You've got Hoover Dam, Glen Canyon Dam, all the dams on the tributaries above them. That 100 cfs that you lost would be worth about 24 megawatts of power if it were still in the river. That is worth about five million dollars over the course of the irrigation season. And the equivalent amount of alfalfa that you could raise would be worth about \$400 thousand. So again, you've created ten times the wealth by leaving the water in the river. More importantly, you have advanced the cause of sustainability.

Now, you know, these are tiny, tiny little examples of what I'm driving at—but you gotta start somewhere. The main thing we have to do—to bring this to a close—is overcome a couple of myths.

#### THE FRONTIER MYTH

One, and I guess the title of my speech alludes to this, is the frontier myth, which says in effect, "we will never run out of anything." This myth is common to all giant countries. Any people who are lucky enough to inherit half a continent—Brazil, we, Canada, Russia—have always had this sense that they'd never run out of anything. So, the Canadians have gone wild with logging, the Brazilians have gone wild with damn building, because they can't really stand to look at that huge expanse of uncivilized continent. They've got to do something with it. They figure well, we can build a dam on this river.

And, there are all these other rivers. We can log this forest because there are all these other forests. We'll never run out. If you really want to get a dose of this thinking, go to Alaska. It is, I think, the prevailing dogma in the American West. But we are running out of everything. We're running out of salmon, we're running out of topsoil, we're running out of forests. Which isn't to say we stop grazing, we stop logging, and so on. But it is to say that we recognize that we can't go on this way forever.

Now, the other thing we have to realize—and this is the tough one for Westerners, I think—is that the whole myth of the frontier had a concomitant myth, which is that of the rugged individualist. Everybody believes that, you know, back East, well, it was just a bunch of namby-pambys who stayed there and everybody who came out here was a rugged individualist!

Well, now I really begin to offend people. I believe in all honesty that in the West, we have preached individualism and practiced socialism longer than anywhere else in this country. And we've done it in such clever, devious ways that we've gotten away with it.

The American West has always been an example of cleverly disguised socialism. There's always been lots of welfare for somebody or other. It began with the railroads, who got enormous grants of land in return for laying the track out here so people would come out and settle. That was welfare for the rich. Then, we have welfare for the poor in the form of the Homestead Acts, which essentially gave people free land (which wasn't available in the East) in exchange for coming out here and trying to settle it. We got all kinds of permutations of the Homestead Acts—we had the Timber and Stone Act, the Swamp and

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Overflow Act in the 1850s and '60s. What they usually ended up doing was enriching a few already rich guys. Whole redwood forests were acquired under the Timber and Stone Act because sailors could get off the ship in San Francisco, take title to 160 acres, sign the deed over to the capitalist who was acquiring the whole North Coast and then ship out. They got a bottle of whiskey, they got a night in a brothel, and that was all they really wanted.

So, socialism. When you talk about subsidizing water, you're talking about 25% of all the water sold in the West. The Bureau of Reclamation sells all of its agricultural water at hugely subsidized rates. The people in California who get water from the State Water Project, pay \$80 an acre foot. People next door who get it from the Central Valley Project pay \$6, \$8, \$10 an acre foot. WE, the taxpayers, are paying the difference. This is socialist water. Nobody likes to admit that, but that's what it is. When you set a cow out on BLM land, 300 million acres of it, you pay an average \$1.92 or \$1.94 a month to graze that cow on that land. Well, I have a rancher friend in Montana who leases land for grazing, and he charges people \$12 to \$14 per AUM. (animal unit month). So again, we're giving something away below cost.

The below cost timber sales argument, I'm not going to get into that here. Are you kidding? But, there at least is an argument that we are selling timber in some national forests below costs, an argument that's been taken seriously by a lot of people, including *ME*, and I think we can make that argument strongly in the case of the Tongass Forest in Alaska.

So, let's practice what we preach.

We've got to get beyond the myth. We've got to get beyond these programs that encourage non-sustainable living. That's really what you're talking about—when you put so many cattle on public lands that the soils are degraded; when you put so much water on land that never would have been brought into agricultural production because of the salts and selenium, but was because the water was so cheap and then the land begins to die. A lot of the stuff that we've done that I think can't be sustained was caused by the government. And this is where I suddenly turn into a Republican. Unfortunately, the Republicans by and large are the ones who want to keep these programs going. There's an irony, I think, in that, a terrific irony—but I think it's a fact. The Democrats created them over the Republicans' resistance decades ago. Today the Democrats want to reform them, but a lot of Republicans suddenly think they're great.

The planet is not a shmoo. I don't know if many of you are old enough to remember that cartoon strip, Lil' Abner—this makes me feel old. Anyway, there was the little creature about this big that just kind of drifted around and it liked to be eaten, and it replenished eternally. This shmoo has become a kind of a catchword for a great deal—too good a deal to be true. I think we've been operating with a shmoo mentality, and it has to stop. It's becoming a matter of life or death for the planet that we figure out how to stay wealthy and how to sustain the planet that makes us so. Those of you who are students are the ones who are going to have to figure it out, because my generation has done a terrible job of it. We've essentially left you a mess and I apologize. But, you know, humanity can

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rise to occasions, and this is the occasion of a lifetime for you. There is an old Chinese curse which says, "May you live in interesting times," and these are . . . very interesting times. Thank you very much.

I PROMISED I WOULD TAKE A FEW QUESTIONS, COMMENTS, OR GRATUITOUS INSULTS...

Q: I wondered if you would care to comment a little more about the concept of sustainability. Thinking about the examples you've given us whether the notion of sustainability which has sort of a warm, fuzzy feeling to it, but doesn't it in effect take one's eye off the ball? We're not so much dealing with sustainability vs non-sustainability, as we are that our actions have consequences. In fact, if one were to look at tourism in Colorado or anyplace else, one could argue that may or may not be sustainable, if there's a whole infrastructure that goes with that and there is a set of consequences—many of which are unforeseen. So, I've wondered whether sustainability is one of these nice notions, but when you really look at it, is not really where the action is.

A: Well, it's, you know the Indians, or the Native Americans, who were here before the whites came, practiced a lot of intervention in the landscape, as we now know. They burned forests. Usually, they were smart enough to burn them when they weren't going to burn out of control, but what they wanted to do was get rid of the undergrowth so they could create a lot of grass which would bring in a lot of deer. They did it for themselves. They did it so that they could eat. But, they also created a habitat for other species. They managed, they manipulated, but they didn't do it in such a monstrously destructive

way as we're doing— as, for example, is going on in the Amazon with slash and burn agriculture. And that burning that they practiced, it may have been intervention with nature, but it was sustainable intervention. What's going on in the Amazon is not sustainable. You get one or a few years of grazing down there on that soil and then it's gone. So, I guess what I'm talking about is treading more lightly. I think we're six billion people on the planet, a lot of sustainability is impossible. We can't reduce our oil consumption to the level that we're never going to run out. But we certainly can produce a car that gets 40 or 50 miles a gallon, instead of 26 miles a gallon, no matter what Dan Quayle says, we can do that.

We certainly can practice sustainable grazing—the Savery method seems much more promising when it comes to soil preservation than the kind of cattle grazing that's been going on for decades. I've even heard people argue that clearcutting may not actually be the best silvicultural method in the Northwest. They may not know what they're talking about, but I guess I'm using it as more of an ideal than as something we can actually achieve. But that's the direction we simply have to go in.

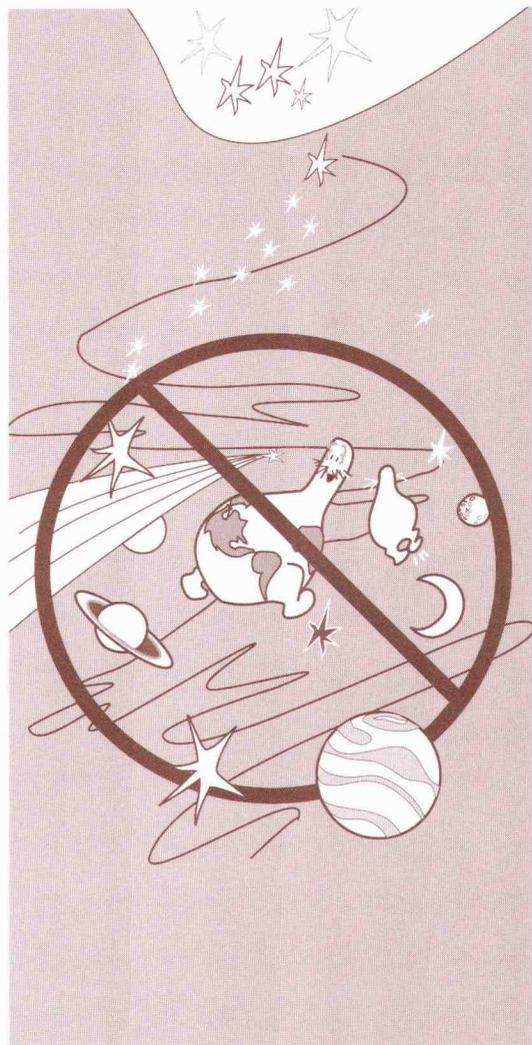
Q: How do we change our economics? I think today we have an economy that faults sustainability. Maybe if I'm a sharp economist what I want to do is cut down my forest which has a low growth rate, put my money in a bank which has a high interest rate, and live very safe, sustainably off the interest. How can you change that in a fundamental way?

A: Well, it involves, I guess, have any of you read Al Gore's book? He talks about it

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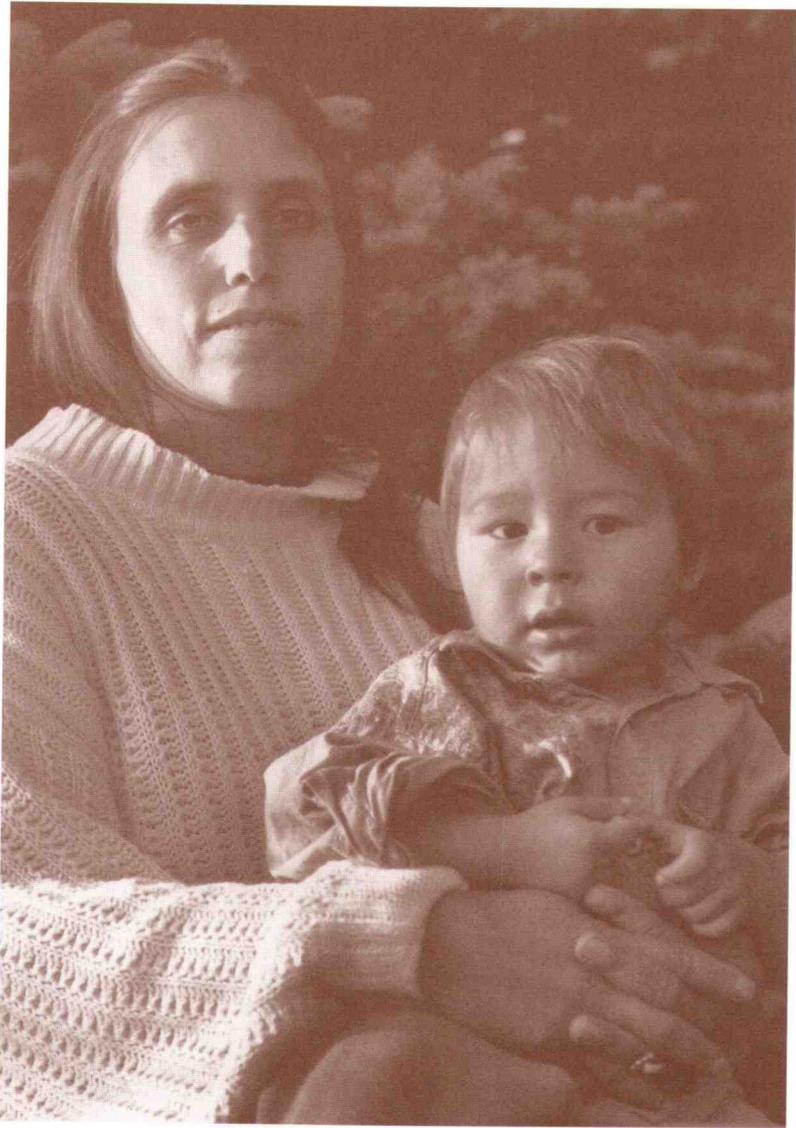
a lot in religious terms, and I think that's our most challenging leap. You know, our forebearers who came out here and decided to create as much wealth as they could as fast as possible in any way they could, were greedy to a large degree, but in the back of their minds was the command from Genesis—Go forth, subdue, multiply, conquer the earth, however it goes. Fortunately, in the Bible there's always a passage somewhere that contradicts something else that was said. I don't know the Bible well enough because I was brought up Unitarian—but, somewhere in there, there must be something that contradicts that command from Genesis. I think that, you know, fifty years ago creating a lot of wealth was something that people may have actually wanted to do for their kids. What it's evolved into today is the creation of tremendous amounts of short-term gain at the expense of our children. We are eating our grandchildren, and I don't know how anybody can argue with that. We simply have to come up with a new definition of what's good for our grandchildren. The creation of immediate wealth by as much resource extraction as possible is not good for our grandchildren. Leaving the resources alone to a greater degree is. And there you get into an almost spiritual or religious issue. I get in arguments all the time with water developers when I make this argument: "We don't care about our grandchildren." They get furious with me. They look at this fantastic system we created in California—agriculture, dams, aqueducts, look at all the wealth it creates! Look how comfortable your kids and your grandchildren are going to be—to which the only response you have is, "Sure, as long as it lasts." And I'm just saying all the evidence I see shows me it's not going to last that much longer. A lot of

people think well, we're going to come up with answers. Every reservoir is going to silt up. That's a known hydrologic fact. Now for years, people have been saying, "Well, we'll figure out how to get the silt out of the reservoirs." But, nobody's come up with an answer. We built a whole bunch of nuclear power plants without first, figuring out what to do with the nuclear waste. And we still don't have an answer to that. So, it's a matter of humility, more than anything.



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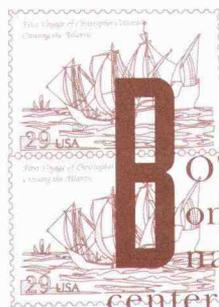


*photo by John Porter Ratzloff Photography, Maple Plain, Minnesota*

# A Society Based on Conquest Cannot Be Sustained: Native Peoples and the Environmental Crisis

BY

WINONA LADUKE, Executive Director, White Earth Land Recovery Project; Internationally recognized Native rights organizer and activist



**B**OTH WORLDWIDE AND on a North American scale, native peoples are at the center of the present environmental and economic crisis. This is no coincidence. Five hundred years after the invasion, native peoples still maintain a significant presence on the North American continent, and in the

**We hope that North American peoples will recognize indigenous models and values as the basis for future discussions of sustaining life on the earth.**

Western hemisphere overall. Although an estimated 2000 native communities have become extinct during the past four centuries, over 700 communities remain on the continent. Two hundred are in Alaska, 80 remain in California, and hundreds more are scattered as islands in a sea of what is called the U.S. and Canada, thus retaining lands reserved by treaty or other agreement.

Although native peoples demographically represent a minority population in North America, we maintain land occupancy over substantial areas of the continent. In many regions in the U.S., for example, parts of New Mexico, Arizona, northern Minnesota, the Dakotas, and Montana, we are the majority population. The statistics for the Arctic and sub arctic are even more striking.

From the 50th parallel north, in what is called Canada, the majority of the population—85% or more—is native. The Northwest Territories, for instance, is under legislative mandate to divide the land into two native territories—one Dene´ and one Inuit. This is not surprising, because almost everyone there is native. However, elsewhere across the north—northern Quebec, Newfoundland, Labrador, Ontario—all the way to British Columbia, the northern population is decidedly native. The native population is the majority population in the upper two-thirds of Canada, i.e., about one-third of the continent. Within this context, native thinking, the survival of native communities, and the issues of sovereignty and control over natural resources are central to North American resource politics and the challenge for North Americans of conscience. Consider the following:

- Over 50 million indigenous people inhabit the world's remaining rainforests.
- Over one million indigenous people are slated to be relocated for hydroelectric dam projects in the next decade.
- All nuclear weapons have been "tested" or detonated in the lands of indigenous peoples by the U.S., and over 600 of these have occurred within the lands of the Shoshone Nation alone.

- Two-thirds of all uranium resources within the "borders of the U.S." underlie native reservations, and Indians produced 100% of all federally controlled uranium in 1975.

- One-third of all Western, low-sulphur coal is on located Indian lands in the US., with four of the 10 largest coal strip mines in the country in these same areas.

- Fifteen of the present 18 recipients of nuclear waste research grants (so-called monitored retrievable nuclear storage sites) are Indian communities.

- The single largest hydroelectric project on the continent—the James Bay Hydroelectric Project—is on Cree and Inuit lands in northern Canada.

In order to explore the consequences of U.S. colonial occupation for the health, sovereignty, culture, and environment of native peoples, I will briefly discuss three subjects: (1) the relationship of indigenous values to sustainable communities and economies, (2) the legacy of colonialism and the present political and economic circumstances of native North America, with an emphasis on North American energy issues, and (3) native resistance and the rebuilding of native communities.

#### SUSTAINABLE COMMUNITIES: MINO BIMAATISIWIN

The key to a sustainable society is accountability to natural law. Indigenous, or land-based societies (wherever they are found in the world or in history) understand that all life is accountable to natural law. Laws made by such groupings as nations, states, provinces, and cities are inferior to this supreme law. In the Anishinabeg community, we have a value system and code of behavior or ethics that keeps communities and individuals in line with natural law.

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“Mino bimaatisiwin” or the “good life” is a central value to the Anishinabeg people who, to this day, occupy a great portion of the North American continent. Mino bimaatisiwin guides the way of life and is the essence of sustainability on this land. An alternative interpretation of the word is “continuous rebirth.” Two basic tenets essential to living within natural law and within mino bimaatisiwin are cyclical thinking and reciprocal relations with the Earth.

Cyclical thinking, common to most indigenous or land-based cultures and value systems, is an understanding that the world, time, and all parts of the natural order flow in cycles—whether the moon, the tides, our bodies, seasons, or life itself. Within this understanding is a clear sense of birth and rebirth, and a knowledge that what one does today will affect one in the future.

Reciprocal relations defines the responsibilities and ways of relating between humans and the ecosystem. Simply stated, with few exceptions, “the resources” of the ecosystem, whether wild rice or deer, are recognized as animate, and, as such, as gifts from the Creator. Thus, one could not take life without a reciprocal offering, usually tobacco or saymah. Within the practice of reciprocity is also an understanding “that you take only what you need and leave the rest.”

Implicit in the concept of Mino bimaatisiwin is a continuous inhabitation of place, an intimate understanding of the relationship between humans and the ecosystem, and a recognition of the need to maintain the balance. These values and cultural tenets make it possible for many indigenous peoples to maintain economic, political, religious, and

other institutions for generations in a manner which would today be characterized as “sustainable.”

By nature, a social and economic system based on these ascribed indigenous values must be decentralized, self-reliant, and closely based on the land of that ecosystem. Not surprisingly, most indigenous economies comprise a diversified mix of hunting, harvesting, and gardening; all use a balance of human intervention and care, and are in keeping with the religious/cultural systems’ reliance upon the wealth and generosity of nature. A nurturing relationship with the natural world is essential to indigenous societies.

The Anishinabeg or Ojibway Nation represents an example of a sustainably based community. Within a region encompassing the southern parts of four Canadian provinces and the northern parts of five American states, this nation retains a common culture, language, history, governance, and land base. According to international law, these are the five indicators of the existence of a nation of people. This nation functions within a decentralized economic and political system, and much of the governance is left to local bands (similar to villages or counties) through clan and extended family systems. The vast natural wealth of this region and the resource management systems, which emphasize sustained yield, have enabled the Anishinabeg to prosper for many generations. This system provides sustenance for both domestic production and production of exchange for export. Whether the resource is wild rice or whitefish, the extended family works as a production unit that harvests the resource within a social and resource management code which ensures sustained yield.

The Anishinabeg cultural practices maintained for thousands of years are indicative of the way of life in many native or land-based communities. This cursory overview represents a small window through which to view the context of indigenous values, economic systems, and their relevance in the present discussion of "sustainable development."

CONQUEST: A WAY OF LIFE

In sharp contrast to the Anishinabeg practice is the system of capitalism and other forms of industrialism, which lack respect for people and their environments in an insatiable quest for resources. This is particularly obvious in the U.S., which consumes one-third of the world's resources and hosts only 6% of the world's population.

Columbus provided the entree for the system into the Western hemisphere. The holocaust that occurred in the Americas is unparalleled on a world scale, and in its wake caused the disruption necessary to unseat many indigenous economic and governmental systems. It is the most comprehensive system of imperialism ever witnessed by humanity. Although no one knows exactly how many people have been killed since the invasion, one conservative estimate suggests that the population of indigenous people in 1492 was 112,554,000 in the Western hemisphere and 28,264,000 in 1980.

This genocide facilitated a subsequent process of colonialism which established new relations of dependency and underdevelopment between indigenous nations and colonial or settler nations in the Americas. Three elements define these relations. Thus, colonialism has been extended

through an expansion of centralized power by (1) the spread of Christianity, Western science, and other forms of Western thought, (2) the socioeconomic practice of capitalism, and (3) the military-political practice of colonialism. The appropriation of land and resources, which has characterized these relations, has effectively placed indigenous populations in circumstances of material poverty and ill-health.

As Ward Churchill and I wrote some time ago, "Land has always been the issue central to North American politics and economics. Those who control the land are those who control the resources—whether the resource at issue is oil, natural gas, uranium—water, agriculture, or land ownership. Social control and all the other aggregate components of power are fundamentally interrelated." This may be true everywhere, but the peculiarities in this hemisphere, with its imported apparatus of socioeconomic power, make the equation especially acute.

As a vast portion of the remaining natural resources in the North American continent still lie under native lands, and as disposal of toxic and nuclear wastes on Indian reservations continues, the residual structures of colonialism make native communities focal points for the excrement of industrial society. Any discussion of present environmental circumstances or the possibilities for sustainable development in a North American context must recognize these historical relations.

AN ENERGY POLICY THAT VIOLATES NATURAL LAW

I want to focus briefly on North American energy policy from the viewpoint of

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native peoples by looking at two specific issues. These issues involve the development of nuclear and hydroelectric energy.

Similar to society itself, North American energy policy is based on short-term capital gains and accelerated consumption, rather than long-term sustainability. Consequently, seemingly endless proposals of nightmarish proportions loom on the horizon. We have had more than our share—from lethal uranium mines to coal gasification and slurry pipelines in virtual deserts to the Frankenstein of all hydroelectric projects, an untested ecological manipulation intended for American markets and an outmoded development plan for Quebec.

The nuclear age blew into Native America with the first uranium for atomic weapons. Next came thousands of uranium mines throughout the Navajo Reservation (an area the size of West Virginia). Today mostly abandoned, these mines still emit high levels of radioactive gases and endanger the community.

According to Victor Gillinsky of the U.S. Nuclear Regulatory Commission, "Uranium mining and milling are the most significant sources of radiation exposure to the public of the entire nuclear fuel cycle, far surpassing nuclear reactors and nuclear waste disposal . . ." (1978). A 1978 report by the Los Alamos Scientific Laboratory stated that, ". . . perhaps the solution to the radon emission problem is to zone the land into uranium mining and milling districts so as to forbid human habitation."

The production of uranium or yellowcake from uranium ore usually requires the discharge of significant amounts of water and the disposal of significant portions of radioac-

tive material. Uranium mill tailings, the solid wastes from the uranium milling stage of the cycle, contain 85% of the radioactivity originally in the uranium ore. One of these products, radium-226, remains radioactive for at least 16,000 years.

In 1975, 100% of all federally produced uranium came from Indian reservations. That same year there were 380 uranium leases on Indian lands, as compared to four on public and acquired lands. In 1979, there were 368 operating uranium mines in the U.S. Worldwide, estimates are that 70% of uranium resources are contained on indigenous lands.

Thirty years after it blew in, nuclear energy moved out. This largely coincided with an aggressive antinuclear movement (only 120 reactors have been built in the U.S., compared to the 1000 reactors proposed for this country by the year 2000), and a subsequent drop in uranium prices.

Companies moved to cheaper uranium deposits, such as those located in Saskatchewan Cree, Dené, and Metis lands, the lands of Australian aborigines, and many others. And America looked towards hydroelectric power for a cleaner source of electricity. Hydroelectric energy became the new myth, and it supported a continental policy of Manifest Destiny, which clarified the north as the new frontier.

### HYDROELECTRIC EXPLOITATION: THE JAMES BAY I PROJECT

James Bay, at the base of Hudson Bay, is the largest northern drainage system on the North American continent. Virtually every major river in the heartland ends up there.

This makes the bay a rich ecosystem teeming with wildlife. James Bay provides the staging ground for migratory birds, and a feeding area for the largest migratory herd of mammals on the continent—the George's River Caribou herd. Approximately 35,000 Cree, Innu, Inuit, and Ojibway peoples live within the region and depend upon the ecosystem. Their way of life is land-based: a subsistence, hunting, harvesting, and tourism economy in which at least 50% of the food and income for the region originates.

In 1972 in a joint meeting of a number of public and private corporations, the James Bay I Project was introduced in northern Quebec. The intent was to produce 10,000 megawatts of electricity by putting 1150 square kilometers of land under water and behind dams. The initial project concentrated along the East Main and Rupert Rivers, and ultimately ruined the ecology of some 176,000 square kilometers, an area about the size of West Germany. Native peoples did not hear of the project until planning was well underway. Most of the power produced was to be sold to companies in New York and New England.

After several years of litigation, the Quebec Court of Appeals ruled that too much money had already been spent on the project to abort it, even though no serious assessment of damage was ever authorized. Further, they did not consider alternatives that would protect cultural and bioregional diversity. Basing their decision on the "balance of convenience" argument, the court ruled that the project should go ahead. Within 11 months, 400 kilometers of paved roads pushed into the heart of the territory. With the building of three large power stations and the flooding of

five large reservoirs, four major rivers were destroyed: the LaGrande was drowned; the East Main and Opinaca were dried up; and the headwaters of the Caniapiscau were diverted to flow south into the LaGrande, rather than north into Ungava Bay. Five 735-KV power lines cut a swath through Cree territory wilderness all the way to the U.S. border. Six new power plants are planned to provide an additional 4500 megawatts of power. Because these and many more proposals are seen as "upgrades," rather than as new projects, no environmental assessment is planned even now.

Under present conditions, the environmental impact of the project is devastating. The LaGrande reservoir is contaminated with mercury and contains the by-products of vast amounts of decaying vegetation. Mercury levels at the reservoirs are six times higher than recognized safe levels, and about two-thirds of the people downstream from the reservoirs have mercury contamination in their bodies, at levels up to 30 times the allowable level. The devastation of vast amounts of hunting and trapping territory has resulted in economic and social dislocation from loss of food and changes in cultural practices.

Even with widespread opposition to the dams, province officials propose a new phase for the economic development program. Over \$62 billion are being raised by Hydro Quebec on the bond market to secure investments. If successful, the plan will flood an area roughly the size of Lake Erie, and use the electricity to fuel energy-intensive aluminum smelters and export contracts to the U.S., primarily New England.

Phase II of the James Bay Project will

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be even more devastating than phase I. The first proposal calls for the construction of another \$600 million worth of roads and airports. Numerous small rivers are to be diverted into a large one and 80 dams are to be constructed. The cumulative impact of this phase not only will destroy caribou calving grounds and habitat for migratory birds, but also will destabilize water relations throughout the ecosystem. According to Jan Bayea of the National Audubon Society, the entire ecosystem will be lost in 50 years from these two projects.

Even worse, these projects are matched by 58 smaller dams proposed for drainages in the Ontario portion of James Bay. Those drainages include the Moose River system, the largest river at the base of the Bay.

### MANITOBA HYDROELECTRIC DAMS

In the early 1970s, a series of dams and power stations were built on the Nelson and Churchill River systems, and generated large amounts of power. These two river systems drain one of the largest watersheds in North America. Construction of the dams and power stations has caused siltation, which chokes the reservoirs, and has resulted in widespread mercury contamination and destruction of wildlife.

A major consequence of this has been widespread economic dislocation. At Moose Lake, for instance, two-thirds of the land base was flooded and hundreds of people were moved into a housing project. In the early 1970s, at least 75% of the food and the majority of the income came from the land. Today this is impossible, and most people must buy food at stores, often at extraordinarily high prices. Elsewhere suicide epidemics, substance

abuse, and other psychological problems have flooded the communities.

Today, hydroelectric dams exist or are planned throughout much of northern Canada, from Newfoundland to British Columbia. In all cases, native peoples face relocation and devastation of their ecosystems. Most of the hydroelectric energy is designated for American markets.

### NUCLEAR WASTE CONTAMINATION: HANFORD NUCLEAR RESERVATION

Nuclear waste remains the largest obstacle for a peaceful atom, and native peoples again are central to the discussion. The Hanford Nuclear Reservation is located well within the treaty area of the Yakima Indian Nation on the Columbia River. A significant portion of the 570 square miles of land contained in the nuclear site is contaminated. Approximately 20 different indigenous peoples reside in the area. In August 1973, over 115,000 gallons of liquid, high-level radioactive waste leaked from a storage tank and seeped into the ground. The waste contained cesium-137, strontium-90, and plutonium—one of the most toxic substances known to humans. Many leaks to this day have included over 442,000 gallons of radioactive material.

Soil at the site is so contaminated that officials classified and removed it as high-level radioactive waste. The U.S. Department of Energy changed its definition of nuclear waste so that plutonium contamination can rise almost indefinitely at the site. Airborne dust released from smokestacks cannot be contained by the site boundaries.

The U.S. government recently solicited every Indian tribe within U.S. borders to

host a possible nuclear waste storage facility. Officials entice tribes with "no strings attached" grants of hundreds of thousands of dollars. The U.S. Office of Nuclear Waste Negotiation states that its mission is to find "a state or Indian tribe willing to host a repository or monitored retrievable storage facility for nuclear waste..." Some reservations accepted the offers, but most rejected the overtures of the Department of Energy.

These experiences are not unique. They are indicative of the conflict between industrial society and the land and the people who live on it. Hundreds of additional examples might be cited from Hopi, Zuni, Acoma, Isleta, Crow, Northern Cheyenne, and other native nations in the U.S., and from the Cree, Metis, Athabasca, and other native peoples of Canada.

Resource extraction plans, or energy mega-projects are proposed for indigenous lands, without consideration for the significance of these economic systems, nor of their value for the future. A direct consequence is that environmentally destructive development programs often ensue, and foreclose the opportunity to continue long-term, continuous, intergenerational, economic practices. For many indigenous peoples, the reality is that, as sociologist Ivan Illich has noted, "... the practice of development is in fact a war on subsistence."

Indigenous peoples remain on the front lines of the North American struggle to protect the environment. We understand clearly that our lives, and those of our future generations, are totally dependent on our

ability to continue resistance to colonialism and industrialization in our lands, and to rebuild our communities.

In the U.S., examples of indigenous peoples' successful battles to defend their homelands abound. Among these examples in which native peoples successfully resisted the destruction of their land and lives are:

- The North Cheyenne, who now face a series of coal developments, opposed and successfully defeated coal strip mining on their reservation for almost three decades.

- The Gwichin people, with a coalition of environmental groups, successfully averted the opening of the Arctic National Wildlife Refuge in the fall of 1991.

- The White Earth Anishinabeg from northern Minnesota successfully repudiated the siting of a nuclear waste repository on the reservation.

- The Cree of the Moose River (James Bay) have thus far stopped the proposal for 12 dams in the river basin.

The year 1992 marked the 500th anniversary of the Invasion. Many native peoples would say that the invasion is the problem. The denial of the invasion and of its consequences (for example, the destruction of more species in the past 100 years than in the entire period since the Ice Age) indicates the lack of awareness of industrial societies for the land and its people.

Indigenous nations continue their resistance to industrialization and to a way of life which is not based on "mino bimaatisiwin." Many native peoples believe that it is in the interest of all North Americans to join this

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struggle. Indigenous nations see themselves in a critical position in the entire industrial framework—at the point for resource extraction, and simultaneously maintaining living models of sustainable development, even after 500 years. We hope that North American peoples will recognize these indigenous models and values as the basis for future discussions of sustaining life on the earth.

Megwetch  
Wabunong  
Zhawanong  
Ningabi' among  
Giwedinong  
Megwetch.

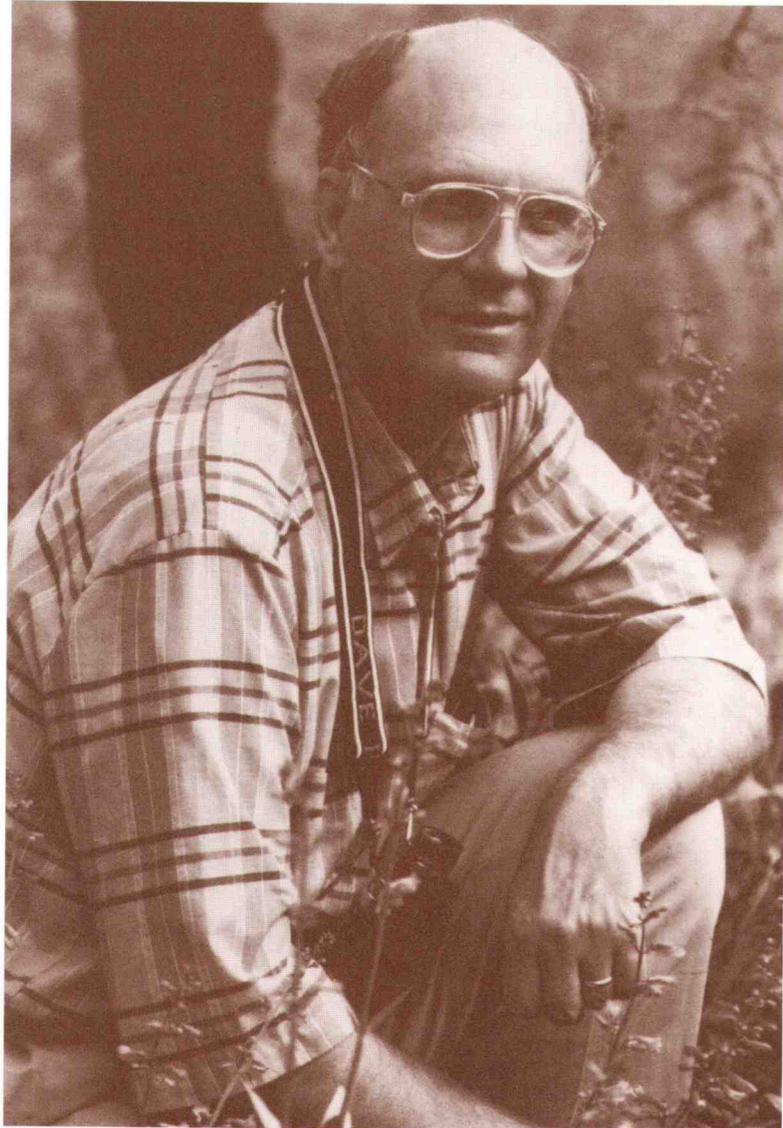


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DR. DAVID PEARSON

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*photo by David Middleton*

# Cultural Clashes and the Future of Tropical Rain Forest Conservation

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**C**OOPERATION AND UNDER-  
standing of common benefits  
are the keys for rational use  
and conservation of tropical rain  
forests. Unfortunately a clash of  
perspectives from numerous cul-  
tures has made a serious situa-  
tion grave, and the future of rain  
forests lies in the balance.

The significant clashes involve

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the local indigenous culture, the  
national or regional culture, and  
the dominant international cul-  
ture. Competition for limited  
resources, emphasis on short-  
term goals, and ignorance all  
help to ensure that clashes,  
rather than cooperation, are the  
outcome of inevitable interac-  
tions involving rain forests.

BIODIVERSITY

The introduction of the concept of biodiversity (Wilson 1988) has helped define a common goal for resolving some of the cultural conflicts surrounding tropical rain forests. The study of biodiversity involves an understanding of all the factors and interactions that have brought about and maintain the diversity of life in the world (Ehrlich and Wilson 1991). Biology is only one part of this understanding, however, and must be coordinated with other fields of research, such as economics, sociology, anthropology, psychology, chemistry, geology, and law. In addition to basic research, conversation and education are essential for understanding biodiversity.

Ecotourism provides an example of how biodiversity has changed a clash of culture into a cooperative and mutually beneficial endeavor. Many tourists from North American and Europe want to experience the rain forest and are willing to pay thousands of dollars a day to do so. Tourist lodges constructed in intact forests immediately gain several advantages. National and local politicians perceive these forests to be worth more intact than they would be were they cut down. Some of the profits from ecotourism can be used to subsidize national and international scientists, as well as to provide economic return to local people. Further, protection of these forests for direct economic benefit in turn provides both time and facilities in which to discover additional benefits from intact forests.

TROPICAL RAIN FOREST CONCEPTS

The potential for cooperative use and conservation of tropical rain forests is not possible unless some basic concepts are understood (Mabberley 1992). Although biodiversi-

ty applies to temperate zones as well as to tropical zones, the temperate zone experience generally is considered to be inadequate for understanding tropical rain forest biodiversity. The major concepts—species richness, photosynthesis and herbivores, predator-prey interactions, pollination, seed dispersion, and limiting resources and nutrient cycling—are discussed in the following sections.

Species richness: One aspect of biodiversity involves species numbers. A hectare of forest in Oregon or in North Carolina may support 5-15 species of trees, whereas a hectare of forest in some tropical lowland areas may have more than 200 species of trees (Gentry 1988). Over 1,200 species of butterflies and over 500 species of birds have been found on a 5 km path in southeastern Peru (Pearson and Cassola 1992). These totals from a short path through the rain forest are comparable to or greater than the total number of species of butterflies and nesting birds known for North America.

Ten or 20 years ago, most biology text books reliably stated that about one million species of animals and plants existed in the world. Systematists have long been struggling to classify the new organisms that they readily find on or near the forest floor in tropical rain forests. The forest canopy has been relatively inaccessible because of logistics and expense. Recently, however, several entomologists made a technological breakthrough to survey the canopy of tropical rain forests for insects. With use of a machine that produces a fog of short-lived insecticide, these entomologists were able to collect large numbers of insects from the canopies of individual trees. Up to a kilo of insects comprising 2,000

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species was collected from a single tree. In many cases fewer than 200 of these insect species had been previously described. Sampling the next individual tree of this species, often at a distance of several kilometers, another kilo and 2,000 species of insects could be collected, but up to 70% of the insect species in the second sample were not found in the first tree (Erwin 1982).

Estimating that insects make up over 80% of all the species in the world and extrapolating from similar canopy samples in other parts of the world's rain forests, the total number of species in the world is likely to be close to 10, or even 30 million (Erwin 1982). Thus, even though the world's tropical rain forests make up only 6% of the land surface of the earth, they contain between 50 and 75% of all the species on earth. We do not have names for the vast majority of these species, much less knowledge of their interactions and general biology. This information is essential for developing management programs and conservation efforts.

**Photosynthesis and herbivores:** The most important interaction in rain forests is photosynthesis. Because they are able to convert sunlight energy to chemical energy in such great amounts, rain forests are the most productive terrestrial ecosystems in the world (Whitmore 1990).

The second most important interaction in these forests is the attack of herbivores on photosynthetic leaf surfaces. Instead of being completely eaten by herbivores, mainly insects, the plants have developed protection. In turn, the herbivores have developed better ways to get around the plants' defenses. Although some plants use such physical

defenses as spines and hard leaf surfaces, the most common defense is chemical. Virtually every plant in rain forests contains such toxins as caffeine, nicotine, and cardiac glycosides to protect them from herbivores. Extreme specialization is typical of tropical forests. In this case each plant species has its own set of chemicals.

By coincidence some or even many of these chemicals have physiological effects on human beings. Many of the medicines we use today originated from plants. Aspirin came originally from the bark of a temperate zone willow tree. Imagine the potential number of new medicines available from a forest which supports at least an order of magnitude greater number of species and chemicals than do temperate zone forests. By some estimates we have looked at fewer than 2% of all tropical plants for their medicinal value, and medicines already discovered in tropical forest yield millions of dollars annually. Unfortunately, few if any of these economic benefits find their way back to the people who live in an around these forests.

Potential economic benefits are also affected by another tropical forest pattern. Unlike temperate zone species, tropical species tend to have relatively small geographic ranges. Thus, when a large area of forest is cleared, an uncertain number of species are likely to go extinct. By some estimates, many species, mainly insects and plants, are going extinct every day (Mann 1991) as a result of rain forest destruction. In the face of potential economic and health losses, what can be done to stave off this destruction of rain forests for short-term gains? How can we garner the time

needed to survey the plants for their economic potential?

Luckily libraries exist in all the rain forests of the world, and these data are already available. These libraries are the oral traditions of indigenous peoples. Through generations these peoples have discovered uses, including medicinal, for most of the plants around them. This knowledge could save scientists decades of field work, but it cannot now be taken from those who live in the forests as it was in the past. This time indigenous peoples must be able to profit economically from their knowledge. In so doing we will establish that these forests are worth more intact in the long run than they are cut down for nebulous short-term profits. This change in perception between the cultures in turn will provide more time to study the forests and to understand how they can be better managed and rationally used.

Predator-prey interactions: Another priority for research in rain forests involves understanding predator-prey interactions. This understanding is vital for developing effective management programs and conservation plans. Among the many impacts, these interactions directly affect the entire forest through control of herbivores by their predators.

Because of the diversity and complexity of life in rain forests, one common method for understanding these systems involves the use of bioindicators. Bioindicators are taxa of plants or animals that can be readily studied with results that can be used to generate broad generalizations for the entire ecosystem. For example, the Harpy Eagle is a top predator in Amazonian forests. Typical of

these top predators is their extreme sensitivity to small changes in habitat. In this case, if the focus of a forest management program is to support a viable population of Harpy Eagles, all the organisms in the tropic levels below the eagles should benefit as well from management practices necessary to maintain the eagles.

But even this relatively simple approach involves a complexity of interactions that are lacking in temperate zones. One of the major prey items of the Harpy Eagle is the sloth. Sloths are completely herbivorous and move slowly through the canopy of the forest while searching for appropriate leaves to eat. The hair of sloths has longitudinal grooves in which, because of the warmth and moisture, algae and fungi quickly grow. The hair thus turns green, and this combined with the sloth's slow movement ensures that the eagle has a difficult time finding sloths. This interaction does not stop here, however. In the hair of sloths lives a highly specialized sloth moth. These adult moths apparently avoid their own enemies, insectivorous birds, by seeking out a sloth and hiding in its hair. Among its strange habits is how often and where the sloth defecates. The sloth does not just defecate from the canopy. Apparently falling sloth dung would be too much of a signal to predators that a slow-moving prey item was in the area. Instead, once a week or every other week the sloth descends a tree trunk, digs a hole at the base of the tree, and defecates into it. The moths take advantage of this behavior and rush out of the sloth hair to lay their eggs on this predigested leaf material. The larvae hatch from the eggs, feed on the dung, and eventually grow into adult moths, which seek another sloth in which to hide. The

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cycle—driven largely by predator-prey interactions—then begins again.

Even more common, and perhaps more important, are the thousands that occur between herbivorous insects and their enemies. The sloth interaction with other species is one of the few examples in which we know something of the complexity of interspecific dependence. As was emphasized in the section on species richness, thousands or perhaps millions of species of insects have not yet been named, much less studied so that the interactions that are so vital for managing and rationally using tropical rain forests can be understood.

**Pollination:** Another rain forest concept that must be better understood is pollination. Unlike their temperate zone counterparts, for which wind is an important factor, tropical rain forest plants depend predominantly on animals for pollination.

Pollination is critical for sexual reproduction, and the process by which the plant attracts an animal to gather nectar can be complex. In gathering or consuming the nectar, the animal collects pollen. The animal then carries this pollen to the next flower in a continued search for nectar. Pollen grains thus are passed from the male parts of flowers to the female parts, and this results in fertilization and the formation of the fruits. Hummingbirds, butterflies, and bats are examples of a few of the tropical animals that transport pollen from flower to flower.

The flowers of temperate zone plant species that are pollinated by animals are usually pollinated by multiple species of generalist pollinators. In contrast, tropical flowering

plants are often pollinated by a single species of specialized pollinator. This specialization is frequently manifested in a morphology or behavior that gives the animal specific access to the nectar and the pollen. The advantage to the plant is that its pollen is efficiently carried to other individuals of the same species. The advantage to the pollinator is that there is a little chance for competitors to successfully remove the nectar and the associated pollen. The disadvantage, however, is that, if either of these tightly interdependent species goes extinct or suffers a population decline, the other species will also go extinct or suffer a population decline. With so much specialization in tropical rain forests, the extinction of a single species is much more likely to drastically affect other species than it would in temperate zone forests.

**Seed dispersion:** The dispersion of seeds from the parent tree is the basis for another critical interaction. An accumulation of seeds near the mother tree will attract seed predators and cause the destruction of most of them (Janzen 1970). Any seed that can move away from this concentration is more likely to survive. As with pollination, animals, rather than wind, are more important dispersers in tropical forests. The seeds are generally encased in a tasty pulp, which attracts animals such as frugivorous birds and mammals. These animals consume the fruit, and the seeds pass through their digestive systems and are deposited far from the parent tree when the animal finally defecates. These seeds then lie in the soil or grow into seedlings which await proper conditions for growth into adult plants.

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The importance of our knowledge of seed dispersion has only recently been made obvious. Interest in regenerating tropical rain forests cut down for short-term gain such as cattle ranching is increasing. In Brazil this practice has been sharply reduced because the government learned that, without substantial subsidies, raising cattle on extensive rain forest clearings is uneconomical. Some scientists have estimated that it takes over a ton of forest vegetation to convert into a single quarter-pounder hamburger (Uhl and Parker 1989). Without insecticides, pesticides, and supplemental feed, the low-grade beef raised on these clearings does not justify the cost. However, trying to restore extensively cleared areas of rain forests has proven to be difficult. Largely because the soil seed bank has been destroyed and the effect of normal seed dispersion disrupted, attempts at forest regeneration have had marginal results.

In some forests close to river systems, for instance, the primary dispersers of seeds are frugivorous fishes. During flood season, the trees are inundated by several meters of water. Should these forests be cleared, the populations of fishes dependent on the fruits during flood season also will be decimated. Replanting trees may not be sufficient to either build up the fish dispersers or attract them from a distance. Thus, the forest cannot be maintained without extensive and expensive human intervention. In addition, the absence of trees may irrevocably change the soil's ability to maintain the trees, even if they are planted properly.

This example further illustrates how tropical forests must be perceived differently

than are temperate forests. Most temperate zone aquatic ecologists are segregated from terrestrial ecologists. They have separate journals, separate meetings, and share theories on only relatively rare occasions. Most of these scientists admit that the border between aquatic and terrestrial ecosystems is artificial, yet the segregation is maintained. In tropical systems the boundary between aquatic and terrestrial systems is even more artificial, and it is unlikely that either system can be understood without understanding the other.

Limiting resources and nutrient cycling: In temperate zone forests, water or nutrients such as nitrogen and phosphates are factors that frequently limit growth, reproduction, and survival of individuals. Temperate zone generalizations cannot be applied to tropical rain forests, however, because they exhibit different patterns. For instance, nutrients and water are common limiting resources in temperate zone forests. In intact tropical forests the canopy is so dense that little sunlight filters through. Seeds and seedlings often are not limited by nutrients and water, but rather by sunlight, which is essential for photosynthesis. One species of fig (*Ficus*) has evolved a remarkable solution to this problem. Its fruits are eaten by monkeys and birds. These dispersers defecate the seeds high up in the canopy on another tree, and the fig uses the host tree for access to the sunlight. By producing its leaves first, the fig is able to quickly photosynthesize sufficient chemical energy to grow its trunk down the trunk of the host tree and finally grow its roots into the soil. Although eventually the fig completely strangles the host tree, it has effectively overcome

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the light limitation problem.

In temperate zone forests organic material builds up in the soil to produce humus and a large reservoir of nutrients. Topical forests, by contrast, are generally so warm and humid throughout the year that any organic material falling to the forest floor is quickly broken down by the abundant decomposer fungi and bacteria, and has no chance to accumulate. Instead of root systems that penetrate deep into the soil, tropical trees tend to produce roots that grow laterally close to the soil surface. This permits the tree to quickly absorb organic material as it is broken down. Up to 90% of the nutrients in tropical forests are in the plant themselves, and the soil is nutrient poor (Proctor 1989).

Rainfall in the tropical forests is generally high compared to that in most temperate zone forests. This is another reason that temperate zone management practices are difficult to apply to tropical forests. Through evapotranspiration from leaf surfaces, water vapor builds up over the canopy. As this vapor rises it eventually cools and condenses. Tropical rain forests produce up to 70% of their own rainfall in this manner (Salati and Vose 1984). Thus, if extensive areas of tropical forest are cleared and then burned off to raise cattle or some alternative crop, most of the local nutrients and rainfall are removed.

### NORTH AMERICAN INTERESTS AND INFLUENCES

The first thing that North Americans must learn about tropical rain forests is that they are not a distant part of the world that affect us only minimally. These forests are on our kitchen tables (bananas, tea, chicken), in

our medicine cabinets (many medicines have been derived from tropical plants), and in our backyards (most migrant bird species are tropical birds that spend a few months here in North America). These relationships are not just symbolic, but rather affect the quality of our everyday lives. Our consumption patterns directly influence the kinds of rain forest products that are marketed. If we buy vanilla and Brazil nuts, we use economic force to maintain topical rain forests, because these products come from intact forest. In so doing we ensure that other forest species are available and enable further investigation of intact rain forests for additional useful products. However, if we buy tea and black pepper, we condemn tropical rain forests because these forests must be completely cut down to satisfy our economic demand. No one will ever know whether or not a cure for ovarian cancer was destroyed forever when the forests of Sri Lanka were cut down to provide us with tea plantations.

Although as North Americans our power to affect the future of rain forests is tremendous, we cannot produce a positive future for rain forests alone. Their future lies in the cooperative efforts of several cultures: the local indigenous people, whose knowledge of the forest can provide access to otherwise unknown economic benefit; the national culture, whose members have unique insight into solutions for problems that elude international observers; and the dominant international culture. By returning some reasonable portion of profits gained from economic use of rain forests, local and national cultures will perceive the forests as valuable assets.

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Harvesting forest products economically from intact forests rather than destroying forests to harvest monoculture plantations will provide time and forest to investigate further rational use and benefit.

This type of cooperative effort must emphasize the mutual benefit to all cultures. Education of adults and children so that long-term benefits can be perceived and appreciated is essential. A respect for different social systems must also be learned. Finally each culture must learn to listen to the needs and appreciate the abilities of the other cultures.

As an example of an intercultural effort, in the summer of 1987 I was invited to participate in an innovative rain forest education and conservation program in Peru. This program was funded by the World Wildlife Fund but conceived, organized, and carried out by Latin Americans. As the only gringo, I was a token presence. The goal of this two-week program was to inform and convince the local residents living on the boundary of the immense national reserve, Pacaya-Samiria, of the social and economic importance of forest conservation.

The Pacaya-Samiria National Reserve was established in 1943 to protect the fish populations of the area. The reserve is the size of the state of Vermont (3 million hectares), and is protected by fewer than 10 park guards. Because it is designated for multiple use, some areas are open to licensed fishing and tree cutting. Other areas are restricted to scientific study. Further, areas that serve as buffer zones are located between the totally protected areas and the large human populations living along the river boundaries of the reserve.

To accomplish our goal, 11 Peruvian instructors, including professors and government officials who were biologists, sociologists, economists, psychologists, and law enforcement officers, were recruited. Thirty five local teachers and mayors from each of the 12 villages on the rivers surrounding the reserve were invited to participate. We all boarded a large river launch and spent two weeks together in a mobile seminar.

The plan had two parts. First, while moving from site to site along the rivers within and along the borders of the reserve, we held 3-5 lectures per day for the participants. The top deck of the launch served as a classroom by day, dining room during meals, and a place to hang hammocks at night.

The lectures covered many topics, including Peruvian conservation laws, ecology of tropical forests, fisheries management, economics, pedagogy, and sociology. These formal presentations exposed participants to a broad array of pertinent subjects, and provided them with a legal and intellectual background for understanding the overall need to protect the reserve and use it rationally. This understanding, together with their considerable enthusiasm, in turn enabled the participants to transmit the message to their neighbors and constituents in their individual villages when they returned home. Informally the participants also made valuable contacts among themselves and with the instructors. They developed a network of contacts that might otherwise have been impossible or have taken years to establish.

The second part of our approach was to visit each of the 12 villages on the borders

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of the reserve. At each site, the students who were from that particular village were in charge of a two-hour long presentation and open forum to the assembled townspeople on the importance of the Pacaya-Samiria Reserve across the river. They emphasized the economic importance of controlling exploitation of animal and plant resources. At each locality, the people attending were invited to share with us their thoughts and experiences with the reserve. We quickly learned that they were very well aware of the economic and social impact of the reserve.

At least one person in each town passionately expressed both anger and fear regarding how little they were profiting from the presence of the reserve across the river. The reserve was quickly becoming the sole source of such natural products as fish and thatching for roofs for hundreds of kilometers in all directions. One of the greatest frustrations was lack of control of illegal extraction of natural resources from the reserve. The local people felt helpless, because they did not know how licenses were obtained or who could legally get them. When they witnessed apparently illegal activities, they did not know of their rights to stop them nor to whom to report the infractions. The sustained and long-term economic benefits of the reserve were by-passing them and going directly to markets in the big cities like Iquitos and Lima. If the people living on the borders cannot share economically in the conservation and rational use of the reserve, their incentive to participate in its protection will remain small.

Psychologically the leaders of the mobile seminar had succeeded in this phase

of their plan. They had forced the local people to identify their problems and demand a solution. The master plan for this effort included direct help from the government in the formation of cooperatives at each village. Established as legal units, licenses could be issued, quotas determined, and financial help for initial training and equipment could be provided. Each village was provided with sole access to that part of the reserve across from them, and, among the 12 villages, this access encompassed virtually the complete periphery of the reserve. No one else was allowed into a village's assigned area, and they knew their rights and had their contacts at the ministry. The villagers intuitively understood why they could not take more than their quota of palm, fish, and forest products. They also understood why the central area was untouchable. It was the reservoir from which young fish and seeds for new plants would have to come to replace the products they removed from their sites. By the time the seminar ended, we had several thousand park guards.

The adults understood and appreciated the economic incentives to conservation. Any other approach would likely have met with little success. At the same time, however, the school teachers would be introducing a conservation ethic to the children of these villages that went beyond the purely economic factors that were the primary motivators of their parents. The importance of more subtle aspects of forest conservation, such as aesthetics, diversity, and long-term ecological ramifications would be taught to the youth so that they have a broader basis than do their parents upon which to judge the merits of the reserve.

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Three cultures worked together to solve this problem. The international dominant culture provided the funds, but the national culture used insight unavailable to the dominant culture to help the local culture perceive and solve its problem. In so doing all three cultures gained socially, politically, and economically. Clashes of culture need not be inevitable, and for the future of tropical rain forests they cannot be inevitable.

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Culture And Natural Resources



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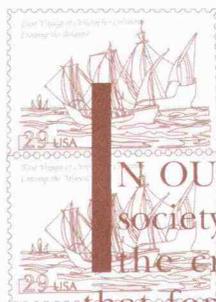
*photo by Brian MacCleery*

# What In The World Have We Done To Our Forests?

A brief overview on  
conditions and trends  
of U.S. forests

BY

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**I**N OUR HIGHLY URBANIZED society, we may easily overlook the critically important role that forests have played in the history and development of the nation. The single most important event in the evolution of the American landscape as we know it today was the clearing of forests for agriculture.

Scarcely more than a century ago, it became increasingly clear that old approaches were not sustainable. We began to view forests and wildlife, not as products to be mined or foraged, but as resources that could be managed over the long term on a scientific basis for both products and environmental services.

This clearing was essential to provide food for a rapidly growing population. Yet forests were cleared for a wide variety of products and uses in addition to agriculture. Wood was virtually

the only fuel used in this country for most of its history. Wood warmed its citizens, produced its iron, and drove its locomotives, steamboats, and stationary engines. Lumber, timbers, and other structural products were the primary material used in houses, barns, fences, bridges, and even dams and locks.

Such products were essential for the development of rural economies across the nation, as well as for industry, transportation, and the building of cities. Further, forests provided habitat for wildlife which was the basis for lucrative export markets in furs, as well as an important supplement to the diet of millions of Americans. In a very real sense, American forests—the products derived from them and the land they occupied—were the economic foundation of the nation.

In a spiritual sense, the forests and the wilderness values it represents have played an important role in the identity of the nation. This was expressed in the writings of Thoreau, Emerson, Marsh, and others, and was first evidenced politically in the late 1800s in efforts to address concerns over wildlife decimation and forest depletion. Without its forests, America would have had a decidedly different history, and would be a decidedly different place than it is today.

In the past few years, we have seen an increased interest in all aspects of the environment. A portion of this interest has focused on concerns over the condition of the nation's forests and associated wildlife. An enlightened perspective on the current condition of and trends involving forests and wildlife needs to be based on a general understanding of how they came to be what they are

today. Thus, this paper outlines briefly the natural and human influences that have shaped this nation's forests over the years.

#### NATURE AND EXTENT OF NORTH AMERICAN FORESTS PRIOR TO EUROPEAN SETTLEMENT

Early European settlers to America were awed by the ocean of trees which greeted them. Forests blanketed the entire eastern one-third of the U.S.—from the Atlantic Coast to the prairies beyond the Mississippi. These vast forests were a sharp contrast to those of England and much of the rest of Europe which had been depleted for fuel and building materials. The original forests covered 1.1 billion acres, or about half of the U.S. land area (including Alaska).

Today, about one-third of the nation—approximately 737 million acres—is forested. This is about 70% of the area that was forested in 1600. About 310 million acres of forest have been converted to other uses—primarily to agricultural lands—since 1600.

Forests remained the dominant feature of the landscape in eastern North America for centuries after initial settlement. In 1796, almost two centuries after the first European settlements, a French naturalist visiting the new American nation wrote that, "The most striking feature (of the country) is an almost universal forest, starting at the Atlantic and thickening and enlarging to the heart of the country." He said that in his travels into America's interior that he "scarcely passed, for three miles together through a tract of unwooded or cleared land."

About three-quarters of the nation's original forest was in the eastern third of the country. West of the Mississippi, as rainfall

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diminished, forests and woodlands gave way to vast, treeless prairies and deserts. However, in mountainous areas where rainfall was sufficient and along the Pacific Coast, extensive and often magnificent forests developed.

One popular myth is that, prior to European contact, America was dominated by impenetrable, relatively uniform ancient forests that cloaked the landscape in a long-term static balance with the environment. The reality was quite the contrary. Presettlement forests were exceedingly dynamic—shaped by a myriad of both natural and human-caused influences, disturbances, and catastrophic events that had a profound effect on the age, planet species, and wildlife of the forest environment. Presettlement forests in both the East and the West were a diverse mosaic of forest stands whose age, tree species, and wildlife varied widely and reflected the disturbance history of the area.

Further, America's original forests were strongly influenced, in both the East and the West, by Native Americans. In the eastern forests, most Native Americans lived in fixed villages. Domesticated crops accounted for half or more of their diet. It was a maize-based agriculture. Population densities were at least five times that of the nomadic, hunter/gatherer societies to the north and west. Millions of acres were cleared for fields. Hundreds of millions more were burned frequently to improve game habitat, facilitate travel, reduce insect pests, remove cover for potential enemies, enhance conditions for berries, and drive game. It was a shifting type of agriculture. Fields and villages were abandoned when their natural fertility declined, new forests were cleared, and the abandoned lands

quickly reverted back to forest.

European settlers spoke of the open, parklike forest that they encountered (a condition created by frequent burning)—and of the frequency of Indian burning. Settlers in New England reported that the Native Americans burned the woods twice a year. A general statement can be made that, wherever there were Native Americans, there was fire.

The abundant wildlife that was reported also gives an indication of the frequency of disturbance. Deer, wild turkeys, and a variety of game birds abounded. Even elk and bison, normally associated with the western prairies, were common in the eastern forests. Bison were reported as far east as Massachusetts.

The South was dominated by fire-created forests—such as longleaf pine savannahs on the Coastal Plain and Piedmont. The hardwood forests of the Appalachian Mountains also were burned frequently by Native Americans. In Virginia, the Shenandoah Valley—the area between the Blue Ridge Mountains and the Alleghenies—was one vast grass prairie. Native Americans burned the area annually.

On the western fringe of the forest, fire-dominated forest types, such as oak and pine savannahs, covered tens of millions of acres. These forests were heavily influenced by fires sweeping in off the western prairies. Fire-created prairies extended well into Ohio, Pennsylvania and western New York. Evidence that demonstrates the dominant role fire played in these forests does exist. When farms finally began to move out onto the prairies and to cut off prairie fires, millions of acres of open oak savannahs and even treeless prairies

to the east of these farms became dense woodlands and forests within two decades.

As we see increasing concern over the need to protect some of our forests in their "natural" condition, the complex natural and presettlement human history of U.S. forests raises equally complex technical and policy questions over whether to allow wildfire to assume its natural role in these areas, or to seek to replicate presettlement human influences. We know that it is virtually impossible to separate natural from human-caused influences in presettlement forests. North American forests have been both occupied and influenced by humans from the time these forests advanced northward behind the retreating continental glaciers more than 8,000 years ago.

#### EUROPEAN VIEW OF THE FORESTS

The era of European settlement ushered in a vast increase in the impact of humans on the forest. The abundance of land and resources, and the scarcity of labor were a defining difference between America and Europe, where the situation was reversed. This difference affected everything we did, from the stewardship we applied to our resources (or the lack thereof), to the adoption of the institution of slavery.

The seemingly endless forest was viewed as a mixed blessing by early European colonists. It provided an abundant and readily available source of fuel and building materials. It also yielded abundant game, which remained for decades after settlement as an important source of food. But the forest was also habitat for wolves, eastern panthers, and other predators that found colonial livestock easy prey and against which the colonists

waged unrelenting war. It provided cover for sometimes hostile Indians. Most importantly, however, the forest occupied potential cropland that could be liberated only after intensive and back-breaking labor with the primitive hand tools of the day.

For the first three centuries of our history, most Americans were farmers. In 1800, more than 90% of the people lived on the land. Except for a relatively few people engaged in plantation agriculture in the South, most were subsistence farmers. The predominant view that emerged in the early 1600s, and that continued for almost 300 years, was that the forest was both inexhaustible and an obstacle to the much preferred agricultural use of the land.

The nation was much more concerned about feeding itself than it was over the spiritual value of forests. Forest clearing became a win/win situation. It liberated cropland and pasture, while providing fuel, fencing, and material for building homes, barns, mills, and factories. Indeed, the fuelwood and potash that could be made from wood ashes often could be sold to pay most of the cost of buying the land.

#### USE OF WOOD FOR FUEL

Energy was the dominant use of wood on a volume basis until well into the late 1800s. In the late 1700s, about two-thirds of the volume of wood harvested was for fuel. By 1850, wood still provided over 90% of the nation's fuel requirements. Domestic heating and cooking were by far the dominant use of fuelwood. However, wood was also the primary industrial fuel. Until after the Civil War, virtually all steamboats, railroads, and stationary engines used wood fuel. The per capita con-

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sumption of fuelwood averaged over four cords per year for most of the 19th Century, and the volume of fuelwood consumed rose 15 times between 1800 and 1900.

Even before 1800, fuelwood cutting was depleting the forests around population centers. In 1759, one visitor described the area around Philadelphia as "bereft of forests." In the late 1700s, fuelwood was being hauled nearly 100 miles to several coastal towns causing the price to rise beyond the reach of the poor.

### FENCES

Until the middle of the 19th Century, next to energy, the most important use of wood on a volume basis was for fences. Fences were not ornamental. Because labor was scarce, herding livestock, as had been common in Europe, was generally not practiced. Instead, hogs, cattle, and other livestock were turned untended into the woods. Fences were needed to keep them out of crops and gardens. Construction of fences was second only to forest clearing in its labor requirements. In 1850, 3.2 million miles of wooden fences—enough to circle the earth over 120 times—existed in the U.S.

### EARLY INDUSTRIAL USE OF WOOD

Most mechanical power for textile mills, grist mills, sawmills, and other mills and factories was provided by water. However, most mills were built of wood, the dam in the river was most likely made of wood, and even most of the machinery inside the mill was built of wood, tipped with iron.

The production of iron itself depended upon wood. Until 1850, the majority of

U.S. iron was smelted using wood charcoal. Virtually every state east of the Mississippi had a number of iron-making furnaces and forges. In the 1850s, the tonnage of coke iron finally exceeded that of charcoal iron. Even so, the tonnage of charcoal iron produced continued to rise until 1900. Wood was also used as process heat for breweries, tanneries, salt evaporation plants, and anywhere industrial process heat was necessary.

### TRANSPORTATION

By the early 1800s, the U.S. was one of the largest nations in the world. What tied such a large group of disparate and often quarreling states together more than anything else was a transportation system. America's forests figured heavily in this task.

The nation's first highways were its rivers. Wooden keelboats were followed by steamboats, which proliferated after 1830. Steamboats were both made of wood and, until the Civil War, used wood for fuel. In 1840, almost 900,000 cords of wood were sold for steamboat fuel, or a fifth of all fuelwood sold.

Railroads followed the steamboats. After 1850, the railroads began to expand rapidly. They linked the growing cities and provided access to the cities from the agricultural and forest land upon which they depended. Although called the "iron road," railroads used far more wood than iron. Except for the engines and rails, railroads were made of wood. The cars were wood, the ties were wood, the fuel was wood until the Civil War, the bridges and trestles were wood, and station houses, fences, and telegraph poles were wood.

The mileage of U.S. railroads increased more than 35 times between 1850 and 1910, from less than 10 thousand miles to more than 350 thousand miles. By the late 1800s, railroads accounted for 20-25% of the total consumption of timber in the country.

By far the most significant railroad use of wood on a volume basis was for cross-ties. Each mile of track required over 2,500 ties. Cross-ties were not treated until after 1900. Because of their rapid deterioration in contact with the ground, ties had to be replaced every 5-7 years. Given the mileage of track in 1910, that would be equivalent to replacing the ties on over 50,000 miles of track annually. In 1900, just replacing railroad ties on a sustained basis required an estimated 15-20 million acres of forest land.

#### FARM CLEARING

Although use of wood for industrial purposes and transportation was certainly significant, especially in the latter half of the 1800s, clearing for agriculture has been the dominant cause of reduction in forest cover. Because no improvement was made in crop yields per acre throughout the 19th and well into the 20th Century, farm clearing increased at about the same rate as the growth in population. Between 1850 and 1900, the U.S. population increased over three times, from 23 to 76 million people, while the area of cropland increased four times, from 76 to 319 million acres. For every person added to the U.S. population during the 19th Century, farmers were putting another 3-4 acres of cropland under the plow. The area of pasture and hayland increased even more than did that of cropland.

In the 60 years from 1850 to 1910,

American farmers cleared about 190 million acres of forest, more than the total amount that had been cleared in the previous 250 years of settlement. To put forest clearing during this period in perspective, the nation's farmers were clearing forest at an average rate of 13.5 square miles per day every day for 60 years.

#### INCREASE IN LUMBER PRODUCTION AFTER 1850

The 19th Century was a period of rapid population growth. During the century the U.S. population rose over 14 times—increasing from 5.3 to 76 million people.

The America of the early 1800s was overwhelmingly a nation of largely self-sufficient farms. However, after 1850 the U.S. began to restructure from a rural, agrarian society to one increasingly urban and industrialized. Between 1850 and 1900, the population of the nation's cities increased at twice the rate of the general population, and this caused a profound change in the demands the nation placed on its forests.

In addition to increased resource demands resulting from the growing cities, farms were pushing out onto the treeless prairies. These prairie farms themselves began to demand large quantities of lumber for barns, homes, outbuildings, and fences.

Logging and sawmilling increasingly began to be organized into large-scale industrial operations. The consumers and the forests upon which they depended for their natural resources began to be separated by hundreds of miles.

Lumber production increased dramatically. It rose more than eight times between 1850 and 1910, from 5.4 to 44.5 billion board feet annually, or more than twice

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the rate of population growth. Vast areas of the Midwest, South, and Pacific Coast were logged, and often relogged. The tree limbs, tops, and other debris that remained after logging were often burned in the belief that the logged areas could be converted to cropland or improved pasture. These uncontrolled slash fires burned more or less continuously, and, when weather conditions were right, sometimes resulted in massive wildfire, property damage, and major loss of human life.

Repeated wildfires also killed residual trees and seedlings left by logging and created tens of millions of acres of what came to be called "cutovers" or "stumplands" that remained idle, unstocked or poorly stocked with desirable tree species for extended periods of time.

### WILDLIFE DEPLETION

The nation's wildlife faced many of the same pressures as did forests. A wide variety of wildlife species, which at the time of settlement had been present in huge numbers, were severely depleted. The most significant factors were virtually unrestricted market hunting of all kinds of wildlife for food, furs, and feathers (which in the late 1800s were in great demand for women's hats), as well as habitat modification caused by farm clearing, logging, and massive wildfires. Many species of songbirds, such as robins and meadowlarks, were adversely affected in some areas by hunting for food.

### A CALL FOR ACTION

Before the turn of the century, a growing number of people began to be increasingly concerned about what was hap-

pening to much of the nation's woodlands and wildlife. Fears about future supplies of timber were mixed with apparent implications of increased flooding and watershed damage, depleted wildlife populations, loss of the beauty of the American landscape, and even the climate. All of these concerns began to call into question the myth of forest inexhaustibility.

Predictions of an impending "wood famine" were raised frequently, beginning in 1865 with Frederic Starr. Use of the term "famine" was an apt one, for wood in its various forms was one of the most widespread and essential materials in both domestic use and industry.

Bernard Fernow, a German forester, began to promote the idea that forests are a renewable resource that can be managed on a sustainable basis over the long term. George Perkins Marsh, who grew up in Vermont in the 1830s, began to raise concerns about the adverse effects of farm clearing on watersheds and other environmental values. In 1864, he wrote *Man and Nature*, which became a catalyst for public concern.

In 1855, Henry David Thoreau retired to Walden Pond in Massachusetts to reflect on the intrusion of civilization and to mourn the loss of America's wild places. Thoreau's was one of the earliest voices which began to put a value on "unspoiled" places for human spiritual renewal in an increasing urban and artificial society.

Teddy Roosevelt, a well-born but sickly New Yorker, went out to the Western frontier to test his mettle. He came back transformed and became a life-long sportsman and conservationist. In 1887, Roosevelt founded the Boone and Crockett Club, which became

a strong and effective advocate for sportsmen. Its membership was small in number, but large in influence. More importantly, in 1901 an assassin's bullet propelled Roosevelt into the Presidency. In that position he had a profound effect on the conservation history of the nation

The "conservation movement," if it could be called that, was made up of a disparate group of sportsmen, foresters, concerned citizens, and intellectuals, all concerned about what they saw going on. It was not an organized movement, in the sense that the groups strategized to work in concert. Instead, the movement comprised groups with related interests which moved more or less independently, seeking to achieve ends that had a common theme.

The rapid pace of change was a factor in the public concern. People could clearly see the changes in the forest landscape within their lifetime. In 40-50 years, many areas went from 80% forest to 10% or even less. Two wildlife species became the symbols of the deterioration of American wildlife. Bison, which had covered the plains in the tens of millions in 1870 were reduced to scattered remnant bands in 15 short years. The passenger pigeon, probably the most abundant bird in North America, in 1870 had darkened the skies over much of the Midwest. It was virtually extinct 20 years later in 1890.

Early responses to these concerns were expressed in setting aside land in protective categories, such as Yosemite in California (1864), Yellowstone in Wyoming (1872), and the Adirondack Preserve in New York (1885). In 1891, Congress authorized the President to

designate Forest Reserves out of Public Domain lands, but made no provision for their management. The Forest Reserves, unlike the park preserves, were generally not tied to the preservation of a nationally significant, unique area. These designations, which had grown to 40 million acres by 1897, generated much opposition, because it was unclear how such set-asides would address society's need for grazing, wood products, and other resources.

Out of this debate emerged a new idea, one rooted in the sustainable forest management concepts practiced in Europe. Conservation, the notion that forests, wildlife, and other renewable resources can be managed under scientific principles on a sustainable basis over the long term, increasingly began to be promoted by professional foresters, such as Fernow, as well as by hunter/sportsman's groups concerned about the depletion of wildlife. As a result of these efforts, in 1897 Congress finally gave the Forest Reserves a management mandate, i.e., to "preserve and protect the forests," to "secure favorable conditions of water flows," and to "furnish a continuous supply of timber for the use and necessities of the citizens of the United States."

The idea of conservation as wise use received widespread public support under the dynamic advocacy of Gifford Pinchot, first Chief of the Forest Service, and his close friend and mentor, Theodore Roosevelt. Thus, the Forest Service emerged as a product of the nation's first conservation movement. The agency became a major instrument for the practical application of conservation as

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the wise use of forest resources. That role encompassed much more than the management of the National Forests. It also included leadership in working with the states and private landowners in advocating the protection and productive management of nonfederal forest lands, as well as research in forest management and improved utilization of wood products.

### POLICY FRAMEWORK FOR FOREST AND WILDLIFE CONSERVATION

The policy framework that had emerged by the 1930s to address these issues emphasized protection of forests from wildfire and of wildlife from overharvest, and management of both forests and wildlife under scientific principles. Specific actions focused on: (1) promoting and encouraging the protection of forests, regardless of ownership, from wildfire, insects, and disease; (2) acquisition of scientific knowledge on the management of forests and wildlife, and on the improved utilization of wood products; (3) encouraging productive management of private forest lands through tax incentives and technical and financial assistance; (4) adoption and enforcement of strong state and federal wildlife conservation laws; and (5) acquisition and management of public lands for both commodity and amenity uses and values. (See the Appendix for a further description of this policy framework.)

A key element of the public policy framework was strong cooperation among federal, state, and private sector interests to achieve common goals. A stronger, more coercive federal role in the direct regulation

of private forest lands was considered and debated, but ultimately was rejected.

### CONDITION OF U.S. FORESTS AND WILDLIFE IN 1990 VS. 1900

It is a measure of both the inherent resilience of our forests and of the success of the policies that were put in place in response to public concerns in the early decades of this century, that forest conditions over much of the U.S. have improved dramatically since 1900. The following is a snapshot of the forest and wildlife situation that existed in the 1900s, as contrasted to 1990.

- In the early 1900s, wildfire commonly consumed 40-50 million acres annually, an area the size of Virginia, West Virginia, Maryland, and Delaware combined.

The area consumed by wildfire has been reduced by more than 90%, from 40-50 million acres in the early 1900s to 2-5 million acres today—even in bad fire years.

- Largely a result of wildfires, perhaps 80 million acres of “cutovers” continued to remain idle and unstocked or poorly stocked with desirable tree species.

- The cutovers or “stumplands” that existed in 1900 have long since been reforested. Today, many of these areas contain mature forests. Others have been harvested a second time and regenerated to young forests.

- Nationally, the volume of timber harvested greatly exceeded that of forest growth.

- Nationally, forest growth rates have exceeded harvest rates since the 1940s, with each decade generally showing a greater margin of growth over harvest than the one pre-

## Doug MacCleery

ceding. By 1986, the volume of tree growth nationally exceeded the volume harvested by 37%, and growth was more than 3 1/2 times that in 1920.

- No provision for reforestation was being made. In fact, no long-term forest management of any kind was practiced.

- Tree planting on all forest ownerships has increased dramatically since World War II, and was at record levels throughout the 1980s. Many private forest lands are now actively managed for tree growing.

- Large quantities of wood were left after logging, sawmills were inefficient, use of wood in buildings was based on custom, rather than sound engineering, and huge volumes of wood were lost to rot and deterioration.

- The efficiency of wood utilization has improved dramatically since 1900. Much less material is being left in the woods, many sawmills produce twice or more the usable lumber and other products per log input they did in 1900, engineering standards and designs have reduced the volume of wood used per square foot of building space, and preservative treatments have substantially extended the service life of wood. All of these have reduced by millions of acres the area of annual harvest that otherwise would have occurred.

- Large-scale disastrous flooding in the East was tied to farm clearing and to logging and wildfires.

- Eastern watersheds have been reforested. The headwaters of many American rivers are protected from overharvesting by National Forests.

- Clearing of forests for agriculture continued at high levels. In the last decade of

the century, America's farmers cleared forests at the average rate of 13.3 square miles per day. In the five decades ending in 1900, forest cover in many areas east of the Mississippi had been reduced from 60-70% of the land to 20% or even less. Many of the areas being cleared were on steep slopes, marginal for growing crops, and highly erodible.

- For the last 70 years there has been no increase in cropland area. About 1920, for the first time in American history, the increase in the area of cleared farmland abruptly stopped, rather than continuing to rise at the rate of population growth.\* While farm clearing of forests continued after 1920 in some areas, it was offset by farmland abandonment and reversion back to forest in others. The stabilization in the area of cleared farmland had an immensely beneficial effect on U.S. forests.

- By 1900, many wildfire species, which formerly were abundant, were severely depleted or on the brink of extinction. Examples included game animals, such as white-tailed deer, wild turkey, pronghorn antelope, moose, bighorn sheep, and, of course, bison. Furbearers, especially beaver, had been eliminated from significant portions of their ranges. Waterfowl were also severely impacted. They included wood ducks and several other species of ducks, Canadian geese, and all manner of plumed wading birds, such as herons, egrets, and ibises. The passenger pigeon, perhaps the most abundant bird on the North American continent, was, for all intents, extinct in 1900; the heath hen, an eastern relative of the western prairie chicken, was also on the brink. The great auk, a flightless bird along the Northeast Coast, had become extinct in 1840.

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• Wildlife has been a major conservation success story. Although a number of species, such as the great auk, passenger pigeon, heath hen, and several others, did become extinct, many others which were severely depleted or even on the brink of extinction in 1900 have staged remarkable comebacks. Many species which would likely have been on the endangered species list, had one existed in 1900, are today abundant. Examples include: wild turkey; beaver; egrets, herons, and many other wading birds; many species of shorebirds; wood ducks, and several other species of ducks; whistling swans; Rocky Mountain elk, pronghorn antelope, bighorn sheep, black bear, and even white-tailed deer throughout most of its range. Many other species, although not actually on the brink of extinction in 1900, are today both more abundant and more widespread than they were in 1900.

The two primary reasons that the area of cropland stabilized were that:

1) Rapidly increasing numbers of motor vehicles and farm tractors made it unnecessary to continue to raise large numbers of draft animals. In 1910, there were about 50 million horses, mules, and other draft animals in the U.S. Fully 27% of all cropland was devoted to growing food for draft animals. By 1950, the number of draft animals had dropped so dramatically, compared to 1910, that the equivalent of some 70 million acres of cropland had been released to grow crops for human consumption.

2) After 1935, spurred by the development of genetically improved hybrid crops and by expanded use of chemical fertilizers and liming, agricultural productivity began to improve. Yields for corn are typical. Between

1800 and 1935, average corn yields in the U.S. remained virtually stable at about 25 bushels per acre. After 1935, average per acre yields began to increase and resulted in 35 bushels by 1945, 40 bushels by 1950, and 120 bushels by 1988. American farmers now grow as much food on one acre as it took five acres to grow in 1920.

### FOREST WILDLIFE TODAY

Several species of American forest wildlife, such as the passenger pigeon, heath hen, and Carolina parakeet, became extinct as a result of forest changes and human uses during this century. A larger number of subspecies and other wildlife populations were substantially diminished, and some disappeared altogether. However, many species that were poised on the brink of extinction in 1900 have staged remarkable comebacks. Because of actions that were set in motion in the early decades of this century, many forest wildlife species are both more abundant and more widespread than they were in 1900.

The pattern that has emerged since the 1930s involves a substantial increase in forest wildlife that can tolerate a relatively broad range of habitat conditions. The numbers and distribution of the so-called "habitat generalists" have increased dramatically. Fortunately, most U.S. forest wildlife species are habitat generalists. One reason may be the natural dynamics of North American forests and the frequency of disturbance in the natural regime.

Some species, particularly large predators and herbivores such as wolves, elk, and bison, abundant in North American forests prior to European settlement, have not

returned to large areas of their former range. However, many of these species have populated areas large enough to accommodate their needs for a large home range. Although many wildlife species have staged remarkable comebacks, this does not imply the absence of problems. Species with specialized habitat requirements are of increasing concern today. Examples include:

- The red-cockaded woodpecker and gopher tortoise, which are natives of fire-created southern pine savannas and woodlands.
- The Kirtland's warbler, which is native of young jack pine forests in Michigan.
- mature and old-growth forests in the West.

Some forest wildlife species, e.g., Kirtland's warbler, require active management of young forests for their survival. Many other species, including a wide variety of both game and nongame species, need a mixture of forest and forest edge environments. Some, such as grizzly bears, wolves, elk, and forest-interior birds, need large, contiguous areas of habitat. Some require old and ecologically diverse forests. Others, e.g., the red-cockaded woodpecker, although needing mature forests, require specific habitat conditions, such as open savannas and woodlands which are created by frequent ground fires. Even the old-growth, Douglas-fir forests which are habitat for the northern spotted owl are subclimax forest types that will eventually move toward different forest conditions without occasional, stand-replacing wildfires.

#### THE EASTERN FOREST COMES BACK

Nationally, the U.S. has about the same area of forests as it did in 1920.

However, some areas have considerably more forest than existed in 1920. Beginning gradually in the mid-1800s, marginal agricultural land in the East and South began to be abandoned as more productive farm lands in the Midwest were opened up. These areas generally reverted to forest.

The reasons for reversion back to forest are complex. Two related factors were working in concert. The growth of the cities accelerated the transition of U.S. agriculture from subsistence to commercial. At the same time, the nation's progressively improving transportation system opened up more productive western lands to provide for the growing cities. The steep lands, small fields, and less productive lands of the East and southern Appalachians were unable to compete commercially with the lands of the Ohio Valley and much of the rest of the Midwest. The opening of the Erie Canal in 1825 was the first major step that set the stage for cropland reversion in the Northeast. Cropland depletion was also a factor in some cases, as was the reduction in the need for pasture that resulted from declining numbers of draft animals.

The process of farmland reversion back to forest continued into the 1900s and was accelerated by the Great Depression. Under the Resettlement Act, a New Deal program, thousands of farmers in the Appalachians and elsewhere were relocated to more productive land. Between 1925 and 1945, almost 20 million acres of abandoned farms and depleted woodlands were incorporated into the eastern National Forests under the Weeks Act. Millions of additional acres became state parks and forests.

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In many ways, the forest and farmland landscape of many parts of the Appalachians, as well as other areas of the East and South, have come full circle. By the 1960s and '70s, the pattern of forest, fields, and pastures was much like it was prior to 1800. In many areas the rural landscape has taken on an appearance similar to that prior to the American Revolution.

### INCREASING DEMANDS FOR NONTIMBER USES AND VALUES

After World War II, steadily increasing national economic growth provided the basis for increasing personal income and leisure time. That, along with the proliferation of automobiles, revolutionized the recreational habits of the American people. Recreational visits to the National Forests increased from 27 million in 1950 to 263 million in 1990. This reflected a pattern that was common to other public lands.

As the nation's population has become more urbanized, mobile, and affluent, interest grew in setting aside land in parks, recreation areas, and reserves. In addition, the success of forest conservation practices began to demonstrate the nation's ability to meet increasing wood product needs from both private and public lands. Consequently, the area of forest land set aside for amenity values in parks, wilderness areas, and similar designations under which timber harvest is prohibited has increased significantly.

Currently, about 34.5 million acres of productive forest lands—about double what was set aside in 1960—have been so designated. This is an area the size of the state of Florida.

Increased recreational demands came at the same time that demand on the nation's public forests increased for other uses as well. Such pressures have been felt especially in the last three decades as conflicts over the use and management of public lands has intensified.

### AMERICAN FORESTS—A TRANSFORMED HERITAGE

Today, our forests represent a substantially transformed legacy, particularly in comparison to 1600, which most of us understand. But our forests have also been substantially transformed since 1900, and this dimension is less well understood by most people.

The view of humans toward the nation's forests has changed profoundly over the years. Although Native Americans viewed the forest in a spiritual context, they also took a utilitarian approach. They used and managed the forest to serve their own ends.

European Americans initially viewed forests as an encumbrance to agriculture, or as a virtually inexhaustible resource. At first they used the forest—its wildlife, wood products, and land—to meet their subsistence needs for food and energy, much as Native Americans had done. Later, the abundant wealth of the forests was used to build the homes, cities, and transportation infrastructure of a growing nation, and the lands previously occupied by forests were used to feed a rapidly growing population.

Scarcely more than a century ago, it became increasingly clear that old approaches were not sustainable. We began to view forests and wildlife, not as products to be mined or foraged for, but as resources that could be managed over the long term on a scientific basis for both products and environmental services.

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As our population has continued to urbanize, the principle of forest conservation for products and services has remained, but its role and scope have enlarged. A few decades ago we began to view forests as attractive settings for outdoor recreation and as places for human spiritual renewal.

Comparatively recently, we have begun to view forests as ecosystems supporting a complex web of life, of which humans are a part. Although it is impossible to predict how our view of forests may change in the future, it is important to understand how they came to be what they are today.

### LESSONS OF THE PAST

Today, the U.S. has almost four times the population, living at a substantially higher standard of living, as in 1890. Yet our forests and wildlife, in most of their major dimensions, are in significantly better condition today than they were a century ago.

Our forests and wildlife have demonstrated a resilience and responsiveness to management undreamed of by conservationists at the turn of the century. These leaders were almost universally pessimistic about the future. Gifford Pinchot and others predicted an impending timber famine, coupled with significantly increased wood product prices, and consequent economic hardship and disruption. Wildlife leaders, such as William T. Hornaday and others, predicted the imminent extinction of scores of species. The timber famine never came. Most species whose extinction was prophesied have since recovered; many are even abundant today.

In their defense, the predictions of these early conservationists were logical and

understandable. Indeed, these conservationists were predicting what they felt would likely occur if past trends continued and no actions were taken to address the concerns they raised. However, action was taken. New policies were debated and implemented. History has demonstrated that past public policies, coupled with the natural resilience of the resource, have generally served the country well.

In addition to the policy framework already discussed, other nonpolicy factors, largely unrecognized by early conservation leaders, have contributed to the improved condition of our forest and wildlife resources. One factor involves the basic resilience of the forest resources of North America in recovering from disturbance and responding to management. In most of its past projections of future forest growth, the Forest Service has consistently underestimated the growth that subsequently occurred. Wildlife specialists have similarly underestimated the resiliency and rates of recovery of many species, once protected from exploitation and placed under management.

Conversion of the energy base from wood to fossil fuels removed a huge burden from American forests, particularly as the population continued to grow. Indirectly, use of fossil fuels in internal combustion engines substantially reduced pressure to clear forests for agriculture. Thus, tens of millions of acres of cropland were released to grow food for humans, rather than for draft animals. Petroleum also was the feedstock for fertilizers and pesticides that substantially increased agricultural productivity after 1930.

American forests have been one of many beneficiaries of the remarkable improvement in agricultural productivity that

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has occurred over the last half century. The inexorable, three century-long conversion of the U.S. forests to farmland largely halted in the 1920s. Today, we have about the same area of both forests and cropland as we had in 1920. This has occurred in spite of the fact that the U.S. population has more than doubled since 1920, from 106 to 250 million, and that U.S. farmers also feed, through exports, the equivalent of more than 100 million people in other lands. This is a truly remarkable accomplishment. Although questions have arisen in the last decade over some of the adverse consequences of intensive agricultural practices, such as pesticide and fertilizer runoff, these problems are being addressed and appear manageable. They should not overshadow the huge contribution to humanity and the environment that has resulted from improved agricultural productivity.

In addition to forest resiliency, most conservation leaders did not recognize the effect that increasing real prices for wood products would have on both consumption and supply. Real price increases for wood created powerful incentives for more efficient use for wood, e.g., less left in the woods after logging, better utilization by sawmills, and more efficient use in end-product applications through improved engineering, protection from rot through preservative treatment, and similar measures. Price increases also encouraged use of substitutes, such as steel and concrete, for wood. These private sector responses are the primary reason that wood consumption did not continue to rise after 1910 as it had in previous decades.

The conventional wisdom at the turn of the last century was that, as a result of the

long time frames and low economic returns involved in growing trees, the private sector could not be relied upon to shoulder much of the burden for producing the nation's wood once the original forests were harvested. In addition to watershed protection, this was one of the rationales for establishing the National Forests.

Just as they had encouraged improved wood utilization, increasing wood prices spurred private sector investments in timber growing. Investments other than for fire protection were not significant until after World War II, when industrial forest lands began to be managed in earnest for tree growing. Today, private forests comprise 73% of U.S. productive forest land, yet supply 80% of the wood volume harvested.

As the condition of U.S. forests improved, a central conservation issue at the turn of the last century, i.e., whether or not the nation can ensure a sustainable level of timber products for the economy, has diminished as a national-level concern. Whereas economic sustainability remains an issue in some areas, concerns over an impending "national famine of wood" are a relic of history. Concerns over forest sustainability have reemerged of late, but tend to be focused in such local- and regional-level issues as sustainability of natural processes, plant and animal communities, and biodiversity.

### CHALLENGES FOR THE FUTURE

As past issues have been successfully addressed, new issues have emerged. In recent years the growing urbanization, affluence, and mobility of the American population have caused a virtual revolution in the expectations

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of and demands on U.S. forests. Some of these are in direct conflict with traditional forest values and uses.

Issues such as protection of remaining old-growth forests in the West, maintaining biological diversity, protecting endangered species, loss of wetlands, use of herbicides in forestry, and the impact that atmospheric pollution may be having on our forests continue to be hotly debated. Although most wildlife are in better condition today than a century ago, clear exceptions exist. Some species with specialized habitat requirements remain the focus of concern. The red-cockaded woodpecker in the South and the northern spotted owl on the West Coast are examples. Declining numbers of some Neotropical migrating birds has raised concerns over forest habitat loss and fragmentation in North America as well as in Central and South America. These are all issues we must seek to successfully address as demands on the resources of our planet increase.

One of the most profound changes in American society in the 20th Century has been its transition from a rural, agrarian society to an urban, industrialized nation. This change has been accompanied by a corresponding physical and psychological separation of its people from the land that sustains them.

In a world of farms, forests, and small towns, the linkages between food and fields and between forests and home and hearth were clear and sustained by personal experience. In a world of cities and suburbs, of offices and air conditioning, those linkages have become more obscure, and for many people, virtually nonexistent. Yet today's urbanized society is no less dependent upon

the products of its forests and fields than were the subsistence farmers of America's past.

In the last decade, we have seen the debate between those advocating the utilitarian use and management of forests for commodity products and those wanting to minimize human influences and emphasize amenity values (particularly on public forests) become increasingly shrill and divisive. This conflict existed in the early 1900s and found focus in the public debates between Gifford Pinchot and John Muir. As this century draws to a close and the nation's population has become increasingly affluent, mobile, and urbanized, we have seen increasing interest in the natural process/amenity side of the conservation spectrum.

Utilitarian use of the forest for commodities and forest protection for amenity and natural values are often viewed as irreconcilably in conflict. On a personal level, or when the focus is on an individual parcel of land, they frequently are. Yet, in a larger sense and scale, they are compatible; indeed, they are inextricably linked.

Somewhat ironically, it has been the success of the scientifically based, utilitarian-oriented forest management concepts advocated by Fernow, Pinchot, and other forestry leaders at the turn of the century that has, to a very large degree, provided society with the abundance that has allowed it the capacity, unique to only a handful of other nations, to decide how much of John Muir's brand of forest conservation is appropriate. The fact that this nation now has the resource wealth to consider such choices is itself a clear and positive sign of the success of its past conservation policies.

Nonetheless, there are limits to such

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choices. Society remains dependent upon forests for a wide variety of economic products. Indeed, utilization of forests for products has never been higher than it is today on a wood volume basis. Because of this, society's ability to continue to provide for the amenity side of the conservation spectrum will, in no small part, depend upon how much attention is paid to the production/utilitarian side as well.

Today, the U.S. consumes about as much wood on a tonnage basis as the combined total for most other raw materials—steel, plastics, aluminum, other metals, and cements. Any significant substitution of these other materials for wood products could involve other environmental consequences. Alternatives to wood in most applications are both nonrenewable and use considerably more energy per unit of production than does wood.

As human population numbers and resource demands increase, the emerging challenge for society and its land managers is to find ways in which both commodity products and amenity values can be realized over time from the same area of forest. This is the challenging new focus for the evolving concept of land stewardship and forest sustainability.

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### APPENDIX

#### CONSERVATION POLICIES WHICH LED TO IMPROVED FOREST CONDITIONS

A number of forest policies emerged as national goals and priorities in response to public concerns. The success of those policies depended upon effective cooperative relationships among federal, state, and local governments, as well as private forest landowners and other private sector interests. The policies and priorities that had the greatest effect on the improved condition of our forests follow.

- Focusing on fire suppression, prevention, and public education to protect the forests;

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- Establishing and enhancing the profession of forestry, and later of wildlife management, hydrology, and other natural resource disciplines, through establishment of accredited natural resource schools, professional societies, etc.;

- Improving the art and science of forest regeneration and management, including research, establishing tree nurseries, and providing technical and financial assistance to forest landowners;

- Improving the efficiency with which wood products are utilized in the woods, at the mill, and in end-product applications. Such gains are the result of wood utilization research, its effective application, and the incentive created by increasing real prices for forest products. The Forest Service's Forest Products Laboratory in Madison, Wisconsin, established in 1910, has been a significant contributor over the years to expanding the technical knowledge necessary for improving the utilization of wood products.

- Improving the quality of forest management on private lands by improving economic incentives and removing tax and other disincentives;

- Establishing the Forest Reserves (later the National Forests) for watershed protection, irrigation, and sustained timber production.

Although not established for forestry purposes, one policy that nonetheless had a significant beneficial impact on the nation's forest resources was the strategic decision made in USDA in the early decades of this century to emphasize agricultural research aimed at increasing crop yields. Prior to that, USDA focused primarily on statistical report-

ing, soil and farm implement testing, and related activities.

An additional factor that has had a significant positive effect on forest conservation has been the increasing real price of wood over the decades. Between 1850 and 1950, the real price of lumber, and of standing timber, increased by more than five times, adjusted for inflation. This has created powerful economic incentives both for growing and managing forests and for reducing consumption of wood by using it more efficiently. The power of such economic incentives for conservation and efficient use of the resource by the private sector was largely unrecognized by early conservation leaders.

### CONSERVATION POLICIES WHICH LED TO IMPROVED WILDLIFE CONDITIONS

A significant factor in the conservation of the nation's wildlife was the establishment and proliferation in the late 1800s of politically active sportsmen's organizations. These groups waged a protracted, and ultimately successful, war against market hunting. They also vigorously supported the enforcement of game laws, self-taxation to support state game management, and acquisition of habitat reserves and management areas. The policies and other factors that follow had the greatest effect on the improved condition of U.S. wildlife.

- Adopting a variety of strong state and federal wildlife conservation laws, and establishing the agencies effectively to enforce them. This game law framework includes the following:

- Halting market hunting of wildlife for meat and most other products, including feathers (market hunting of furbearers has continued under state regulation);

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- Eliminating spring shooting of waterfowl and other game birds;
- State regulation of resident game and nongame species;
- Prohibition under federal law of: a) hunting of song birds, plume birds, and other migratory nongame birds, and b) interstate commerce in wildlife products taken in violation of state law;
- Federal regulation of sport hunting of waterfowl and other migratory game birds; and
- Federal protection of endangered and threatened species after 1966.
- Improving the art and science of wildlife management.
- Establishing professional state fish and game departments devoted to scientific wildlife management and game law enforcement.
- Improving habitat conditions, especially in the East and South, where millions of acres of agricultural land have reverted back to forest.
- Reintroducing species into their formerly occupied ranges.
- Establishing about 90 million acres of National Wildlife Refuges and 4 million acres of state wildlife reserves. Wildlife refuges and reserves in the contiguous 48 states were financed largely by hunting license fees and taxes on sporting arms, ammunition, and equipment.
- Establishing the National Forest System:
  - In the West, National Forests acted as wildlife reserves by providing protection for beleaguered populations of many wildlife species, especially large game, until state and

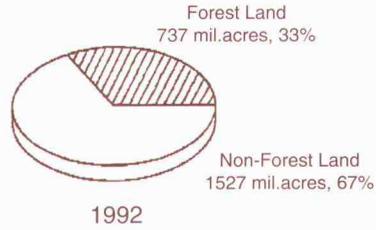
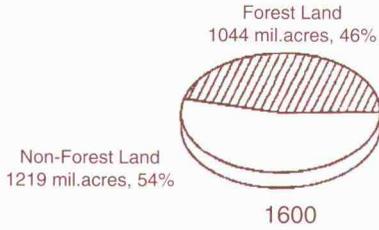
federal wildlife programs and enforcement were put in place in the 1930s and beyond. The National Forests were the source of animals for a number of later reintroductions into formerly occupied habitat.

- East of the Mississippi, millions of acres of abandoned and depleted farm and forest lands became National Forest lands after 1920. After acquisition, feral cattle, dogs, and goats were eliminated and the land rehabilitated. Today these areas provide superb habitat supporting rich populations of many wildlife species, some of which had not existed on these lands since before the American Revolution.

- The multiple use mandate of the 191-million acre National Forest System lands provides for full consideration of wildlife values and objectives in land management decisions. It has also encouraged the development of highly constructive joint efforts with state wildlife agencies in the management of wildlife habitats and populations.

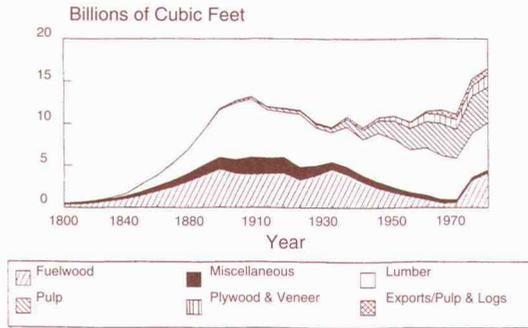
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## U.S. FOREST AREA Forests as Percent of U.S. Land Area 1600-1990



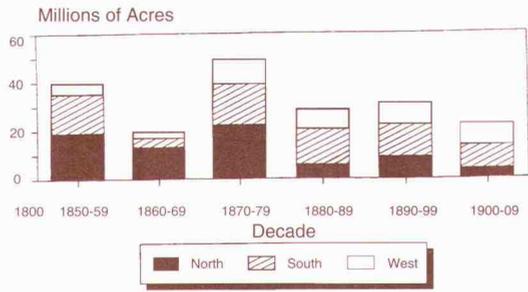
Source: 1992 RPA Assessment Update,  
USDA/FS, 5/93.

## Domestic Production of Forest Products 1800-1985



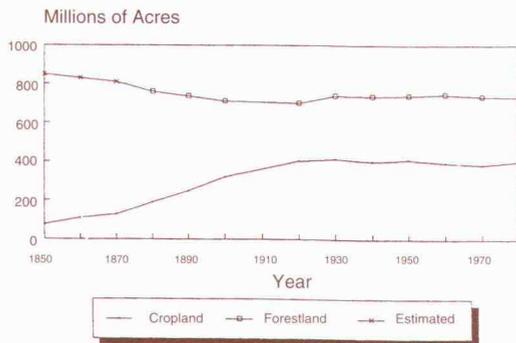
Source: Fredrick & Sedjo, "The Nation's Forest Resources,"  
RFF Paper ENR90-07, 1/90

## Farm Clearing of Forest in The U.S. 1850-1910 By Decade and Major Region



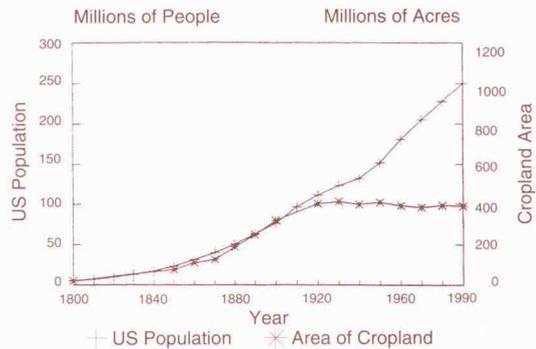
Source: M. Williams, *Americans and Their Forests, An Historical Geography*, 1989

## U.S. Crop & Forest Land Area 1850-1980



Source: RPA Technical Report RM-175,  
USDA/FS, 9/89

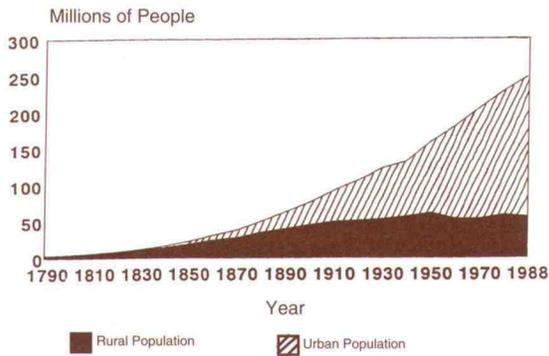
## Cropland vs. U.S. Population 1800-1990



Source: J. Fedkiw, GTR RM-175,  
USDA/FS, 9/89

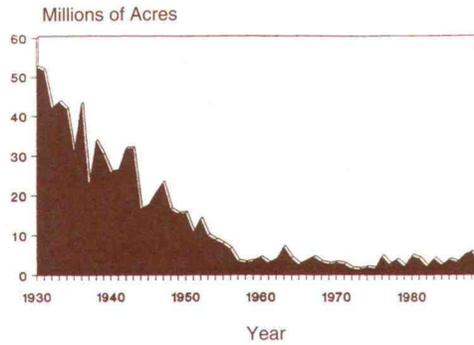
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U.S. Population - By Rural/Urban 1790-1988



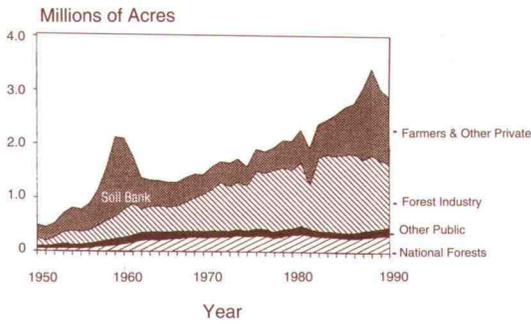
Source: U.S. Bureau of Census Figures

U.S. Wildfire Trends - Area Burned 1930-1989



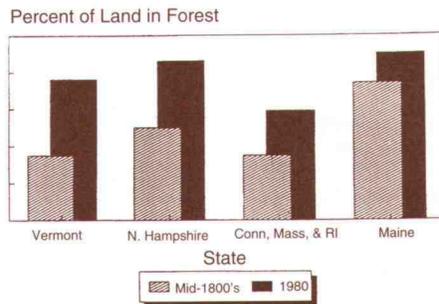
Source: Wildfire Statistics, USDA-FS

Tree Planting in the United States



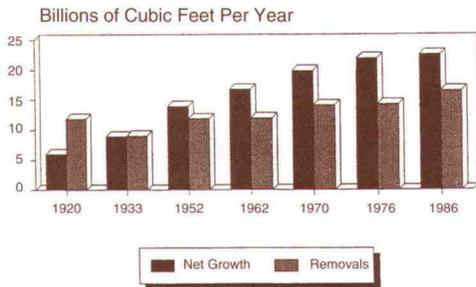
Source: "Annual Tree Planting Notes," USDA/FS

The Eastern Forest Comes Back  
Trends in Eastern Forestland 1850-1980



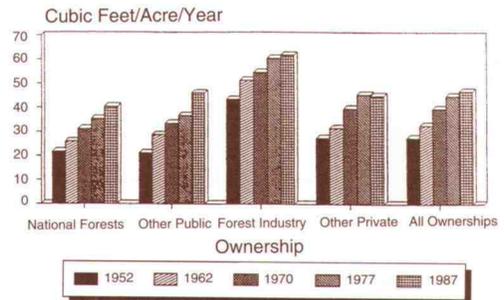
Source: J. Barrett, *Regional Silviculture of the United States*, 1980

U.S. Timber Growth and Removals 1920 - 1986



Sources: PNW-RB-168; FRR No. 23, 12/82; 1933 "Copeland Report"; 1920 "Capper Report"; (all USDA/FS); RFF Paper ENR90-07, 1/90.

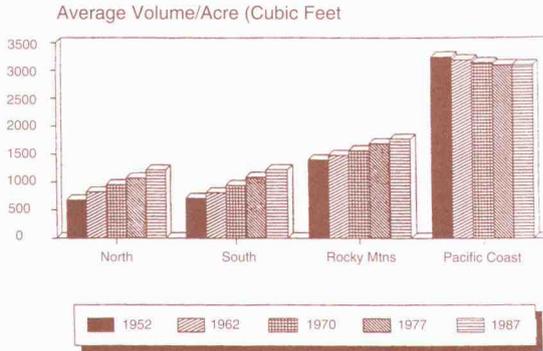
Trends in Net Forest Growth Per Acre by Major Owner 1952 - 1987



Source: "Forest Statistics of the U.S., 1987," PNW-RB168, USDA/FS, 9/89.

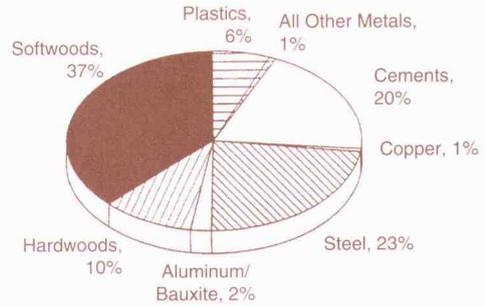
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Trends in U.S. Standing Timber Volume Per Acre  
All Owners, by Region 1952 - 1986



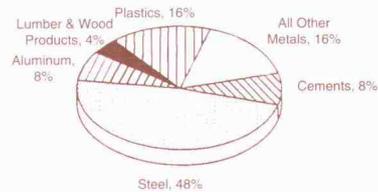
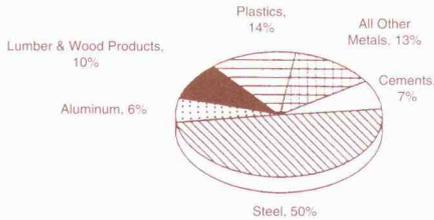
Source: "Forest Statistics of the U.S., 1987,"  
PNW-RB168, USDA/FS, 9/89.

Consumption of Industrial Raw Materials  
Wood Products, Cement, Metals & Plastics  
U.S. Totals, Percent by Weight - 1987



Source: J.L. Bowyer, U. of Minnesota

Consumption of Energy for Industrial Raw Materials  
Wood Products (Excluding Paper Products), Cement, Metals & Plastics  
Percent of Energy Consumed - 1988

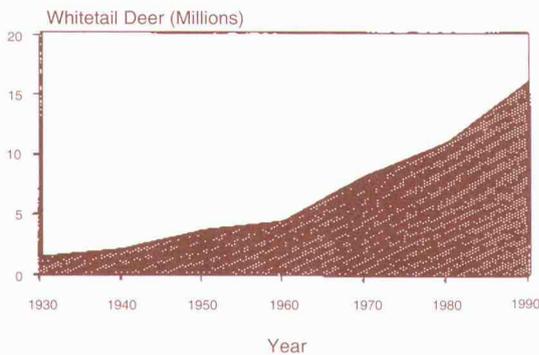


Total Energy Consumption

Net Energy Consumption  
(Total Minus By-Product Energy Inputs)

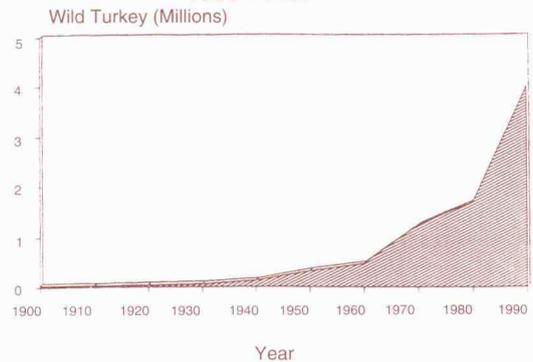
Source: Manufacturing Energy Consumption Survey, 5/91  
Department of Energy, Energy Information Administration, Table 1 and Table 13 (1988)

Trends in U.S. Whitetail Deer Populations  
1930 - 1990



Note: Since not all States are included in the data, population numbers reflect trends, rather than absolute numbers. Based on Chapter 8, "Wildlife" by Jack Ward Thomas, from *Natural Resources for the 21st Century*, AFA, 1990.

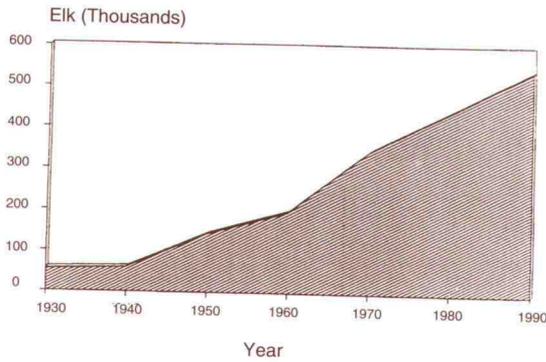
Trends in U.S. Wild Turkey Populations  
1900 - 1990



Source: National Wild Turkey Federation

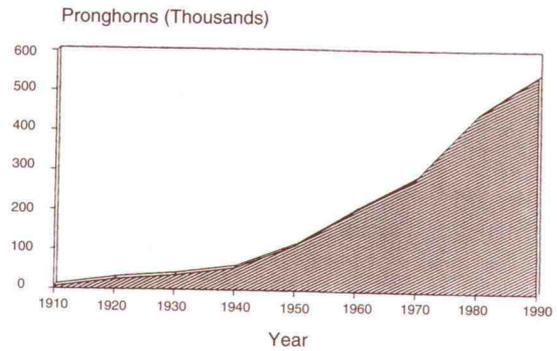
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Trends in U.S. Elk Populations  
1930 - 1990



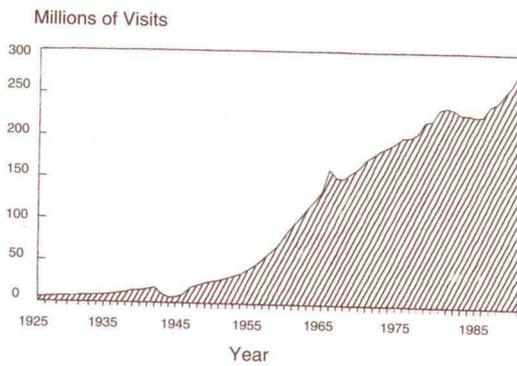
Source: A. Christensen, USDA/FS,  
Based on data from *Elk of North America*

Trends in U.S. Pronghorn Populations  
1910 - 1990



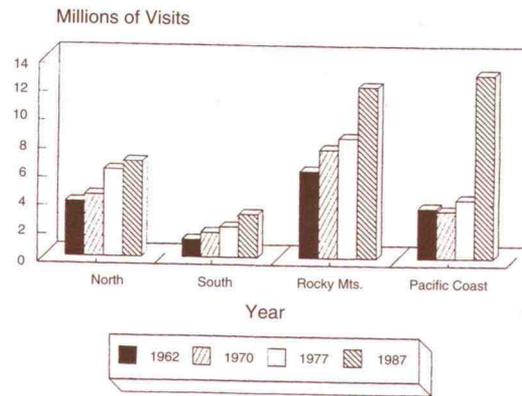
Note: Since not all States are included in the data, population numbers reflect trends, rather than absolute numbers. Based on Chapter 8, "Wildlife" by Jack Ward Thomas, from *Natural Resources for the 21st Century*, AFA, 1990.

National Forest Outdoor Recreational Use  
1925-1990



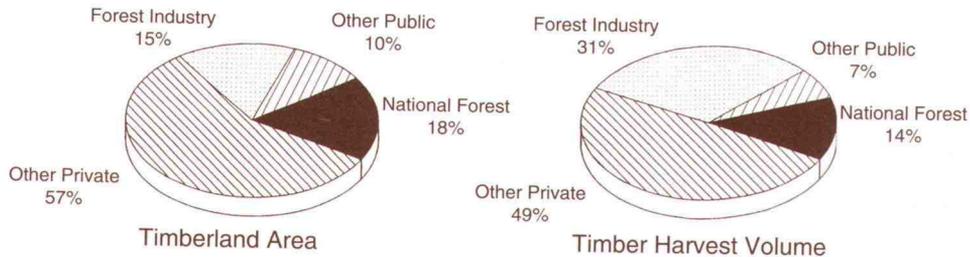
Source: USDA/Forest Service

Trends In Reserved Productive Forestland  
By Region, 1962-1986



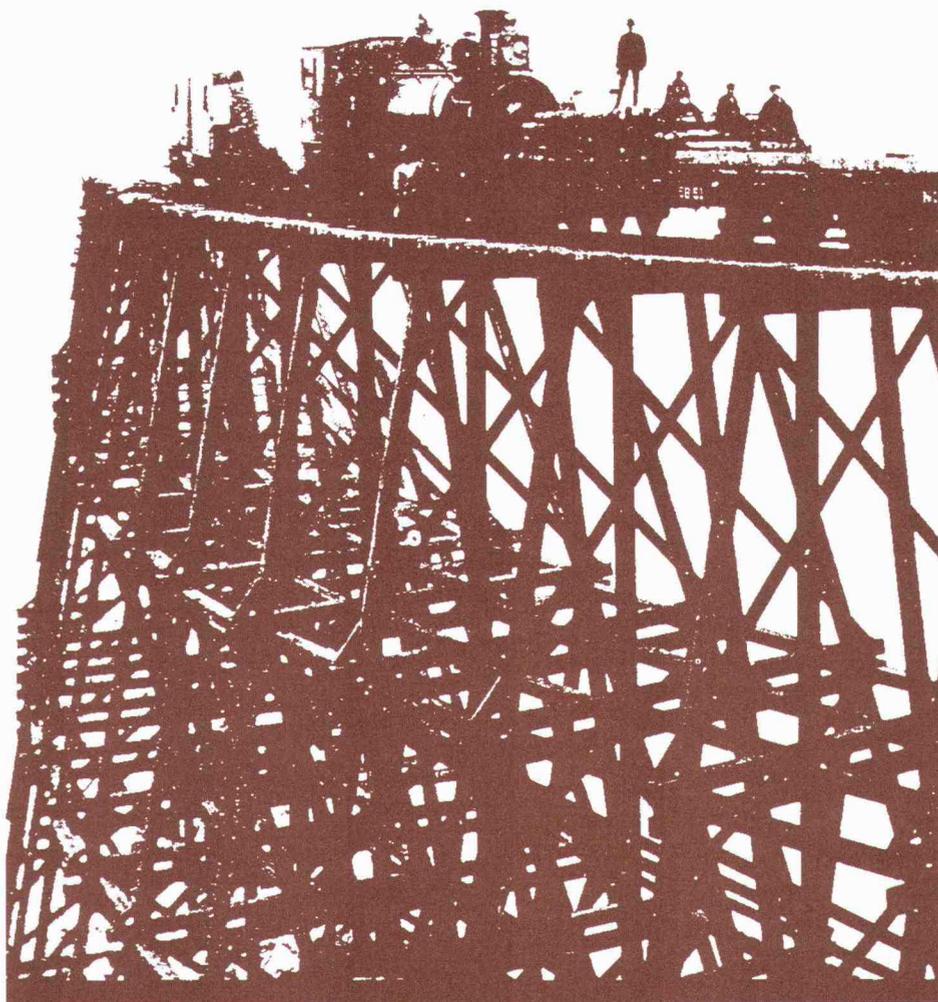
Source: RPA Assessment Documents

U.S. Timberland Area & Timber Harvest  
By Major Owner - 1986



Source:FRP No. 23, USDA/Forest Service

What In The World Have We Done To Our Forests?



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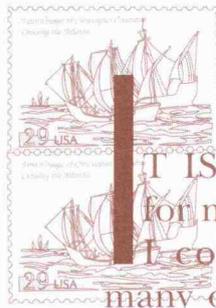


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# Forest Care: A Feminist Theory of Forest Management

BY

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IT IS A SPECIAL PLEASURE for me to be here. Not only do I count among my friends many of the people who are on the faculty here, but also students who are here that I have known from other places. It feels very good to be among friends. I comment on that because I'd like you to remember I feel I'm

**An overriding message here from the feminist's perspective is, at times when things seem the most objective, neutral, and empirical, they are also likely to be the most oppressive.**

among friends for the purposes of this talk.

When the committee asked me to come and talk and provide a different perspective, I said, "What do you have in mind?" and Norm Johnson said, "Well, maybe you could just tell us about how things would be different if women were in charge."

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I thought about that and I said, "Well, let's put it a little differently." So, my task today is to provide a different perspective. However, it is a great challenge for me to do this. And the reason for the challenge is that many of the arenas that I have been working in are quite separated from each other.

### INFLUENCES SHAPING MY PERSPECTIVE

I've been working in the area of feminist theory and feminist studies for some time. My interest came from trying to understand my own experience over the last 20 years as a professional who, when I first wanted to go to work for the Forest Service as a summer seasonal, could not work in the woods because women weren't allowed prior to 1972. By allowed, I mean to be on the ground doing things like work on trail crews or fire crews. Yet, by doing a summer of clerical work, I was allowed to be a fire tower lookout for the Forest Service, which I continued for six summers while I was in school. In these same years, I became very interested in forestry as an undergraduate in Montana. These were the times that the clearcutting controversy was raging. My father was one of the authors of the Bitterroot Report by the Select Committee of University of Montana Faculty, one of the original committees that evaluated and critiqued timber management practices. For those of you who knew my Dad, you will appreciate that this was a topic of lively household discussion.

Feminist theory was also a topic of professional interest to me, because as a social scientist interested in forest management, it was very hard to find a place. Although the importance of society and social values in forestry is

clearly recognized, it is still very hard to be a social scientist in forestry and to be valued for contributing a necessary perspective for the practice of forestry. Beyond simply being a social scientist, given the mythological connections to swashbucklers like Gifford Pinchot or others who endured the hardships of outdoor life, taking a feminist perspective may seem like sissy stuff.

One purpose of this talk will be to provide some insight into what feminist theory and feminist methodology can offer to forest management and policy.

The title of this talk illustrates two potential contributions of feminist theory. First, feminist theory can be used to develop a new substantive grounding for enduring forest management — *Forest Care*. In contrast to stewardship, which locates responsibility in individuals, forest care requires community. It requires community in the sense that there has to be some kind of empathy in order for there to be a caring relationship. Care by individuals, taken singly, is simply self-interest, or as the utilitarian would argue, the avoidance of pain. Second, *feminist theory of forest management* was to indicate that a whole new way of thinking was necessary, built from different forms of knowledge and with a different viewpoint on history. One cannot move toward Forest Care simply by making incremental improvements at the margins of current practice.

### WHY FEMINIST THEORY AND EPISTEMOLOGY?

Now I suspect for most of you, you're still wondering what is a feminist theoretic approach. Let me outline a few elements of it which are pertinent to this talk.

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**One of the primary assumptions in feminist methodology and feminist theory is that the realities we see — as if they were obvious, as if they were neutral, as if they were objective, as if that simply is the way the world is — are actually structures of power. They are created.** They are created as we think and as we live. They're created by history. As products of human creation, our understandings of ourselves, our society, our world, and, of course, our forests are always partial. It is this partiality, and the reasons for it, that are the central focus of feminist theory and method.

The primary purpose of feminist research is to illuminate what is missing. If there is a particular agenda to feminist theory, it is to illuminate the chronology of women's roles and the voices that have been lost over time due to lack of attention or purposive exclusion from the dominant view of history. Feminist methodology is designed to illuminate the structures and sources of power which lead to the dominant forms of knowledge. Thus, feminist theory and methodology are particularly well-suited to the task of revealing the ways the everyday world and our everyday assumptions about that world are the creation of those wielding power. In the case of forest management, the wielders of power are the scientists, managers, owners, and others who control access to knowledge-making and using. The historic exclusion of women from these ranks is what lead Norm Johnson to ask me, "What would things be like of women were in charge?"

To not disappoint Norm too much, I will conclude this talk with a discussion of leadership, and in particular, women's leadership styles. Two questions arise from a discus-

sion of women's leadership: are women particularly well-suited to the special aspects of the leadership role, and are there elements that might come from women's knowledge useful to others in leadership roles? Beyond responding to the questions posed to me, there is another reason to discuss leadership. Like the idea of Forest Care, leadership is a quality of a community. One cannot stand alone and be a leader.

To begin this talk, I will discuss what kinds of epistemology might be most useful to understand the forces that shape this world we take for granted. I will use the separation of the forest from the everyday lives of people as an illustration of how our conception of a "normal forest" reflects a particular conception of the relationship of the forest to the economy, not the household. Rather than discuss in detail the categories that shape our understanding of what a "forest" is or what "forest resources" are, I will look at another arena — war — and illustrate how our conception of war is partial and specifically ignores the contribution of women. The reason to take up war is to connect it to fundamental political theories which separate the public and private realm, and relegate women to the private realm. My argument will be that the relegation of women to the private realm and of forests to the public realm severed the connection of women's knowledge of forests from the "management of forests." Thus, the conception of Forest Care is to reunite women's knowledge with our common understanding of what a forest is and its value. The discussion in the final section of women's leadership is to link the idea of Forest Care with new forms of action

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that rely on different kinds of knowledge, and thus value women's ways of knowing and women as creative knowers.

### THE PROBLEM OF FOREST MANAGEMENT

To begin this critique, we must first ask not only whose problem is forest management, but also who gets to define the problem of forest management. Presumably you wonder what I could be talking about. The "problem" of forest management is obvious. It is to provide wood for society, to provide habitat for animals, to provide respite from industrial society, and so forth. The primary contribution of the feminist theoretical perspective is to teach us that it is exactly when a problem seems the most objective, the most neutral, the most empirically-based, that it is the most blind to the perspective of the viewer, the most inclined to have been shaped by powerful bias, to overlook other forms of knowledge, and to be understood based on limited acceptance of subjective knowledge. **It is at times when things seem the most objective, neutral, and empirical, that they're also likely to be the most oppressive.**

In scientific research, we distinguish between method, methodology, and epistemology. Both a choice of methodology or specific techniques and methods rely on a conception of what kind of knowledge is pertinent to addressing the question at hand. For example, to assess the values of the forest resources, one might inventory the resources — wood, water, wildlife, forage, etc. — and assign them values based on what users are willing to pay or give up for these resources. But are these things the only kind of "resources" in forests, and is exchange value a sufficient mea-

sure of their worth? Such questions are at the level of epistemology: *what counts as knowledge*. Included in what counts as knowledge is *who can be knowers*. To take a feminist approach, we must critique both the fundamental concepts, like what are forest resources, as creations of power as well as the processes of knowing as exercises of power by those who hold the power to be knowers.

The richness of a feminist approach comes from illuminating things that are very hard to see, especially because those in power have spent a lot of energy making sure they are invisible. And that's precisely the issue here—that theories are constructed to overlook some aspects of life in order to simplify so that we can see a few things well. Sociology, for example, has focused on public, official, visible, and dramatic events, and thus has not looked at private, unofficial, supportive, less dramatic, or invisible events. Feminist sociologists are working to fill these gaps in knowledge, by studying, for example, the social organization of housework and nutrition.

Scientific knowledge about forests, like modern science in general, assumes that nature is governed by universal, timeless and simple laws which can be understood by technicians in the same manner as they understand the workings of machines (Banuri and Marglin 1993:19). The distinguishing characteristics of modern scientific knowledge are its disembeddedness from context, its universal application to all contexts, its separation from community, separation of the knower from the known, all leading to both a radical individualism and pure instrumentalism.

In practice, this means that forests have been defined based on characteristics

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supporting human uses for specific things which are assumed to be always and everywhere the same. Forest resources are assumed to be objective characteristics of forests which are everywhere and always present, whether used or not. For example, while the specific species of tree varies by place and use, the resource “wood or fiber” is a category of forest resource which all forests are assumed to be capable of supplying. As a result, forestry is based on a concept of forests which assumes a single society. In other words, no matter who you are — man or woman, ethnic heritage, or social class — the definition of what are forest resources is the same for you as for anyone else.

Yet, it is clear that differently situated individuals experience society differently. Thus, for forests, it is unlikely that there categories of forest resources that anywhere and always are the same. Rather, there are many forests, since they are experienced by many different people in many different places who recognize, use, and value many different elements of the forest. Thus, in contrast to modern scientific forestry, there is also forest knowledge which is embedded in the locality of the place, located within a community of knowers, not separable from the act of knowing, and thus less easily transformed into instrumental knowledge in the service of particular objectives or values (Id:1). This form of knowledge is often called “indigenous knowledge,” or “local knowledge,” or because women are frequently the users of the forest products and services, “women’s knowledge.”

A feminist methodology offers several approaches to discussing the contrast between these systems of knowledge and the implications for a theory of forest care. First, we can

look historically to the story of forests and forest management, and see how the definition of a forest served the growth and development of modern, industrial social and economic structures. Second, we can compare the partiality of modern forest management with other aspects of society, and see if we can identify what elements or experiences are systematically missing which are similar to the missing knowledge in forestry. The next two sections take up these two approaches and provide an glimpse of the contribution a feminist approach can make towards reconceptualizing forest management in terms of Forest Care. As expressed in my introduction, this paper can do little more than outline the direction of argument and inspire further research and study on the part of those committed to a more inclusive forestry and to a new theory of forest management which recognizes both the centrality of location and of the community of knowers embedded in that place.

### FORESTS AND FOREST WORK

To understand the origins of the modern problem underlying the development of scientific forest management, we need to take a look at the past. I recommend you read one of my favorite books on this subject. It’s called *A Forest’s Journey: The History of Civilization from the Perspective of Wood* (1990) by John Perlin. Perlin traces the evolution of society and social institutions from the changes in the forests and the shifts in what are defined as forest resources.

Clive Ponting, in *A Green History of the World* (1991), also points to the changes in forests and forest knowledge as cities and

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trade emerged as the dominant world patterns. "In a great variety of combinations humans, animals, water and wind provided the bulk of the world's power until well into the nineteenth century. The world's main source of fuel throughout this period was wood, and apart from animal dung there was no real substitute. Wood had many advantages — it was easy to collect, readily available, burned well when dried and, in many cases, it was free. The problem was that wood was in great demand. Although some requirements could be met by other methods short of felling whole forests (such as coppicing), most could not, and little attention seems to have been paid to treating wood as a renewable source while supplies seemed virtually inexhaustible. Forests were destroyed not just to provide more land for agriculture but also for wood for fuel and timber. It was used in housebuilding and construction work of all kinds (including fortifications and bridges), in industry to make casks, vats and machinery, in shipbuilding, and, in the form of charcoal, as the primary fuel for industries such as iron smelting, brewing, glass making and brick production. A moderate sized house in medieval England required a dozen oaks to be cut down, and in the fourteenth century work on Windsor Castle resulted in the felling of over 4,000 oaks in ten years. ... Once industrial uses became important there was a big step up in demand for wood and charcoal. ... In the United States in the nineteenth century an average blast furnace accounted for the destruction of about 250 acres of woodland every year and the Hopewell furnace of Pennsylvania was using up as much as 750 acres a year. ... In 1850 wood still accounted for 90 percent of the

United States' fuel supplies and half of the nation's iron was still produced using charcoal. ... Not until the mid-1880s did coal become the principal source of energy in the United States — when its readily available wood supplies were largely exhausted." (pages 277-284)

John Perlin's book documents in detail this general story as well. His primary message is that the forests fell in front of advancing societies which used them for trade, fuel, war, and building. Indeed, the impetus for colonization and exploration by Europeans came more from the need for wood than from a search for gold! In the face of demands for wood for expanding urban societies, the claims of forest dwelling people were disregarded and, of course, generally they were overrun or eliminated. Today, when hearing this rendition of history, heads nod in sympathy but shoulders shrug in acceptance of its inevitability. In the international arena, however, people are not so complacent; many have not accepted the inevitability of the loss of their forests to the continued onslaught of industrial society. The history of Europe and the United States is replete with examples of efforts to contain the destruction of forests for their wood and to hold forests in place for their protection values as well as their use values. Given the centrality of forests to the lives of people, it is difficult not to wonder why efforts to contain the felling of forests across great areas of land continued for so long and with so little effective control.

A look at forestry and forest management can point us toward some of the answers to this question. While forestry as a social practice extends back 3000 years in China as

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we are always reminded by Jeff Romm at Berkeley, forestry as practiced in the United States today reflects most directly the history of Switzerland, Germany, Great Britain and France over the past five hundred years. Gifford Pinchot, encouraged by his father to consider forestry as a career, traveled around Europe in 1870 to look at forestry and see what foresters did. What he saw reflected the very history Perlin and Ponting outline, for forestry had already been separated from the everyday uses of household economies. This separation led to a segregation in who did forest work. Pinchot saw men doing forest work. He saw men doing logging, felling, and bucking. He saw men doing forest administration and management. The great impediments to forestry, according to the male foresters he talked to, were all the local uses that people (often women and children) living near the forests had the right to maintain — like grazing livestock, gathering firewood, and collecting forest products like truffles and mushrooms.

Pinchot and future American foresters felt fortunate that many of the vast forests of the United States did not have protected servitudes like were found in Europe. Servitudes are sets of rights to use resources of the forests that are not easily severed, like rights to grazing, rights to collect fuelwood, rights to walk in the forest, rights to have fodder available to grazing animals, and so forth. From the standpoint of forest management for wood production, these servitudes encumbered managerial prerogatives on many of the forest lands.

Let me return to feminist theory and develop a different perspective on forestry and forest management; a perspective that can help us begin to dissect and deconstruct

the nature of the problem of forests and forest management. We can begin by looking at the definition of the problem and trying to reveal who is defining the problem. In feminist research, we look especially to find when women are active agents as well as creative knowers who make and use knowledge. In addition, in the case of forest management we must look both to different ways of defining the “problem” of forest management, as well as how a different problem might both derive from and draw upon different kinds and sources of knowledge.

In forest management, little time is spent critiquing the received and accepted “problem of forest management.” All assume that it is clear and empirically accurate, that forests can provide multiple products over time, that predictable and certain supplies of forest resources are the obvious goal of forest management, and that when some resources must give way to others their commercial value determines which resources are most important. This all too familiar conception of forest management completely ignores the perspective of women and the kinds of values and knowledge that women’s lives might contribute to understanding the nature of forests and the values of forests.

Written in 1850, *Rural Hours*, by Susan Fenimore Cooper (daughter of James Fenimore Cooper) was widely read and in print for forty years. In it, she writes, “Of the infinite variety of fruits which spring from the bosom of the earth, the trees of the wood are the greatest in dignity. Of all the works of the creation which know the changes of life and death, the trees of the forest have the longest existence. Of all the objects which crown the

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gray earth, the woods preserve unchanged, throughout the greatest reach of time, their native character: the works of man are ever varying their aspect; his towns and his fields alike reflect the unstable options, the fickle wills and fancies of each passing generation; but the forests on his borders remain today the same as they were ages of years since. Old as the everlasting hills, during the thousands of seasons they have put forth and laid down their verdure in calm obedience to the decree which first bade them cover the ruins of the Deluge" (as quoted in Anderson 1991: 69). The enduring nature of the forest made it a touchstone for stability in contrast to the works of human society.

Such expressions are found elsewhere in women's writing and also in their poetry. For example, in "Breaklight," a poem written in 1974 by Lucille Clifton, an African-American poet raised in upstate New York, points to the ability to speak the language of the forest.

light keeps on breaking.  
i keep knowing  
the language of other nations.  
i keep hearing  
tree talk  
water words  
and i keep knowing what they mean.  
and light just keeps on breaking.  
last night  
the fears of my mother came  
knocking and when i  
opened the door  
they tried to explain themselves  
and i understood  
everything they said.

(Anderson 1991:8-9)

Such conceptions of the forest stand in stark contrast to the usual language of forest management. Indeed, I would argue, the main purpose of the language of forestry and forest management is to negate the concepts and knowledge expressed in both selections quoted above. For as long as the knowledge of the forest is embedded in the ability of the knower to "speak the language of the forest," it is difficult to segment it from the knower and access it through non-experiential modes of learning. Thus, it is impossible to characterize forests based on abstracted universal principles.

The arguments found in the critiques of scientific, technical forestry in the international literature today turn on exactly this distinction. It is not that science cannot be useful in illuminating the processes of the forest ecosystem, it is that knowledge must be placed in context with local knowledge about the forest. Local knowledge is bound by time and space, by contextual and moral factors (Ibid:13). Local knowledge interlinks different realms of experience, and thus is much more accessible than technical knowledge which derives from principles abstracted from experience and perceived to be universal properties of forest ecosystems.

It is not a new argument to show the connection between science, instrumental rationality, economic growth, and a colonial mentality towards people and forests. It is important to begin with this set of connections, however, before adding a feminist critique to it. The critical perspective on abstracted science and reliance on technical knowledge derived from it, on the domination of local people by the sweep of colonizing efforts by industrializing economies, and on the paradigm of

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economic growth itself do not necessarily link women or women's knowledge to the critique.

In the case of forestry it is essential to link women and women's knowledge to this broader critical perspective. First, from a local use perspective, women use the forest in ways and for things not usually considered "forest resources" for the purposes of forest management. Second, from an epistemological perspective, women's knowledge is disconnected from the body of scientific knowledge about forests, and women as active knowers are discouraged from drawing upon women's knowledge — they must learn the language of scientific forestry developed by men in support of felling the forests to create an industrial economy! The separation of women from the economy outside of the locality and the segregation of women into the private realms of society and outside of public life together ensure that women and women's knowledge will neither inform nor constrain forest management and forestry.

Before completing a critique of forest management, I think that I may need to show you what I mean by segregating women from both public life, and therefore a voice in governance, and from the larger economy. In industrial societies, political voice and economic voice are inextricably linked in property ownership. To provide a brief glimpse into how women have been excluded from these realms at a time and place when knowledge about forests and forestry was central to the development of the Constitutional framework of the United States — thereby creating the office of citizen — and the development of a national economy, I will turn to the Revolutionary War period and the 19th century.

### WOMEN AND WAR: A REVOLUTION

It is important to dissect the ways in which a social order simply creates its own inevitability. This is what Catherine MacKinnon, one of the most pre-eminent legal feminist scholars in the country, argues when she says that when law most closely conforms to precedent, to fact, to legislative intent, it most closely reinforces male norms and it precludes questioning of their content as having a point of view. Problem definitions always have a point of view, and it is incumbent upon us to ask, "What kind of point of view might it have?" For example, let me take on a familiar event in American history — the Revolutionary War.

The Revolutionary War was a strongly defining experience in the context of this nation and our culture. It was intended to be transformative. It was intended to throw out old political models and to create new models. It was intended to create virtuous citizens who would be capable of self-government.

There was a clear sense among people in those revolutionary times that they were engaged in a transformative act. However, after the war, the many kinds of contributions that women made to that war, (as they have made to all wars), were quickly forgotten. Where in your history books did you read about the events that happened prior to the Boston Tea Party when the women of Boston organized the boycott of British tea? Did you know that by the time the men went onto the British ship that held the tea — the reason tea was still onboard was because women were not buying tea from the shops in Boston? The women waged an effective boycott. Did you read that in your history book? No, probably not. Neither did I.

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War is generally pictured as the ultimate all-male domain. The maintenance of the purity of this domain has extended to subordinated ethnic groups, races, even lifestyles. Nevertheless, the reality of war is quite different. Listen, for example, to this description of the Hessian army after the surrender of Burgoyne in the Revolutionary War:

“Great numbers of women, who seemed to be the beasts of burden, having a bushel basket on their back, by which they were bent double, the contents seemed to be Pots and Kettles, various sorts of Furniture, children peeping thro’ gridirons and other utensils, some very young infants who were born on the road, the women in bare feet, cloathd in dirty raggs, such effluvia filld the air while they were passing, had they not been smoking all the time, I should have been apprehensive of being contaminated by them” (Kerber 1980).

Women played major, not minor supporting roles, in the colonies and during the Revolutionary War. The Revolutionary War has drawn special attention because its purpose was transformative; it aimed to replace distant, authoritarian power with close, republican self-governance. To this end, new institutions were created, new political theories invented, new values articulated, and through it all women played an important role. Yet, their ultimate political position left married women “civilly dead,” children under the absolute authority of the father, and women as citizens of lesser political standing.

“Despite their formal prepolitical status, women participated in the Revolution. They were central to the success of boycotts of imported products and, later, to the produc-

tion of household manufactures. Their work on farms and in businesses in their husbands’ absences was a vital and obvious contribution. Women’s participation also took less conventional forms. Edward Countryman recounted instances in which groups of women, angered at what they saw as wartime price-gouging, forced storekeepers to charge just prices. During and after the war, women also took part in urban crowd actions, organized petition campaigns, and formed groups to help soldiers and widows. Some even met with legislature to press for individual demands. Whatever their purposes, all of these activities were congruent with women’s identification with the home, family, and community” (Baker 1984:630-1).

The key to understanding women’s political participation may be recognition that the public and private spheres were merged in their activities. The radical separation of public and private spheres followed from the legacy of Great Britain, and was continued in the Constitution partly due to the unfortunate decision to adopt the controversial, and draconian summary of British common law by Blackstone to stand as precedent in the U.S. Whereas in the colonies women had enjoyed political rights and had participated in politics, the Constitution and the newly created government removed women from public life by defining them as outside it and under the subjugation of white, male, propertied citizens.

Women’s political life always blended the home and society. Current debates over biblical rules regarding priests return to the central role of Mary Magdelene who preached independently as well as “washing the feet of Jesus.” All during the Revolution women rode

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though the forests warning groups of militia of the movements of the British soldiers. Women fought beside the men in the Revolution. Indeed, George Washington lamented their absence when coming upon a group of soldiers who could not manage to wash and care for their own clothes, but let them rot on their backs.

Such examples raise the obvious question of why leave out the contributions of women in telling the story of the Revolutionary War? Why indeed do our history books with which we seek to educate our children neglect the story of women? While history books cast the taming of the west in male, pioneering terms, the voices of women are frequently heard as the pioneers who braved the hardships to seek land and a new life. However, the legal relationships emerging from westward expansion do not build upon women's lives, but on men's lives. Water law stems from mining claims. Homesteads were given to males over twenty-one years of age, because even though the law said "citizen," women did not share equally in the office of citizen.

During the 19th century feminist groups organized around such obvious injustices, including the right to vote, the injustice of taxation without equal political voice, and the necessity of abolishing slavery which treated even children as chattel property to be disposed at the will of the owner. It was the women's organizations which pressed President Lincoln to remain firm in the commitments to abolishing slavery which preceded the Civil War. There were women land owners who were either never-married or widowed. All during the Nineteenth century women's suffrage groups organized tax revolts on the same revo-

lutionary cry as the Declaration of Independence — no taxation without representation (Wagner 1987). Nonetheless, women, Blacks, Indians, and workers were still oppressed in different ways a century after the Revolution. As a result of continuing work by feminist organizations, the years around the first Centennial of the Declaration of Independence became important years for political organizing.

On the 100th anniversary of the Battle of Lexington, April 19, 1874, Lillie Devereux Blake, president of the National Women Suffrage Association, expressed the continuing frustration of women from being excluded from realizing the liberty and justice for *all* citizens — not just men — promised by the Declaration of Independence and the Constitution:

"Our ancestors called the imposition of taxes without their consent, slavery, and the denial of personal representation, tyranny. Slavery and tyranny! Words which they tell us today are too strong for our use. We must find some mild and ladylike phrases in which to describe these oppressions. We must employ some safe and gentle terms to indicate the crimes which our forefathers denounced! My friends, what was truth a century ago is truth today! Other things may have changed, but justice has not changed in a hundred years!" (Wagner 1987:42)

The 1876 Centennial celebration became the moment when clear resolve to bring to full political attention the injustices of excluding women from political equality brought together people of like minds.

"Yet notwithstanding all these wrongs and usurpations practiced upon woman, all the unjust laws that rob her of money and

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property, and more, of that inalienable right to self-government guaranteed to her by God and nature, we wage no cruel war, no bloody conflict, but will persistently plead for justice and right of those who hold in their power our rights. Though we have waited through one hundred years of cruel, yes cruel political servitude we will still wait and watch. The doors of justice refuse us entrance, but still we will stand at the threshold and knock, and knock again. One hundred years is long to wait, but if another must be our lot, O Centennial women of 1876, be patient, be firm, be strong, be active. Let us educate the daughters to hold the fort that we today are storming. We are making history" (New Northwest, 4 August 1876).

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Around the country women joined together in separate "celebrations" of the Centennial. The New Northwest was a feminist newspaper published in Portland, Oregon and not only printed the text of the Women's Declaration, it also predicted the ultimate success of its purposes. Elsewhere in Oregon, the women in McMinnville "gathered in a grove to hear the Woman's Declaration of Independence" read at the national celebrations in Philadelphia Independence Hall (Wagner 1987:69). In your neighboring state, then Washington Territory, the women deemed it "an honor and a privilege that an opportunity is afforded them of joining with their sisters throughout this nation in a protest... against this government allowing men to legislate for women in all cases whatsoever" (Wagner 1987:70).

In Philadelphia, the leaders of the women's movements were denied the opportunity to present the Woman's Declaration of

Independence during the official ceremonies. Instead, they staged a silent presentation in protest, and then, in a fashion recalling the events a century before, they read aloud the Declaration on Independence Square in front of Constitution Hall. Many newspapers published the entire document the next day, and it was read and celebrated around the country during the rest of the summer (Ibid). Like the 1776 Declaration of Independence, the women began with the self-evident principle that "men and women" are created equal, and thus the tyranny of men over women was unjust.

"Taxes are not only imposed upon us without our consent, but they are made more onerous by masculine extravagance, embezzlements, and a lack of true knowledge of both political and domestic economy. Men have spurned our offers of advice and assistance, and opposed our attempts to assume our rightful places. They have ridiculed our movement for the establishment of equal rights, and they have insulted, arrested, and fined our leaders. They have multiplied offices, set swarms of useless officers to devour our substance, and to wax fat and arrogant upon our industry and frugality. They have equipped soldiers, raised and maintained armies and navies, and made wars, desolating our homes, shedding much innocent blood in direct violation of our natural instincts and our peaceful desires. ... They have, in fine, declared themselves invested with power to legislate for us *in all cases whatsoever*... Wherefore, we hereby declare that a government whose character is thus marked by every act which may define a despotism is unfit for a republic and a people claiming to be **FREE**" (Wagner 1987:70).

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At the same time, Belva Lockwood, a prominent Washington, D.C. lawyer, was finally seeing successful passage of a bill to allow women to practice before the Supreme Court. She became the first woman to do so, and continued to press for the right for black male lawyers to also be admitted to practice before the high court (Wagner 1987:91). In the same year as both the Hardrock Mining Act and the Yellowstone Park Act, Belva Lockwood drafted a bill requiring equal pay for equal work for federal employees, and it too was passed in 1872.

In 1884, Belva Lockwood and Marietta Stow accepted the nominations for President and Vice President by the Equal Rights Party. The Equal Rights Party stood for full political participation regardless of color, sex or nationality and for an equal and exact justice for all (Wagner 1987:92). According to Sally Roesch Wagner, the press admired Lockwood's campaign. The Washington Evening Star was noted by Wagner (1987:93) as declaring "Candidate Lockwood's letter of acceptance is the best of the lot. It is short, sharp, and decisive. She means what she says and says what she means. It is evident that Mrs. Lockwood, if elected, will have a policy; and in many respects that policy will commend itself to all people of common sense."

How, then in the context of all this activism on the part of women and full political rights for women, was such recognition one hundred and twenty years coming at the national level? Part of the explanation may lie in the political role charted for women in the context of the wild frontier and the shapeless government which was inventing itself. The theme of the 19th century for women is their role as "republican mothers" (Kerber).

In their vested place as republican mothers, women were considered the embodiment and the outpost of civilization. Whereas women had little political identity, it was not the case that men could always treat them badly with impunity. Rather, the emerging social intolerance of wife-beating, rape, molestation, and alcohol-related abuse reflected the centrality of the role of women as guardians of republican virtue. As "republican mothers" women in frontier communities held two voices: the voice of private life — home, family, domestic community — and public responsibility for education, civic virtue, and the preparation of males for participation in democratic government. As is frequently found in the writings and speeches of women at the time or in the histories of their lives and contributions, this duality of voice is the locus of tension, a tension constitutive of the political role of women.

Republican mothers, their duality evident in the concept, bridged the public-private split. The public lives of women were organized toward creating a society of justice, freedom, and security, and their private lives charted new roles and opportunities for them and for others less on the forefront of social change. Can one usefully think of forests from the perspective of "republican virtue," and so locate forests in a dual voice, the voices of commerce and economic development along with the voice of community commitment and stability?

### LEADERSHIP AND WOMEN

Framing forest management from this vantage point opens new ways of thinking about forests, forest policy, and the relationships between forests, communities, society,

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and economy. This is the reason for a feminist theory of forest management. Whereas traditional forest management concepts were derived from masculine political concerns and emphasized masculine roles in extended economies, a feminist forest management might begin in the home and begin with concerns for sustenance, security, and community economics.

To bring feminist theory from the 19th century to nearly the 21st century, one place where qualities of women are gaining particular recognition is in the area of *leadership*. The perception of a leadership vacuum or gap today extends through all parts of American society — from the making of cars to the management of national forests. New theories of leadership are “surprisingly” consonant with feminine qualities, and women often excel when such qualities are the path to success. Given the centrality of forests to world environmental problems, perhaps this perspective is particularly illuminating now.

Frequently, scientists and managers act as if they have clear, unambiguous, fairly certain sets of categories. But really there is a great deal of tension between categories. We can use the tension between the concepts of the natural forest and the managed forest as a pedagogy for learning about natural forests and managed forests. This use of the tension between concepts opens our eyes to the process of definition and clarifies the processes of creating categories, not just examining given realities as if the examiner had no role in creating the view. In addition, concepts like “forest” are emergent qualities of complex systems. So, for example, is the concept of an “ecosystem.” You don’t just draw a line around

one, and say, “Ah, this is it—I’ve found the Ecosystem!” No. It’s an emergent property of a whole set of relationships. Ecosystems emerge if a set of relationships is in place.

Forms of knowledge and styles of action always go together. For example, men have typically been very well socialized for command-control relationships. Whether in military organizations or in the long history of administrative roles, basic structures of hierarchical command and control are frequently employed. When the task is to ensure that lower level soldiers or workers follow directions with unquestioning loyalty, these may be effective forms of organization. However, if there is any question as to the definition of the mission or the task to be completed, these forms of organization can incorporate questioning only in the form of mutiny or revolt. Thus, the high price of questioning and change makes it rare and extremely threatening to all within the organization. “Men used to operating exclusively in the command-and-control mode are doomed to failure in the fast-moving, information-laden, constantly changing environment of modern business” (Aburdene and Naisbett 1992:94).

When talking about a pedagogy for learning through exploration of the tension between different systems of knowledge, one needs an organizational form which thrives on questioning, critique and change. Naisbett and Aburdene draw from empirical studies of women in leadership roles and describe a different form of organization and a different set of skills for management. Contrary to the hierarchical model, women tend to encourage participation from all members of an organization and at all levels. Women tend to be

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much more interested in sharing power and information. They tend to strive to enhance others' self-worth. In particular, they emphasize getting others excited about their own work and contributions.

**“Every item on the expert’s lists of leadership qualities — openness, trust, ongoing education, compassion, understanding — describe the female leadership style”** (Aburdene and Naisbett 1992:89). I would hope as you think about these words your response is, “It sounds like Total Quality Management.” It does. That’s the point. Whole organizations have been restructured around trying to enhance the esteem of the employees. Since these are characteristics of how we define leaders and also noted characteristics of women, this says two things: 1) women tend to practice those things as a matter of their own set of skills based on their own experience, and 2) women’s knowledge was used in creating those characteristics.

Those are also the characteristics of civic republicanism, of open public deliberation, of civic forums, of civic virtue. So rather than separating today’s women who are in the workworld from those ragtag women who walked along with their babies in their arms and their pots clanking as they followed behind the armies—There Is No Separation! Both roles blend the tension between the public and the private.

Naisbett and Aburdene found in their research that women in leadership positions draw very much from their experiences as women, from women’s ways of doing things, and from women’s ways of knowing. Women in leadership viewed themselves as active agents in the creation of knowledge and the capacity to act.

One of the things Aburdene and Naisbett discuss in particular, and as Norm asked originally, is “how things would be different if women were in charge” — say, of the forests. Women don’t say, “Well, how is it different with *me* in charge?” Women don’t say that because women don’t particularly like the game of king-on-the-mountain. Women don’t particularly like the game of let’s-see-if-I-can-push-you-off-today. As educators, it is common to find whole classes of students getting infuriated when they are put in a competitive situation—it doesn’t feel right. They don’t want to compete against each other. There are very different learning styles, and to categorize some as “female” is all right as long as we remember that men as well as women can share these styles.

Nonetheless, it seems true that women generally work within networks and locate themselves within webs of relationships; networks and webs they constantly work at nurturing. They’re constantly doing emotional work on their webs in conjunction with their managerial or instrumental work. Thus, it is in the concept of webs and in the concept of the circle that we begin to see how women locate themselves. Aburdene and Naisbett observed: “Women leaders like being in the center of things, rather than at the top, which they perceived as a lonely and disconnected position. The great thing about the circle is it does not box you in. You can connect with any other point” (Aburdene and Naisbett 1992:94).

If we start to fit women’s experiences into the problem of forest management, what do we begin to find? Aburdene and Naisbett identify six characteristics of women’s leadership: empower, restructure, teaching, role

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model, openness, and questioner. Looking briefly at these characteristics, it is possible to not only address what difference it makes to have women in forest management, but how different the knowledge and practice of forest management is when women help make it.

In *Megatrends For Women*, the authors, in talking to people, noted the word that most characterized leadership was the word empowerment. In contrast, words characterizing management derived mostly from the command-control and let's-get-the-job-done approach.

### **Management**

Punishment  
Demand Respect  
Drill Sergeant  
Limits and Defines  
Imposes Discipline  
Here's What We Shall Do!  
Bottom Line

### **Empower**

### **Restructure**

Control  
Rank  
Hierarchy  
Rigid  
Automatic Annual Raises  
Performance Review  
Mechanistic  
Compartmental

### **Teaching**

Order-giving  
Military Archetype

### **Role Model**

Issues Orders

### **Openness**

Keeping People on Their Toes  
Reach Up/Down  
Information Control

### **Questioner**

Knows All the Answers

### **Leadership**

Reward  
Invites Speaking Out  
Motivator  
Empowers  
Values Creativity  
How Can I Serve You?  
Vision

Change  
Connection  
Network  
Flexible  
Pay For Performance  
Mutual Contract for Results  
Wholistic  
Systemic

Facilitating  
Teaching Archetype

Acts as a Role Model

Nourishing Environment for Growth  
Reach Out  
Information Availability

Asks the Right Questions

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The most useful aspect of these contrasting clusters of characteristics is the creative tension between them. Networks are new ways to relate holistic, systemic concerns. Leaders characterizing themselves as teachers. Teachers and guides as role models. One begins to see different archetypes, different ways in which people act and learn how to act. A sense of openness rather than secrecy; sharing rather than hoarding information as power. When experiences from many aspects of life are brought together, not only is knowledge more accessible, but there is greater likelihood of getting people involved in talking.

### CONCLUSIONS

The bottom line is that we must maintain a creative tension between universal and particular knowledge, between natural and managed forests, between experience in the home and in public, between industrial economies and local economies. It is through the maintenance of this creative tension between experiential and abstract knowing that we can find knowledge that will be useful to understanding forests — their voice as managed forests and their voice as natural forests. We need to be inclusionary and to be very careful when we see words and ideas claimed to have the imprimatur of neutrality, objectivity, and based upon universal categories. We need to ask, “Whose neutrality, objectivity, or universal category?”

One graphic way to illustrate the importance of not accepting a partial and abstracted measure of value — and especially of not assuming that it represents an objective, neutral, and universal quality, is to compare the value of the forest as based solely on

the commercial value of wood products to pornography. The reason pornography is reprehensible to feminist legal scholars like Catherine MacKinnon, (to name only the most well-known individual) is that the sexual availability of a woman is abstracted from the female person and the commercial value of it is viewed as an adequate measure of her worth. To treat the forest as if its value could be adequately measured by simply the exchange value of its large or specially useful trees is to commit the same fallacy.

Public life in the United States is usually understood as independent of the place where it occurs, and thus a universal and abstract experience. But all politicians know that “politics is local.” The challenge of bringing together the forms of knowledge offered by both the modern scientific perspective and the ancient ways of people and places is not a distant challenge in everyday life. It is the halls of academia where these forms of knowledge are in conflict. When we fully welcome women’s ways of knowing and women’s knowledge into the classroom and into our textbooks, then the creative potentials may be realized.

Such lessons are also true in the political realm, for a people’s character, as well as their knowledge, is formed by where they live and how they are shaped by that place. And so, as a final comment, let me share with you the preamble to the Constitution of the state of Montana: “We the people... thankful for the grace of God, for the grandeur of our mountains and spaciousness of our plains, we do so duly constitute ourselves into a citizenry.” Let us follow this same path in our shared interest in the care and nurturing of our forests and our citizens.

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WE HAVE TIME FOR A FEW BRIEF QUESTIONS AND I'LL TRY TO CATCH YOU IN THE ORDER AS YOU RAISE YOUR HAND:

Q: Are you thinking about trying to put some of these ideas into effect on the forestry resource issues in the state of Washington?

A: Well, that is a fair question. I don't have a good answer for it. But yes. I look at things like the promised summit; it's going to happen. And unfortunately I think it'll happen around the dynamics of marketplace politics. And that will go nowhere. I would like to see a democratic forum model where there is an effort at real learning, and to bring analysis into the discussion process, and to figure out how

forces are shaping the problems that seem so obvious and local, and broaden our understanding of those problems. That knowledge, I think, is available. It is just not used. We'll see.

Q: In looking at the chart where you compared the leadership and management qualities, at one point you said attributes such as sharing, trusting, and being compassionate were associated with more feminine-type people. I think of those as attributes of the low person on the totem pole, as many women in our society still are in terms of economic and other parameters. What do you think will happen if we ever get to a more egalitarian society? Will we still value trust and compassion and sharing, or do you think that will be replaced by something else?

A: It's a very astute question, and I don't have a good answer other than to say that's one of the major areas in which there is a lot of feminist work going on. The studies of CEOs are looking at women who are no longer so much in an oppressed state. Do they act differently? What qualities do they have?

The work I'm familiar with tends to show that women still maintain the whole set of family commitments. CEO or not, somebody's got to be home. Somebody's got to make sure the food's there. If you have infants, somebody has to be there. Most of those kinds of work around home issues and around family seem to stay on women's watch for the most part. There are many instances, of course, of sharing that kind of work. But in the aggregate we find that women do it all.

Q: It seems that we often get stuck in terms of how different values are in opposition; rather than seeing differences as complimentary and having dialogue, it still comes

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out as competition and opposition. How do we get beyond that in getting to conversation?

A: I think that the first part is to do what you just did. It's to say that. It's to find ways that are somehow compatible. There are times, of course, that choices are not compatible. And that's one of the very valuable aspects of the science of economics, for example, because it helps to show us when choices are incompatible. So do other kinds of science. But they can't make the decision for us. So we need to have a great deal of discussion. The other part of the question is, in what forum do we have those discussions? If we have it in a forum where we don't take your experience seriously as compared to my experience, then it is much harder to make decisions.

Q: We here in Oregon have heard language very similar to the talk you've given from our governor and her chief of staff. How would you comment on Barbara Roberts' "Conversation with Oregon?"

A: I think it was a really amazing process. The analyses that I have heard of why it didn't work, seemed to be the things we can learn from. It's not likely we are going to somehow transform the way political business is done overnight, get rid of entrenched vested interests. So what can we learn? It doesn't have to succeed every time for it to be a worthy activity.

There needs to be a real tension between the participatory side and the efficacy side. Sometimes you just have to act and make a decision. But once you've added the creative tension, maybe that leads us toward a better pedagogy of public policy than we would have otherwise.

Q: I had two things I wanted to talk about. One was you mentioned a little bit about your own history coming up through, your career, and at that time forestry and forest management, forest policy was a male-dominated world. How did you incorporate some of your own feminine feelings and beliefs and maintain your own identity while playing the game you felt you had to play? And the second point is three previous Starker Lectures that we have heard here, to me were very interesting because they showed me other people's biases, their thoughts and their beliefs. I wanted to thank the organizers for introducing them. Along with your talk, they have been very good in getting us to realize that other people have reasons for their beliefs and their knowledge. And we have to recognize that before we can begin any kind of dialogue.

A: How did I survive? Well, actually there is sort of a serious answer to that question. It was very, very hard. It is still very, very hard. This is still a male-dominated profession. But it has changed dramatically in the last few years. Actually the reason I was able to survive is that I could always call upon a history of mother, grandmothers, aunts, great-grandmothers, who had played a public role. My grandmother, who was a doctor, practiced in World War I, and she married my grandfather who was a missionary in Montana and she lived through hellacious times. My question to her as a college kid was, "Grandmother, why when you got married didn't you say Reverend and Doctor Shannon—I mean, at least that!" Her response to me was, "Granddaughter, that's the generation abyss." That was a perspective that was hard for her to have. My pediatrician in Buffalo had gone

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through Harvard Medical School in the Fifties. She couldn't understand why I kept "my name," because she is married to a surgeon and she didn't. And I just had to look at her and say, "You know, if you don't understand, I can't really explain it to you." For many women in this society, there isn't a model that they can look back to. I feel like I was in a privileged position in that all of my great-grandparents were college educated. How many people in this country can say that? Not very many. My grandmothers worked. My grandmother that was my mother's mother

supported her two children and demanded a man's wage for her work. Her father told her, "You'll never get a man's wage. They'll never give it to you." And in the Thirties, they did—to be a school teacher. She said, "I do a man's job, I need the same wage. I am an earner." There were times when I was denied jobs for no other reason than I was a female. And when I was at Berkeley no women had ever received PhDs out of the Berkeley School of Forestry. And they really didn't think you could do it. They had no vision of finishing. That becomes very disruptive to one's sense of identity.

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